

THE PENNSYLVANIA STATE UNIVERSITY
SCHREYER HONORS COLLEGE

The Sam and Irene Black School of Business

ANALYSIS OF CORPORATE EFFICIENCY AND SHAREHOLDER RETURN

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SPRING 2013

A thesis
submitted in partial fulfillment
of the requirements
for baccalaureate degrees in
Accounting and Finance
with honors in Finance

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Abstract:

Since 1996, *CFO Magazine* has published a list of 1,000 companies in its “Working Capital Scorecard.” In this paper, we examine the cumulative performance of companies’ stock for a six-year period. We analyze their performance against the S&P 500 index and on a risk-adjusted basis. We find a statistically significant difference in the returns of the whole sample portfolio as well as the top 25 percent of the working capital efficient companies, showing higher returns for a potential investor. We find no clear patterns which serve as a driver of the portfolio performance taking into account a possible announcement effect, firm size, book value, and stock price momentum.

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Acknowledgements:

Special thanks to Derrick Steiner, Manager at REL Research for timely providing me with the data needed to make this research project possible.

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I. Introduction

Companies are in business to generate cash flows and enhance owner wealth. The fundamental method for achieving this goal is driven by the operations of the business. The operations of the business are under the strict reign of the company's management team. Management is charged with using the assets of the business to generate revenue and cash inflows to the business. This income is used to continue the operations of the business, whether that is buying supplies, paying for advertisement, and paying employees. The income is also often used to improve the company in the form of re-investment in projects that will eventually increase income in the future. Finally, that income can be paid out to the owners of the company, the shareholders.

Shareholders seek opportunities to earn the highest return for their given risk tolerance. The number of strategies in which to invest grows daily. Some strategies may become profitable for investors, while others underperform and fall out of favor. One best answer does not exist in what serves as the best investment, given the risk tolerance.

For most companies, working capital is considered the current assets used in generating revenues for the business through its operations after all current liabilities have been settled (Mueller, 1953). In theory, better working capital management may increase revenues, due to earning a return on the excess assets after fulfilling short-term liabilities. The excess revenue can potentially benefit shareholders, if it increases the value of the company to those holding its stock or if the excess is paid to shareholders in the form of a dividend. The next section discusses the literature review followed by the hypotheses to be tested, sample and methodology, results, and conclusions.

II. Literary Review

A myriad of investing strategies exist. The strategies take various scenarios into account, such as differing risk tolerances and time horizons. They all have a common goal, to make a profit on investment given risk tolerance, yet none guarantee success. Investors and scholars alike seek to find a strategy that is the monetary equivalent of the Holy Grail.

Momentum investing is one such strategy. This strategy involves purchasing securities that have prices tied to a trend. Gains can be made by owning securities that are on an upward trend and by short selling securities that are on a downward trend. Jegadeesh and Titman (1989) conduct a study on a portfolio of stocks from the period 1965-1989. Their study reveals that a portfolio of stocks being bought, sold, and held under these trend conditions can produce returns. Unfortunately these returns were short-term in nature; most high returns were reversed in subsequent years. They conclude that the negative returns were followed by the movement of money by other investors into these securities. Jegadeesh and Titman are unable to conclude that a momentum-based strategy would yield abnormally high returns over a long time horizon.

The core of momentum investing is the trend of security prices. The question then becomes, what causes these trends in pricing within the market? One possible theory is the media outlets provide information that can influence the decisions of investors about picking one security over another. Fang and Peress (2009) suggest that a security's price is greatly influenced by news about the firm. To test this theory, they measured the stock returns that were rarely mentioned in conventional media outlets. They find that abnormally high returns can be earned if investing in securities that lacked media coverage. Conversely, this finding also suggests that following the media could lead to inferior returns. Chan (2003) actually finds under reaction by investors in stocks that had positive news, versus over reaction to stocks with bad public news. Chan finds that compared to stocks with no publicly identifiable news, pricing patterns were different, essentially meaning that an outside influence is what caused the

swings in price, since the holding period return was adjusted for risk exposure. This influence could possibly be from news reports. The extreme price movements that were unaccompanied by a public news event were also found to reverse in subsequent weeks.

Periodicals like *Fortune* and *Business Week* publish lists about companies that have great potential. One such survey conducted by *Fortune* was of the perception of superior management within a firm. McGuire, Schneeweis, and Branch (1990) test the performance of stocks based on the “Survey for Corporate Reputations,” published by *Fortune*. They conclude that the quality of the firm, whether high or low as determined by *Fortune*, was closely correlated to prior financial performance but not with future financial performance.

Starting in 2002, *Business Week* provides another example of exemplary firms with a list of growth companies deemed to be “hot.” Bauman, Conover, and Cox (2002) test these so-called hot companies stock. The stocks were found to outperform the market in a thirty-six month period before being named in *Business Week*. In the period following the publication’s release, the companies grossly underperformed the market. This effect was proposed to be the movement of money from investors into the securities deemed worthy by being published in the media. The influx of money eventually breaks the price momentum of investors trading the securities. Their findings suggests that an announcement in a periodical could have a negative impact on the stock’s price, regardless of whether the news is perceived as good or bad.

These two studies suggest a counter-productive media effect between publication and performance of securities that are published. This result may be due to the metrics used by both periodicals, which are subjective. For example, a company’s reputation is difficult to grade and measure with an objective scale. A completely objective measurement instrument does not exist to measure the perception of company reputation. That being said, some companies do have “good” and “bad” reputations. Finding a quantifiable correlation between reputation of a company and the performance of

its stock is a difficult, but not an impossible task. The earnings announcement of a company has an objective and tangible value since it deals specifically with the performance of the firm, specifically the bottom-line. May (1971) finds that the week before an announcement and the day of the announcement usually excite the market and increase the volatility and volume of the security being traded. Three possible outcomes exist regarding an earnings announcement from a public company: it will outperform, underperform, or match security analysts' expectations. Investors use the security's performance relative to the analysts' predictions to determine how a company is performing and as a result, what position to hold in the stock (buy, sell, or hold). Investment decisions based on earnings also must take risk tolerance of the investor into account. May (1971) finds support for a security announcement effect. His assumptions have been widely accepted among investors. He finds that investors' reaction to earnings announcements, positive or negative, of firms and that the price changes in the stock in the weeks prior to an announcement are correlated on a statistically-significant basis. May suggests that while this relationship exists, it is uncertain if it is casual since investors appear unable to discern the actual reliability of the announcements. Kross and Schroeder (1984) also look at the earnings reports of the publicly traded companies. Short positions taken on stocks from the period 1971-1976 would have generated abnormally high returns. Kross and Schroeder find that late reports typically revealed bad news. This news was also typically not anticipated by market participants. Conversely, long positions taken in stocks that reported earnings early would have also yielded an abnormally high return. The early reports were the opposite of the late reports, typically having good news about the company. Coincidentally the magnitude of the return was positively correlated with the length of time the report was early or late. Small capitalization stocks were affected by the late or early effect more severely than larger capitalization stocks. Another issue with earnings announcements is the forecasts are created by analysts. Investment analysts try to be as thorough as possible for their forecasts, but they can be wrong. If an analyst is wrong, investors who have made their investment choices based on a particular analyst's

forecast could generate losses, since the majority of the volatility is experienced during the week prior to the announcement, and the extra risk from the volatility could produce an abnormal return (May, 1971). This is typically when only forecasts are available. The accuracy of the analyst reports on the earnings must be taken into account. Bradshaw (2012) finds that a random walk of EPS forecasts was more accurate for smaller and younger companies, for earnings forecasts over longer time horizons, and when analysts predict large changes in EPS or negative EPS. Investors can use the earnings of a company through the lens of an announcement effect as the basis for an investment strategy, but earnings can be used in a different strategy which will be discussed later in this section.

In 1999 *CFO Magazine* published a list of the 1,000 companies largest companies in the United States across 35 industries based on their working capital management. In 2012, the number of companies has been refined as the 1,000 largest public companies spanning over 57 industries. *CFO Magazine*'s research ranks companies into "good" and "bad" categories based on their performance in several measures of operating performance, citing the three "best" and three "worst" in each industry. These metrics include Days Working Capital (DWC), Days Sales Outstanding (DSO), Days Inventory Outstanding (DIO), and Days Payable Outstanding (DPO). The companies are ranked within their industries to keep the comparisons as fair as possible. Filbeck and Krueger (2005) confirm the working capital management of a firm varies greatly from industry to industry and across time within an industry. Regardless of the industry, firms are able to reduce the cost of financing the business or increase the funds available for expansions by minimizing the amount of funds tied up in current assets. Ultimately, the objective of working capital management is to make sure that cash is available for the firm when needed to pay current liabilities, when they come due and invest excess funds to make a return.

What is the main difference between the *CFO Magazine* and the publications by *Businessweek* and *Fortune*? *CFO Magazine* conducts its survey based upon a component of fundamental analysis. Fundamental analysis refers to using the financial documents, filings, and reports of a company for

financial decision making purposes. Fundamental analysis is the core of the value investing strategy. This strategy was pioneered in by Benjamin Graham in the 1940s. Benjamin published his ideas in the book in two books: “Security Analysis,” in 1932 and “The Intelligent Investor” in 1949. Graham (1932, 1949) suggests investing in companies that were priced below the value of the fundamentals of the company found within its financial statements. Value investing requires careful analysis of a public firm’s financial statements. The balance sheet, income statement, statement of cash flows and the statement of shareholder equity are the main financial statements. Selected companies should have strong balance sheets with little to no debt, above-average profit margins, and ample cash flow. Under value investing, the most crucial metric for determining the worthiness of investment is the company earnings. Earnings per share and the price to earnings ratio are the key ratios that value investors use, essentially the information gained by the announcements as previously discussed.

Value investors persist in the market place on both and institutions and retail basis. One such investor has been anointed, the “Oracle of Omaha” or by his given name Warren Buffet. Warren Buffet is, at the time of this writing, the best known value investor save Benjamin Graham himself. Warren Buffet has used the principles of value investing developed by Graham to earn his fortune. Piotroski (2000) creates portfolios based on value investor strategies. He attempts to create evidence of an abnormally high return based on buying stocks that had a high book to price ratio. He concludes that by adopting this ratio in his stock selection criteria, an abnormally high return can be achieved. How can it be that Warren Buffet can use historical data and earn an abnormally high return? Elze (2012) tests the value investing strategy and concludes that value investing and the portfolio that are built under the principles of value investing can earn an abnormal return and in doing so are actually an anomaly to the efficient market hypothesis.

In a larger scope than just the accounting measures used in the value investing strategy, Florou (2010) develops a case study of Greek stock returns against accounting measures and confirms that

accounting measures are used when an investor values a stock. The study concludes that the operating performance of a company, its growth opportunities and capability to generate profits from sales all affected stock returns. Aside from growth opportunities, the other two aspects of the study are highly integrated with the value investing strategy.

The *CFO Magazine* survey alludes to earlier is unique in that it incorporates a media influence effect and elements of fundamental analysis. The media effect comes from the fact that companies are ranked good and bad and then published for investors to review. The fundamental analysis portion comes from how the companies are measured. The ratios are derived from how the company generates revenue. Working capital is considered the assets used within a firm to generate earnings. Since this is so, working capital management is directly linked to the EPS and P/E ratio of a firm.

Filbeck, Krueger, and Preece (2007) conduct an empirical test on the 2006 *CFO Magazine* working capital survey. They test not only the effects of a firm's ranking in the results of the survey to a holding period return of the company's stock, but also they test the rank of the capital management metrics and its effects on stock price during a holding period. The study finds that the announcement of a firm being included in the magazine survey has an influence on the stock's price and ultimately its return; however, it was not statistically significant or permanent. They also find that a company's rank in the survey for cash conversion efficiency was positively correlated to the return the firm experienced, but the working capital rank had no relationship to return.

The market is not immune to booms and busts of varying severity. During the time period that the Great Recession enveloped, the Dow Jones Industrial Average, that for the majority of investors is the barometer of the broad market, decreased dramatically during the crisis. In 2007, the Dow embarked on a journey from its high of 14,093.08 to 6,626.94 by March 2009. The market has only recently reached and surpassed its October 2007 high of 14066. On February 19th 2013, the Dow Jones closed at 14035. Investors who began investing money in early 2007 had to wait six years to recoup their initial

investments.

During financial crises, corporations still must generate cash inflows. The only difference is how they will manage their operations. A similar market boom and bust occurred in the late 1990s into the new millennium. Companies had to shift their management practices, especially those practices concerning working capital management, after the Tech Bubble in 2001. In a study from 1990 to 2004, Russell (2009) observes that cash flow management as having longer-term positive effects for companies that improved their working capital management. This finding actually runs counter to the widely held belief that working capital management is a short-term focused aspect of a business. No doubt that some firms did fail during this 15-year time period of the study. The difference between failure and success could lie within the working capital management of the firm, especially when the crash threatens the liquidity of U.S. Corporations. Working capital, after all, is encumbered funds that are not available to be reinvested into the business. The history of working capital management of companies tells its own story about The Great Recession.

The *CFO Magazine* Working Capital Survey of 2006 heralds companies for their second consecutive year of lowering their amounts of working capital. Qualcomm's CFO was quoted as saying that "you can always do better" (Meyers 2007 p. 1). This is referring to the firms continuing to squeeze working capital. Meyers (2007) notes that companies that were considered in the scorecard to be in a good working capital position within their industry primarily focused on credit collections. While many companies upped their collection efforts, top performers in the scorecard like steel company Nucor, focused more on the credit granting side of their receivables. Increased emphasis was placed on granting companies based on the idea that a company will never collect from someone in a poor situation, regardless of how good their personnel in their collection department are trained. Improvements on collection of receivables could help the 1,000 largest companies capture \$450 billion that REL Research has calculated to be tied up in past-due receivables and vendor invoices.

The title of *CFO Magazine's* 2007 Working Capital Scorecard was an omen, "Growing Problems." In this synopsis of the year 2006 performance of the 1,000 largest US companies, Meyers (2007) suggests that many CFO's and executives were overlooking the importance of inventory. The year 2006 was also the first year that the companies surveyed failed to improve their working capital management. Looking at the overall market during 2006 the market was going up, the Dow Jones was up 14 percent from December 30, 2005 to December 30, 2006. It's not surprising that working capital management slipped under these conditions. Executives were far more concerned with taking advantage of sales in the booming economy. Days Working Capital for the 1,000 largest companies increased from 38.7 days to 38.8. This is a small movement, but it is significant considering that companies have improved every year for the past five years and this was the first year of overall deterioration. The main culprit was considered inventory management since the Days Inventory Outstanding measure from 2005 to 2006 increased 2.1 percent, although this increase was offset somewhat by the improvements in Days Sales Outstanding of 1.2 percent. REL-Research, the group that actually conducts the survey for *CFO Magazine*, estimate that \$764 billion was tied up in working capital and thus not helping any of the businesses surveyed grow. This staggering amount was up over 69 percent from the \$450 billion estimated to be unnecessarily tied up in 2005.

CFO Magazine's 2008 Working Capital Scorecard was titled "No Time to Loose" and is quite fitting. The 2008 summary immediately starts off by saying that a recession may already be upon companies or at the very least loom overhead. It also indicates that customers are beginning to feel a squeeze and may be demanding more favorable credit terms. Many companies were willing to extend payment terms. Meyers (2008) suggests that willingness to extend those terms is a negative sign given the circumstances. A willingness to retain excess inventory is also seen as a negative sign since it too would pacify customers needing extra cash on hand. Between 2006 and 2007 over 61 percent of the 1,000 surveyed were able to improve their Days Working Capital by an average of 8 percent. This

improvement may be exaggerated from the slip in working capital management experienced in 2006. Despite the looming recession, Days Inventory Outstanding shrank on average by 1 day from 30.7 to 29.7. Also Days Payable Outstanding only slightly deteriorated, indicating that collection efforts are still strong despite most companies hoping for more favorable credit terms. The most dramatic deterioration was that of Days Sales Outstanding. This metric was improved from 2005 to 2006, but up nearly 3.27 percent in 2007. The economy was signaling a slowdown that managers and executives would have to maneuver through.

In 2008, specifically during the fourth quarter, the heart of the recession occurred. The credit markets that served US Companies just a year earlier were frozen and causing concern throughout companies who enjoyed operating with leverage to boost sales during the previous years' boom. As such, bolstering the weak amount of cash on hand that companies had become the main focus of many executives. Meyers (2009) notes that the balance sheet became the source of untapped cash that most companies desperately needed. It's no surprise that collection efforts across the board were ramped up and inventory stock levels were trimmed down. The results were impressive though. Ultimately the companies in the survey were able to free \$62.7 billion from working capital that they could use to weather the recession. The surveyed companies were praised in the article for their drastic improvement in Days Working Capital. The Days Working Capital measure of the surveyed companies decreased on average by 6.8 percent in 2008. This change was recorded as the best improvement for that metric in five years. Also despite the poor outlook, on average the 1,000 largest companies' full-year sales revenue increased 10.3percent of the 1,000 surveyed, 603 were found by REL Research to have improved Days Working Capital as well as over 75 percent of all the industries surveyed. As a final remark by REL President, Mark Tennant, "It's good news that so many companies, caught in the cash crisis and credit crunch, finally recognized that they can secure a substantial amount of cash from working capital" (Meyers, 2009 p1). Despite the huge gains, the gap between those companies

improving working capital management and those companies worsening in their working capital management practices, widened. According to REL, \$776 billion could be freed from working capital if the bottom 75 percent of companies surveyed could use the strategies implemented by the top 10 percent surveyed. In the end though as working capital management efficiency was at an all time high, but improvements still could be made.

After the fourth quarter of 2008, the market showed little signs of improving from the slump. The most notable blemish on the market and for companies came during the first quarter in 2009, marked by the Dow Jones reaching an all-time low. This period was the beginning of the “The Great Hangover” as companies tried to position themselves to take advantage of the recovery (Katz 2010 p1). As one could guess, 2009 marked the worst year for working capital management since *CFO Magazine* began to issue the survey. Katz (2010) finds that all four of the efficiency measures deteriorated significantly. The companies surveyed had lost all the improvements made over the past two years and were right back where they started in 2006. Days Working Capital increased by nearly three days, from 35.4 to 38.3, a deterioration of 8.2 percent. Days Sales Outstanding was worse in 2009 by 10.4 percent which coincidentally almost the same amount that Days Payable Outstanding increased favorably, 11.4 percent. A unique combination of companies that began to purchase new inventory in anticipation of a recovery and growth in sales, coupled with companies stuck with obsolete and unsellable inventory on their books, created an increase in Days Inventory Outstanding by 8.8 percent. Still, companies were taking advantage of better working capital management. Inventories that had been previously cut from the economic slowdown needed to be slowly restored. Also the bill collectors that most companies were able to negotiate better terms with for 2008, or just let run, needed to be paid. The key concern of the CFO author and the REL Research president were the rapid responses that company executives made. Working capital management deteriorated on average for the companies surveyed and the diagnosis for this decline, in the opinion of Mark Tennant, was due to a lack of long-term capital management

strategies. Looking forward, he was primarily concerned with the companies sticking to their 2008 and 2009 ways, without managing working capital properly for a recovery.

It would seem that Mark Tennant's concern would be realized in 2010. The 2011 *CFO Magazine* Working Capital Scorecard indicated that sales were reviving, but companies had little intention to hone their working capital management. Katz (2011) finds evidence of this inhibition with minor improvements of the four measures of working capital efficiency in 2010. Days Sales Outstanding improved by 0.1 percent, while Days Inventory Outstanding and Days Payable Outstanding both improved by 1.1 percent. These results translated into an decrease in Days Working Capital by 2 percent. These improvements are insignificant when looking at the deterioration from 2008 to 2009 that needs to be restored. A 2 percent improvement still leaves the surveyed companies with a 6.82 percent decline from their 2008 levels. Much of the reasons for the paltry gains could be that many executives were still shaken up from the lack of cash and credit available to them in prior years. The companies were hoarding cash, but not deploying it to truly grow the business. Also many companies that were feeling secure with their large cash position could have been more insecure than believed. In the article, Ernst and Young senior advisor for working capital, Steven Payne makes companies aware that their large cash positions contain earnings from other countries that would require a hefty 35 percent tax to bring to the United States. While this should have been a cause for concern for executives, most were focused on boosting sales. The economy may have had few signs of improvement, like increased spending, but wringing working capital that could potentially hurt sales during the recovery is not worth the trouble. *CFO Magazine's* research department also conducted its own study on working capital, expanding on more information gathered through its annual survey in the United States and Europe. The research department analyzed this information through the perspective of a Post-Recession America. They found that most CFO's felt that while an eventual recovery would occur, it would most likely be slow. Because of this cash management and cautious spending were crucial. This finding is also

reflected in the need for careful forecasting in order to effectively manage working capital. Despite the need for conservatism, respondents see re-investing their cash reserves in expanding and improving operations as a major priority. Interestingly enough, despite what is recorded in the Working Capital survey, most executive respondents felt that they have managed their company's working capital effectively and feel that they are in a good position, despite the recessionary environment. Respondents recognized that better working capital practices have to be integrated throughout the entire organization, including automated processes for the operation of their company. Even though they believed that they've done a good job at managing working capital, respondents agreed that improvements must be made, especially when it comes to managing an effective amount of inventory. Most small business executives surveyed expressed an interest in negotiating better credit terms from supplies and coincidentally more favorable credit terms for customers. While smaller businesses surveyed will want to go for easier methods of working capital management, they also had the most ability to take advantage of new systems for working capital management, since many most likely did not employ such systems or the cost of implementation would be lower.

The year 2010 was ambiguous for most executives, who were trying to position their companies to take advantage of a recovery by building up inventories, yet were concerned with the possibility of a backslide into turmoil like 2009 and held large amounts of cash. Having this uncertainty for more than a year after the recession, concerns Russ Banham (2012) as he writes a synopsis of the *CFO Magazine* 2012 Working Capital Scorecard. According to the results of the survey, 2011 represented another year of small gains in working capital improvement. The Days Working Capital measure decreased by 0.7 days, or 1.9 percent, to 37 days. Meanwhile, cash on hand for companies surveyed increased by \$60.3 billion dollars. This increase in cash was largely due to companies taking advantage of the low interest rate environment in which they operated, issuing new debt to retire old debt and refinance. While this does increase debt on their books the truly shocking statistic is that working capital among the 1,000

companies surveyed have \$910 billion dollars in working capital. This number was up over \$200 billion from its 2008 level. The largest portion of the excess working capital was inventories, making up \$425 billion of the \$910 billion. Also noted by Banham is the gap, earlier noted in the 2008 survey, between top performers and the worst performers. In the research conducted in 2011 for the 2012 scorecard, the top performers had 49 percent less working capital than the worst performers. The concern voiced by Mark Tennant in the 2010 Working Capital Survey synopsis, seemed to be realized yet again. Banham notes that the gains in working capital are not sustained. “Fewer than 8 percent of companies managed to reduce days working capital over the past three years, and no company surveyed improved all elements of DWC – inventory, receivables, and payables – over the period” (Banham, 2012, p. 1). As a final word from the 2012 Scorecard synopsis, Kevin Kaiser, professor of management practice at INSEAD said, “When global investors think about where to put their money, they look for where they’re going to get the best return for a given amount of risk,” (Banham, 2012, p. 1).

In summation of the *CFO Magazine* articles, a trend of improvement of the different working capital metrics was present in the time before “The Great Recession.” Then as the economy began to slow, working capital improvements stalled. When the recession occurred, progress in working capital management practices reversed. The best performers were companies who had made significant improvements in prior years, apparently setting them up on a solid foundation to weather the recession. The opposite is true for the worst performing companies, who were then not prepared for the recession, and ultimately in a much worse position when resources were needed. This divergence was represented throughout the rest of the years analyzed. When the economy began to recover the executives of companies were much more concerned with holding cash and generating revenue via sales of inventory. They shied away from their progress in 2005-2007 in improving working capital management. This last statement from the 2012 Working Capital Scorecard makes an interesting assumption. Kaiser is suggesting that the working capital efficiency is linked to return for a shareholder given their target risk

level. Does such a link between high working capital efficiency and high return exist? This research aims to provide some insight in the following pages.

III. Hypotheses:

This thesis attempts to answer the following question with this article: Do companies who are efficient at managing their working capital structure provide superior returns to shareholders compared to companies who poorly manage their working capital? In order to analyze this question, this paper will test two different samples of companies and their working capital performance data against predetermined benchmarks. The first test will be conducted using the returns of a portfolio of the “best” companies compared to a portfolio of the “worst” counterparts.

$H_0 \leq$ The returns of a portfolio of efficient net working capital companies will have a less than or equal return to a portfolio of “inefficient” working capital companies.

$H_a >$ The returns of a portfolio of efficient net working capital companies will have a greater return than to a portfolio of “inefficient” working capital companies.

Our first hypothesis is that shareholders will react positively to an announcement of a company being included in the top working capital efficiency in its respective industry in CFO Magazine’s annual publication. This positive reaction would show the possibility of shareholders appreciation for efficient management of current assets to grow the business. Conversely, if shareholders react negatively, this could mean that they do not appreciate the company’s management of current assets and would perhaps like to see it turned over to them in the form of a dividend. Also aggressively managing working capital can also increase costs, which may be viewed negatively by shareholders. A lack of a response from shareholders in the short term could indicate that working capital management is not a factor concerning investors’ decisions. Short term performance will be measured over an eleven trading day window. Five days prior to the announcement, the announcement day, and five days after. This is the same method used by May (1971).

Next, the relationship between working capital management and shareholder return is tested. A portfolio return of the “best” companies over period of 2007 through 2012 is tested against the

benchmark returns of the S&P 500 index. Another benchmark will be a portfolio of the whole sample of companies' stocks that were published in the survey, during the same time period.

H_0 = The portfolio of the "best" companies will not yield a higher return than the benchmarks over the same period of time.

$H_a \neq$ The portfolio of the "best" companies will yield a higher return than the benchmarks over the same period of time.

Our second hypothesis is that shareholders of the most efficient working capital companies will experience positive cumulative abnormal returns over the six year period of this test. Shareholders may have a long-term time horizon objective for their investments and as such may hold a stock for longer than our short term test will capture. Shareholders may experience capital appreciation over the long term, because companies that actively and efficiently managing working capital may continue to improve their business and generate more revenues. If an increase in earnings is observed, shareholders may view this as a positive sign for investment in the company. On the other side, capital appreciation may not be experienced over the holding period. Shareholders may have different return objectives that are unobtainable by the top working capital performers for their level of risk. The stocks of companies that are in the top performing category may not be able to generate the return an investor is seeking given the company's level of risk. The worst performing companies may very well outperform the top performers of the six year period. The worst performing companies' stocks may be affected by the neglected firm phenomenon, since they are receiving negative publication to the general public. The worst performers may also be considered risky, and therefore may have more volatile returns than the top performers. This increased risk could potentially increase the possible reward an investor would experience over the holding period.

Regression analysis results are analyzed using a t-test to determine if the results from either hypothesis test are statically significant.

IV. Sample Selection:

The sample of companies comes from *CFO Magazine's* Annual Working Capital Scorecard. The sample time period is 2007-2012 which includes the working capital scorecards published from 2007 through 2012. The working capital scorecard ranks 1,000 companies in over 35 industries. The entire sample over the six years consists of 6,001 stocks. The scorecard results for the three best performing firms in each industry are publicly available along with the three worst performing firms in each industry. For the period 2007-2010, all 1,000 companies included in the survey are listed by rank in a spreadsheet. The spread sheet is available for download on *CFO Magazine's* websites in a summary article for these three years. The years 2011 and 2012 had the top three and bottom three companies available, but the full list for these years was acquired through REL Research, who conducted the survey data for CFO Magazine. Every year will have a different portfolio as the rankings of the CFO working capital scorecard change. The portfolios will be rebalanced at the time of the new *CFO Magazine* Working Capital Scorecard Results are released. This means that the holding period of the portfolios will be from the publish date of the prior working capital scorecard to the next working capital scorecard. For example, the first holding period is July 1st 2007 to September 1st 2008. This is the time between the first event in the test, the 2007 *CFO Magazine* working capital scorecard and the second event, which is the 2008 *CFO Magazine* working capital scorecard.

The data sample supplied from *CFO Magazine* and REL Research contains exactly 1,000 companies each year. Unfortunately, not all 1,000 companies transition seamlessly into stock tickers which can be used to test their returns over the holding period. . The total number of companies fluctuates around 1,000 each year. Since the working capital survey is published a year after data collection, it was common to see firms that existed the year prior, not exist in the year the survey results were published. These companies could have possibly taken all public stock private, were acquired by

another company, or were declared bankrupt and dissolved.

It must be noted that the holding periods differing in length of time, since they are dependent upon the publishing of each working capital scorecard. It must also be noted that the sample size of the industries are unequal, an example would be Aerospace & Defense, which has eighteen companies represented while Air Freight & Logistics only has nine companies represented. Another characteristic of the sample is actually a lack of data. Some industries are not present in the sample; notably there is a lack of any financial companies or financial industry.

V. Methodology:

The companies are ranked based on four different measure of working capital efficiency. *CFO Magazine* has used the same metrics and definitions throughout their surveys. Days Sales Outstanding is calculated as the year-end trade receivable net of allowance for doubtful accounts, plus financial receivables, divided by one day of average revenue. A decrease in the Days Sales represents an improvement while an increase suggests deterioration. Days Inventory Outstanding is calculated as the year-end inventory plus LIFO reserve, divided by one day of average revenue. This measure uses a decrease as an improvement and an increase as deterioration. Days Payable Outstanding is calculated by year end payables divided by one day of average revenue. Unlike the prior two, an increase in the Days Payables Outstanding is an improvement and a decrease is deterioration, since payables are a liability that must be paid. Days Working Capital is calculated by taking year end net working capital, or the trade receivables plus inventory, minus accounts payable, and dividing that by one day of average revenue. Days Working Capital is used to measure how quickly a firm can take its working capital and generate revenue from it. This measure indicates that the lower the number of days, the more efficient the firm is in generating revenue from working capital. The data being used in the following tests will be taken directly from *CFO Magazine's* calculation of each to ensure consistency.

The portfolios for the efficient working capital and inefficient working capital will be created by taking the top 25 percent and bottom 25 percent of the entire sample. This translates to having 1,555 stocks in the high ranking of working capital efficiency in a portfolio and 1,667 stocks in the low ranking of working capital efficiency. The difference in the number of stocks between portfolios is due to the selection methodology. Each industry was divided in half between efficient and inefficient companies. If an industry had an odd number of companies surveyed, the middle company was included in the inefficient sample. This equates to 112 companies falling on that border and being included in the inefficient sample over the entire six year period. In addition, both of these portfolios will be measured

against a portfolio of the entire sample.

A process of buying and selling the stocks of the high ranking and low ranking companies will be used on the announcement data, which means that theoretically the companies' stocks that are in the high rank and low rank will be bought on the announcement day and held until the next announcement date. Simultaneously, the prior period's high rank and low rank portfolio will be sold. So 2007 will be strictly purchasing the stocks listed and screened in the first announcement and 2012 will be strictly selling the portfolio from the 2011 announcement. All other times in between will have a buying and selling component. Some firms do overlap from year to year, for example Northrop Grumman was a top tier company in the Aerospace industry each year of the survey and would have been held in the portfolio of top ranking stocks each year. While this annual rebalancing will be able to show the performance of the portfolios each year, the focus should be placed on the performance over the entire period of the experiment, six years.

The short term and long term performance of the portfolios will be calculated. Since the creation of the portfolio will be based around a news publication being released to the public, an announcement effect may be present. Much of the stocks premium over the holding period could come from this announcement of the company being published by *CFO Magazine*. The announcement effect will test the stocks' performance five trading days prior to the announcement and five trading days after the announcement (May, 1971). The cumulative abnormal returns will then be tested to see if they are statistically significant. The long term performance will be measured for the entire holding period. This means any capital appreciation that the stock experiences from the day that the stock is bought to the day that it is sold. The long term performance return will also be risk adjusted to better understand the drivers of the stock's performance. The riskier the assets held by the portfolio, the more volatile the return. So if the high rank portfolio is invested in riskier stocks, it may be able to generate better performance than the low rank, if the low rank was invested in less risky stocks. Inversely, if the

portfolio is invested in riskier stocks it could also perform worse.

Performance measures such as the Sharpe Ratio, Treynor Ratio, and Jensen's Alpha will be calculated for each portfolio over the holding period based on their returns. The purpose of using these measures is to analyze risk-return trade off of each portfolio. These measures determine if the portfolios were able to outperform the return of the S&P 500 index through the use of excessive risk.

The Sharpe (1966, 1994) Ratio measures return per unit of total risk. It is the expected return of the portfolio minus the risk free rate over the portfolio's standard deviation.

$$S = \frac{d}{s_d} \quad (1)$$

where:

- d = mean daily difference between the portfolio and the T-bill return, calculated over respective holding periods
- s_d = the sample standard deviation of the daily return differences

The Sharpe Ratio can be positive or negative. A positive Sharpe ratio indicates that excessive risk was not undertaken for the given return, while a negative Sharpe ratio indicates the opposite. The larger the Sharpe ratio, the larger the portfolio return is compared to the risk taken on in the portfolio. In our test, we would like to see a large, positive Sharpe Ratio.

The Treynor (1965) Ratio measures the risk adjusted return based on systematic or un-diversifiable risk. The Treynor Ratio is similar to the Sharpe Ratio, except that it uses the portfolio beta as the measure of risk.

$$T = \frac{d}{\beta} \sqrt{n} \quad (2)$$

where:

- d = mean daily difference between the return on the portfolio of visionary or comparison group stocks and the T-bill return, calculated over respective holding periods
- β = portfolio beta

n = number of days in the respective holding periods

The Treynor Ratio can be positive or negative. A positive Treynor Ratio indicates that the portfolio excess return was greater than means excess returns were earned.

Jensen's (1968) Measure measures the alpha of a portfolio, return of the portfolio against the expected return based on the Capital Asset Pricing Model. Jensen's Alpha, α , is calculated as the intercept term of the regression of the excess returns on the portfolio of the Best Leader firms (and the matched samples) against the excess returns of the market:

$$R_{pt} - R_{ft} = \alpha + \beta(R_{mt} - R_{ft}) + e_{pt}, \quad (3)$$

where:

- β = the beta of the portfolio
- R_{ft} = the return on one-month T-bills
- R_{mt} = the return on a value-weighted market index

Like the other two measures, we want the value of Jensen's Measure to be positive and as large as possible.

Also Fama and French's three factor and four factor models will be used to determine if additional market factors influence the performance of each portfolio. Fama and French's three factor model expands the Capital Asset Pricing Model by including the firm's size and also the book value of the company into the expected return. The 3-factor model is applied by regressing the daily excess returns for Best Leader portfolio on a market factor, a size factor, and a book-to-market factor. The 4-factor model is constructed by integrating the Fama-French (1993) 3-factor model with an additional factor capturing the one-year momentum anomaly documented by Jegadeesh and Titman (1993). Specifically, the 3- and 4-factor models are defined respectively as:

$$R_{it} - R_{ft} = a + b(R_{mt} - R_{ft}) + s SMB_t + hHML_t + e_i; \quad (4)$$

$$R_{it} - R_{ft} = a + b(R_{mt} - R_{ft}) + s SMB_t + hHML_t + m UMD_t + e_i; \quad (5)$$

where:

- R_{it} = the simple return on the stock i of Best Leader sample
- R_{ft} = the return on one-month T-bills
- R_{mt} = the return on a value-weighted market index
- SMB_t = the return on a value-weighted portfolio of small stocks less the return on a value-weighted portfolio of big stocks
- HML_t = the return on a value-weighted portfolio of high book-to-market stocks less the return on a value-weighted portfolio of low book-to-market stocks
- UMD_t = the return on the two prior high return portfolios less the returns on the two prior low return portfolios

As a final note, the year 2012 is not complete until the announcement of the 2012 working capital research being released in the summer of 2013. The year end of 2012 was chosen to represent the final sale of the portfolio and will be the basis for determining the long term performance of the portfolio.

VI. Results:

Short-term event study results are presented in Table 1. As stated in the methodology section, short-term and long-term performance was measured. Cumulative abnormal returns were calculated over an eleven-day period around the announcement of each article. Also several event windows around the announcement date were also used to further screen for abnormal returns. The day prior and event day holding period had negative returns; however, the returns were not statistically significant for any portfolio with the exception on the high-rank portfolio. The -0.02 returns it experienced was significant to the ten percent level. The whole sample and high rank sample experience statistically significant negative returns in the two days prior and two days after holding period, at the five percent level. The whole sample portfolio and the top ranking portfolio primarily experienced negative cumulative abnormal returns around the announcement of each CFO magazine publication. The low ranking portfolio experienced a cumulative abnormal return of 0.17 percent over the entire eleven days, five before and five after the announcement. As such, the major component of the each portfolio's performance cannot be attributed to any short term gains from an announcement effect. This could be due to *CFO Magazine* not being as well-known as other publications like *Fortune*, who in the past have found announcement effects, mentioned earlier in the literary review.

Table 1

	Whole Sample		Top Rank 25% sample		Low rank 25% sample	
Panel A. Cumulative abnormal returns (%) around event date						
Interval	CAR	Z-stat	CAR	Z-stat	CAR	Z-stat
(-5, -2)	-0.10	-1.76*	-0.28	-2.43**	0.09	0.69
(-1, 0)	-0.05	-1.17	-0.02	-1.74*	-0.11	-1.34
(1, 5)	0.04	0.49	0.04	0.27	0.19	1.24
(-1, +1)	-0.05	-0.95	-0.20	-1.81*	-0.10	-0.89
(-2, +2)	-0.19	-2.55**	-0.31	-2.22**	-0.08	-0.57
(-5, 5)	-0.12	-1.06	-0.04	-1.74*	0.17	0.76

* Represents statistical significance at the 10% level

** Represents statistical significance at the 5% level

*** Represents statistical significance at the 1% level

In the long-term holding period over the entire six years, the results of investing in a portfolio containing the top 25 percent of efficient working capital companies published by CFO Magazine would produce a 10.997 percent annual return from 2007 to the end of 2012. Investing in a portfolio of the worst 25 percent of working capital efficiency companies would produce a 10.228 percent return over the same time period. Investing in the entire list of companies published by *CFO Magazine* still produces a 10.222 percent return. Investing in the S&P 500 during the same time period only produced a 1.882 percent return. Panel A of Table 2 summarizes these results.

Table 2

	Whole Sample	Top Rank 25% Sample	Low Rank 25% Sample
<u>Panel A. Cumulative raw return (%)</u>			
Sample (1)	10.222	10.997	10.228
S&P 500 Index (2)	1.882	1.882	1.882
CAR: (1) - (2)	8.340*	9.114**	8.346
<u>Panel B. Risk-adjusted performance measures</u>			
Sharpe measure			
Sample	0.0209	0.0227	0.0201
S&P 500 Index	0.0036	0.0036	0.0036
Treydor measure			
Sample	0.0357	0.0388	0.0345
S&P 500 Index	0.0058	0.0058	0.0058
Jensen's Measure			
Sample	0.0336	0.0369	0.0330

* Represents statistical significance at the 10% level

** Represents statistical significance at the 5% level

*** Represents statistical significance at the 1% level

Panel B of Table 2 expands on the risk adjusted measures of each portfolio's return. The measures used include the Sharpe Ratio, Treynor Ratio, and Jensen's Alpha. The high-ranking portfolio

had positive risk-adjusted measures. The low-ranking portfolio and the whole sample portfolio also had positive risk adjusted performance measures. The positive Sharpe Ratio and Treynor Ratios show that all three portfolios outperformed the risk free rate. Jensen's measure for all three portfolios was also positive, indicating that all of the portfolios earned a return that was higher than what the Capital Asset Pricing Model would have expected. When comparing these results to the S&P 500, the three portfolios have larger measures, indicating that the working capital portfolios outperformed the market over the six year holding period. When comparing the high-rank portfolio to the low-rank portfolio on a risk adjusted basis, the high-rank portfolio had larger measures. Also the high-rank portfolio had larger measures than the entire sample portfolio. It is important to note that none of these results were found to be statistically significant.

Table 3 displays the results from the Fama and French three-factor and four-factor model. The Fama and French's three-factor and four-factor models were used to further derive what factors lead to the working capital efficiency portfolio's performance. The intercept of the three factor model for each portfolio is significant to at least the 1 percent level except for the low ranking portfolio, which has significance at the 5 percent level. Incorporating momentum, as in the four-factor model produces a statistically significant intercept for the whole sample portfolio and the high rank portfolio. The low-rank portfolio; however, does not have a statistically-significant intercept using the four-factor model. These results suggest that the additional market factors do not have a bearing on the performance of the portfolio, with the only exception being the low-rank portfolio.

Table 3

		Whole Sample	Top Rank 25% Sample	Low Rank 25% Sample
<hr/> Panel A. $R_{it} - R_{ft} = a_i + b(R_{mt} - R_{ft}) + s SMB_t + hHML_t + e_{it}$ <hr/>				
Intercept	Coefficient	0.0205	0.0239	0.0175
	t-stat	6.21***	4.83***	2.16**
	z-stat	13.64***	7.12***	6.74**
<hr/> Panel B. $R_{it} - R_{ft} = a_i + b(R_{mt} - R_{ft}) + s SMB_t + hHML_t + mUMD_t + e_{it}$ <hr/>				
Intercept	Coefficient	0.0079	0.0117	0.0020
	t-statistics	2.32**	2.22**	0.28
	z-stat	11.54**	6.06**	5.48

* Represents statistical significance at the 10% level

** Represents statistical significance at the 5% level

*** Represents statistical significance at the 1% level

The test resulted in a rejection of the null hypothesis of an efficient working capital portfolio outperforming an inefficient working capital portfolio of stocks. The performance of the high-rank efficient portfolio outpaced the performance of the low rank inefficient companies by 0.77 percent. The top-rank portfolio sample had a return that was significant to the five percent level, while the low rank portfolio's return was not significant at the ten percent level. The second hypothesis regarding a portfolio of efficient working capital companies outperforming the S&P 500 index and also the portfolio of the whole sample yielded different results. The null hypothesis is rejected and the alternative hypothesis can be accepted. The return of the high rank portfolio does outperform the S&P 500 by 9.114 percent over the holding period at the five percent level.

VII. Conclusion:

In this paper we have looked at the effects of efficient working capital management within a firm as it is related to the return the firm's shareholders can expect. We found that companies that were analyzed by CFO Magazine to be efficient at managing working capital within their industries will produce a higher return for shareholders than the S&P 500. We have also found that investing in a portfolio containing all of the companies listed in CFO Magazine's annual working capital will also yield a higher return than the S&P 500. These returns were not the cause of excessive risk as shown by the risk adjusted return measures. An announcement effect is also not the cause of the portfolios' above market return over the holding period. The Fama and French model including firm size and book value did not indicate that these were neither the cause of the cumulative abnormal returns nor the addition of momentum. More research is necessary to fully understand what drives the portfolio returns of these portfolios assembled based on working capital efficiency. Future research could also test if working capital efficiency has been deemed more valuable to stockholders after the 2007-2008 financial crisis.

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IX. Academic Vita

Ryan E. Knoll

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EDUCATION:

Penn State Erie, the Behrend College

Graduation: May 2013

- Pursuing a Bachelors of Science in Accounting & Finance

- Schreyer's Honors College Scholar
- Dean's list 7 of 8 semesters

EXPERIENCE:

Northwestern Mutual Financial Network

Summer 2012

Financial Services Representative Intern: Forbes Magazine Top 10 Internship

Analyzed individual's specific financial situation, created a comprehensive financial plan for that individual, and made recommendations that could help the individual reach personal and professional goals. Created a network of over 200 professional contacts. Perfected skills in professionalism, communication, and discretion.

The Ophelia Project

Fall 2012

Co-Director of the National Safe Social Culture Conference:

Oversaw all financial aspects of creating a national conference to be held in Erie, PA. This included forecasting costs and revenues within a defined budget for an estimated 1000 person attendance and 200 vendors. The goal of the conference was to spread awareness and promote prevention of relational aggression.

SIGNIFICANT PROJECTS/ ACCOMPLISHMENTS:

- Completed a manufacturing business model for **DeadEye Plastics**. Created five year proforma financial statements as well as used Free Cash Flow Method, Sensitivity Analysis, Net Present Value, and Internal Rate of Return method to effectively value the business for a private equity or public offering.
- Formed and manages a team of students that enhance course material under the supervisor of a Senior Vice President for **Bank of America Meryl Lynch**. Material is focused on financial statement analysis and risk management concepts.
- Used ratio analysis to compare **Herman Miller, Inc.** and competitor Knoll, Inc. then forecasted pro forma data for both firms using Excel to calculate the necessary ratios in a five year time frame.
- Completed **Boy Scouts of America Eagle Project**, organizing 20 people to finance, assemble, and ship 40 care packages to Army Reserve Troops stationed in Afghanistan; received rank of Eagle Scout after completion.

COMMUNICATION SKILLS:

Constructed and executed two presentations for accounting classes at Penn State Erie, the Behrend College. Presentations complemented a 20 page report on changes to GAAP by the FASB and supplemented critical financial information not traditionally taught in the Accounting Curriculum, e.g. foreign exchange transactions.

EXTRACURRICULAR ACTIVITIES:

Vice President - Accounting Club

Fall 2012 - Present

President - Financial Management Club

Spring 2012 - Present

Member - Beta Gamma Sigma Business Honors Society

Spring 2012 - Present

Member - Phi Kappa Phi Business Honors Society

Spring 2012 - Present

Vice President - Lambda Sigma Honors Society

Spring 2010 - Spring 2011

AWARDS:

- Honors Certificate Spring 2011
- Lawrence R. Held Scholarship Recipient
- PNC Achievement Scholarship Recipient
- 1st place Personal Finance for FBLA Region 15
- President's Education Award Recipient