A COMPARISON OF PORTFOLIO PERFORMANCES OF THE RANDOM AND STRATEGIC STOCK SELECTION STRATEGIES: THE HAMPTON ROADS STOCK PICKING CONTEST

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ABSTRACT

In this paper the performance of the random and the strategic stock selection approaches are compared and tested to determine which results in the greater level of returns to a portfolio of stocks of Virginia based companies. The analysis is conducted via a stock picking contest developed by a local daily newspaper in the Hampton Roads area and hosted by a local university business school. The contest included 1,225 entries, in which contestants chose five stocks from Virginia-based companies. The portfolio return performance of contestants was observed over a 12 week period and the contestant receiving the greatest hypothetical returns over the contest period received a $1,000 US savings bond. The stocks selected by contestants were classified into two aggregated portfolios, indicating whether a random, or a technical/strategic method, was used to pick stock portfolios. A comparison of the two aggregated portfolios indicated that the technical/ strategic selection group out-performed the random walk selection group. In 10 of 12 weeks of the contest the researchers observed a statistically significant difference in the returns of these portfolios. It was also observed that the strategic group out-performed the selected population of Virginia based companies. None of the aggregated average returns from the random or the strategic selection group portfolios out-performed the Standard & Poors 500 Average during the contest.

INTRODUCTION

There are well established theories of how stock prices and stock price changes are determined. Investors who believe markets are perfectly efficient and that investors are rational profit maximizers, would have no need to perform analysis. Most fundamental analysts assume that financial markets are efficient or mostly efficient. They believe that all stocks are correctly priced and opportunities to earn abnormal or excess profits do not exist. For the fundamentalists, stock prices reflect the fundamental economic health of the firm. As such, fundamentalists are likely to analyze the firm's profit, growth, and cash flow prospects in order to determine a fair price for a company's stock. Any information that impacts these fundamental economic elements are likely to impact the firm's stock price as well. Since such changes occur randomly and information about such developments arrives in the market randomly, stock prices are likely to change in a random manner. Hence, price changes follow a random walk according to Fama, (1965).

However, it is also argued that knowing the magnitude or direction of the change in price at period t, will provide information to allow prediction of the magnitude or direction of the change in period t + 1. Technical or trend analysts look beyond the firm's economic indicators for elements that influence stock prices and changes in stock prices. As a group they tend to accept the idea that markets are efficient. However, they believe stock price changes follow certain patterns and that such patterns can be discovered and exploited. They devote much effort to developing charts of market activity usually centered around price and volume behavior. Background information on these theories can be found in the works of Malkiel (1989) and Hilsenrath (2004). It is generally assumed that all investors are rational

and are using the same set of available information to assess prices and maximize profits as detailed by Fama (1965). The discussion of the investment environment in which irrational price behaviors is exhibited is described by Thaler & Debondt, (1998).

Both fundamental and technical analysts may see market efficiency as a matter of degree. Either may believe that financial markets are efficient to a degree but not perfectly so. If markets are not perfectly efficient there is an opportunity to discover information that has not been incorporated into security prices. Arguments exist that if an investor acts quickly enough he or she can exploit such inefficiency to earn a so called abnormal return, Thaler & Debont, (1998). These profits are greater than the level justified by the security's risk structure.

Hence, investors who do not believe that markets are perfectly efficient or that they may exhibit irrational behaviors, will be active traders – buying and selling shares to try and stay ahead of the price changes effected by the market's incorporation of new information or exploitable investment behaviors. These active investors believe it is a matter of finding, digesting, and acting upon such information (either new, old, public or private) before the aggregate market can change the share price of a particular stock. Malkiel (1989) argues that if a trading strategy exists, it would allow strategists to exploit the market, but, the cost of transaction fees will reduce the prospect of earning excessive returns.

RESEARCH MOTIVATION AND HYPOTHESIS DEVELOPMENT

In this research, we examine whether the use of a competing stock portfolio selection strategy can result in superior performance as observed by actual average returns in the short-term, for a regional group of Virginia based stocks. In particular, the primary question is whether those subscribing to a random strategy to select a stock portfolio will observe returns different from those using a technical or fundamental strategy. By observing the actual performance of stocks selected using one of these competing strategies the question of the most effective strategy, if one exists, in the short-term, may be answered.

The main question is whether the average returns based on the random stock selection process will be less or greater than the average return on the non-random strategy-based stock portfolio selection method. It is posited based on the existing literature, that in the short term investor's with some specific selection strategy using accounting, financial or industry based data, can not earn higher returns than investors with a completely random selection of stocks.

DATA COLLECTION AND RESEARCH DESIGN

The main source of the data for the study analysis was derived from a local Virginia newspaper's Stock Picking Contest held between January and March of 2005. The newspaper's rules restricted share selection to companies which were headquartered in Virginia or companies possessing a significant presence in Virginia. For example; the Anheuser Busch Company is headquartered in St Louis, but was included, because of the significant plant and employment base in Williamsburg. A complete list of the selection population companies is provided in Table 1. During the contest weekly performance updates were provided by the business faculty of a local university.

Table 1: List of Companies for Selection

Company Name	**Company Name**	**Company Name**	**Company Name**
Advance Auto Parts Inc	Dollar Tree Stores	LCC International Inc.	Shenandoah Telecom Co
AES Corp., The	Dominion Resources	Lowe's Cos. Inc	Shore Financial Corp.
Albemarle Corp.	Dover Corp	Lucent	SLM Corp
Albemarle First Bank	DuPont	ManTech Intl Corp	Smithfield Foods Inc.
Alcoa Inc.	Dynex Capital Inc	Markel Corp.	Southern Fin Bancorp Inc
Alliance Bancshares Corp	Eastern Virginia Bancshares	Massey Energy Co	Spacehab Inc.
Allied Defense Group	ePlus Inc.	Maximus Inc.	SRA International Inc.
Altria Group Inc. (Philip Morris)	Exxon Mobil Corp.	May Dept. Stores	St. George Metals Inc.
American National Bankshares	Fairchild Corp., The	MCG Capital Corp.	Stanley Furniture Co. Inc
American Woodmark Corp.	Fannie Mae	McKesson Corp	Star Scientific Inc.
Amerigroup Corporation	Fauquier Bankshares Inc.	Meadwestvaco Corp	Steelcloud Co
AMF Bowling Worldwide Inc	First Community Bancshares Inc	Media General Inc.	Sunrise Assisted Living Inc.
Anheuser-Busch Companies	First Energy	Microstrategy Inc.	Suntron Corp.
Anteon International Corp.	First National Corp. (VA)	Middleburg Financial Co..	SunTrust Banks
Anthem Inc. (WellPoint)	FNB Corp	Millinieum Bank Corp.	Supervalu Inc
Atlantic Coast Airlines Holdings	Ford	Mills Corp., Inc	Symantec
AvalonBay Communities Inc.	Freddie Mac	National Bankshares Co.	Talk America Holdings
Bank of McKenney (VA)	Friedman, Billings, Ramsey, Gr	NewMarket Corp.	Target Corp.
Bassett Furniture Industries Inc.	Fulton Financial Corp	Nextel Comm Inc	Townebank
BB&T Corp	Gannett Co. Inc.	NII Holdings Inc	Tredegar
BearingPoint Inc.	General Dynamics Corp.	NiSource Inc	Trex Co. Inc
BOE Financial Services of Va.	General Electric	Noland Co.	Tribune
Bowl America Inc.	Genworth Financial Inc	Norfolk Southern	Tyson Foods Inc
Brinks Co.	Gladstone Capital Corp	Northrop Grumman	Union Bankshares Corp
C&F Financial	Greater Atlantic Financial Corp	NVR Inc	Union Pacific
CACI International Inc.	GTSI Corp	Old Point Financial	United Defense Ind Inc,
Cadmus Communications	Halifax Corp.	Online Resources Corp.	United Dom Realty Trust
Capital Automotive REIT	Harbourton Financial Corp.	Optical Cable Corp	United Financial Bank Cos.
Capital One Financial Corp.	HCA Inc	Orbital Sciences Corp.	United Parcel Service
Cardinal Bankshares Corp	Heilig-Meyers Co.	Overnite Corp	Universal Corp./VA
Cardinal Financial Corp.	Henry County Plywood Corp.	Ownes & Minor Inc	US Airwiays Group Inc.
Carmax	Heritage Bankshares Inc.	PEC Solutions	Valley Financial Corp.
Cel-Sci Corp.	HILB Robal & Hamilton	Penney, J.C	Vastera Inc
Central Virginia Bankshares Inc	Home Depot	Performance Food Gr Co.	Vcampus Corp
Chesapeake Corp	Honeywell International Inc.	PHP HealthCare Corp.	Vendingdata Corp.
Chesapeake Financial Shares Inc	Hooker Furniture	Pioneer Bankshares Inc.	Verizon Communications
Cheveron Texaco Corp.	Infineon Technologies	Precision Auto Care Inc	Versar Inc
Church & Dwight Co. Inc	Insmed Inc.	Premier Community Bank	Via Net.Works Inc
Circuit City Stores	InteliData Technologies Corp.	Primus Telecomm	Virginia Commerce Bank
Commonwealth Bankshares	Interstate General Co. LP	ReynoldsAmerican Inc	Virginia Financial Gr Inc.
Commonwealth Biotechnologies	Interstate Hotels & Resorts	RGC Resources Inc	VSE Corp.
Community Bank of N. Virginia	Isomet Corp.	Roanoke Elec Stell Corp.	Wachovia
Community Financial Corp (VA)	James Monroe Bancorp Inc.	Rowe Companies, The	Walgreen Co
Convera Corp.	Kaiser Group Holdings Inc.	S&K Famous Brands	Wal-Mart Stores
Cornerstone Realty Income	Kraft Foods Inc.	Savvis Comm Corp.	webMethods Inc.
CSX	Lafarge North America Inc.	Saxon Capital	Williams Industries, Inc.
Cuisine Solutions Inc.	LandAmerica Fin Group Inc.	Sears & Roebuck Co	Wyeth
Dimon Inc.		Seven-Eleven Inc	

The weekly performance was defined as the average percentage gain (or loss) at the end of a given week compared with the price of the stock portfolios at the beginning of the contest. The contest was advertised in the newspaper on a number of occasions during the month of December, 2004. The advertisement included a mail-in entry form. Contestants were asked to select five companies from the sample list. Each contestant was allowed to enter only once. As a "tie break" strategy, each contestant was also required to estimate the future value of the Dow Jones industrial Average (DJIA) at March 30, 2005. The deadline for selection was Dec 23, 2004. The stock contest had a first place prize award of a $1,000 US saving bond.

The entry form required contestants to briefly describe the procedure used to select their stock portfolio. This information was used as the basis of the research design. Contestants were classified into one of two sample groups by two researchers and a graduate research assistant independently and compared for agreement.

There were 1,391 valid entries in the contest with 1,225 including selection specific information on their mail-in forms. The 346 contestants who indicated that they selected their five companies randomly, with a toss of coin or some other random method were considered in the "random" group. The 879 contestants who indicated a selection strategy based on accounting ratios or a specific industry leadership (fundamental analysis) or based on stock price trends or other economic reason were grouped into a fundamental/technical analysis or "strategy" group. The 166 contestants that did not provide information regarding their stock selection approach are excluded from the study.

The performance of each contestant was tracked each week for 12 weeks starting Jan 3, 2005, and ending March 30, 2005. The weekly results were computed by a local university and published in the newspapers and on the firm's website. Contestant performance rankings were summarized weekly in the newspaper's MONEY AND WORK section. Stock portfolio performance was calculated as the average weekly gain or loss for each stock closing price (or the start price) as of Jan 3, 2005, compared to the closing price at the end of trading, each Wednesday, until the end of the contest on March 30, 2005. To derive the aggregated performance returns of the portfolio, stocks were equally–weighted. The Jan 3, 2005 price was adjusted for any stock splits which occurred during the contest. The contest winner was chosen based on the highest average portfolio return observed between Jan 3, 2005 and March 30, 2005.

FORMULAE

The percentage gain or (loss) for a stock in a given week compared with the initiation date (Jan 3, 2005 closing price) is calculated as;

Percentage Stock Return = $$S_{ij} = \frac{(P_{ij} - P_{i0})}{P_{i0}} \times 100 \qquad (1)$$

Where,

P_{ij} is the closing price of the stock "i" at the end of the j^{th} week,
P_{i0} is the closing price of the stock "i" at the beginning of the contest,
S_{ij} is the percentage return from the beginning on the stock "i" at the end of the j^{th} week.

And the average percentage gain (loss) for each week compared with the initiation date (Jan 3, 2005) is calculated as;

Average Portfolio Return = $$R_{jk} = \sum_{i}^{all\_stocks} \left(\frac{a_{ik} * S_{ij}}{5}\right) \quad (2)$$

Where,

a_{ik} is 1 if k^{th} portfolio contains i^{th} stock (each portfolio has five stocks), 0 otherwise,

R_{jk} is the average percentage return of the k^{th} portfolio in the j^{th} week.

To compare group portfolios we calculated the average performance of each stock portfolio of contestants in the random group and in the strategy group, and then aggregated each portfolio by calculating the group average. The aggregated average portfolio performance of both the random group and the strategic group was calculated for each of the sixteen weeks and a comparison made between the two groups as follows:

Average Group Return = $$G_{jm} = \frac{\sum_{k}^{all\_portfolio} (b_{km} * R_{jk})}{\sum_{k}^{all\_portfolio} (b_{km})} \quad (3)$$

Where,

b_{km} is 1 if k^{th} portfolio belongs to the m^{th} groups (groups are random or strategic) , 0 otherwise,

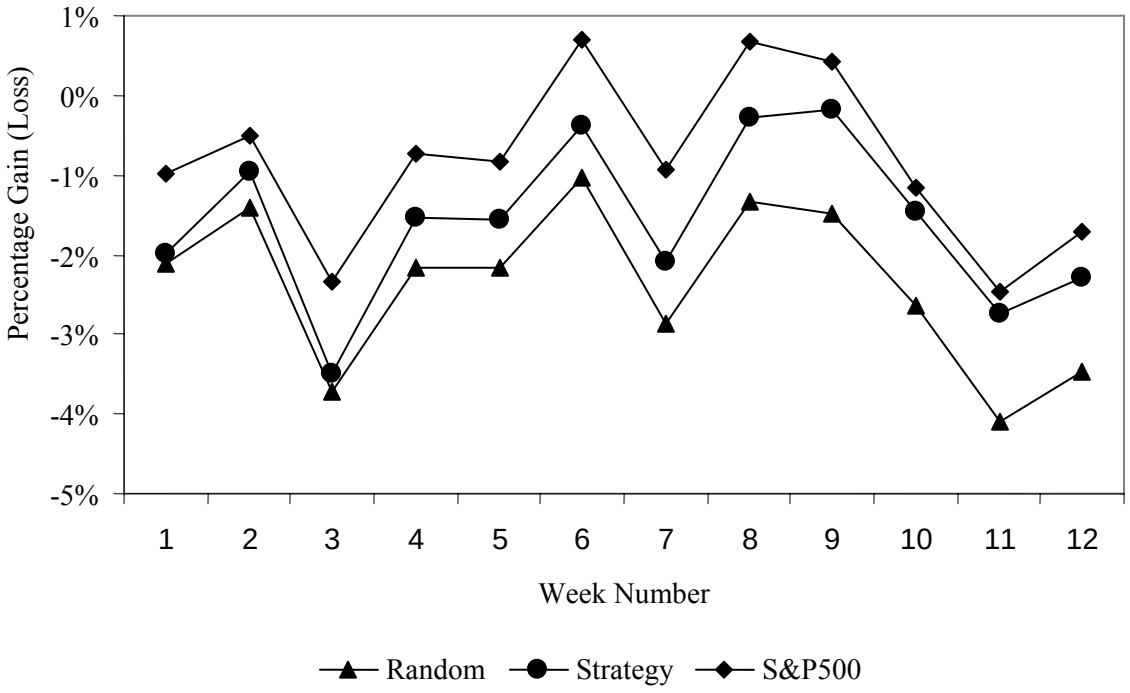
G_{jm} is the average percentage return of the m^{th} group in the j^{th} week.

RESULTS

A summary of the average weekly performance of the random and the strategic groups is presented in Table 2. It is clear that the average performance of the strategic group is higher than the random group during this period. A graphical presentation of these results is presented in Figure 1 below. It is also evident from the data and the graph, that the S&P 500 index performed better than both the strategic and the random groups. The performance of the S&P 500 and the two groups followed similar patterns in the observed gains and losses during the period.. Two separate hypotheses were tested to determine if the S&P 500 performed better than either of the groups. Both hypotheses could not be rejected at an alpha level of 5 percent- a *p-value* of 0.042 and 0.05 for strategic and random groups, respectively. Although not shown, during a majority of the weeks, the strategic group also out-performed all of the stocks of companies of the Virginia based selection population.

To test the significance of the performance difference between the random and the strategic groups, a t-test was conducted, assuming equal variance. The data indicates that the security returns of the strategic group are significantly higher than the random group average returns in 10 out of the 12 weeks of the contest. These results are also presented in Table 2.

Figure 1: Average Weekly Performance of Strategy and Random Portfolios Compared with the S&P 500



Additional Analysis – Control For Bias

Contestants select into a given portfolio, and as a result the size of the strategic group was greater then twice the size of the random group. Although not conclusive, this result implies (from observed behavior) that in the short run the majority of individual investors would use a technical, industry or performance-based methodology in choosing stocks. However, because of the size differential there is the possibility of bias in the statistical results, if the variances of the two groups are not equivalent. Although both samples are statistically large to safeguard against bias, we performed an F-test of the hypothesis that both populations have similar variance.

We found no evidence to reject the hypotheses at a p-value of .58. Hence, statistically both samples have similar variability thus reducing concerns with bias due to size effects. As an additional assurance we tested for the normality of the two samples using a Kolmogorov-Smirnov test. In both cases the data was consistent with a normal distribution. The KS test indicates with a p-value is 0.99, that the strategic group is normally distributed with a mean of -1.605 and standard deviation of 1.233. The random group is also normally distributed with a mean of -2.416 and a standard deviation of 1.188. The p-value of KS test of this group was 0.87. Thus, the sample sizes of the two statistically large groups, even though different, are not significantly so and are not expected to bias results.

Table 2: Test of Significance Two Population *T-test* with an Equal Variance Comparison of the Random Vs Strategic Groups

Week #	Mean Random	Mean Strategy	t Value	P-Value	Significance (error level 5%)
1	-2.120%	-1.988%	-0.992209028	16.06%	No
2	-1.405%	-0.949%	-2.65354733	0.40%	Yes
3	-3.719%	-3.490%	-0.947881002	17.17%	No
4	-2.174%	-1.548%	-2.380140882	0.87%	Yes
5	-2.155%	-1.563%	-2.039134946	2.08%	Yes
6	-1.044%	-0.381%	-2.013693491	2.21%	Yes
7	-2.854%	-2.090%	-2.20498199	1.38%	Yes
8	-1.342%	-0.273%	-2.777538586	0.28%	Yes
9	-1.483%	-0.172%	-3.084463188	0.10%	Yes
10	-2.628%	-1.458%	-2.712236646	0.34%	Yes
11	-4.108%	-2.741%	-2.915585629	0.18%	Yes
12	-3.473%	-2.286%	-2.523403163	0.59%	Yes

Additional Analysis of Results

A number of random group contestants performed relatively well in the overall contest. We test the ratio of these contestants compared with the strategic group in percentile ranks moving from the highest to the lowest ranks of average return performance. Ranks were set at 50 point intervals. Based on the number of contestants in each group the expected ratio of performance is 39.36 percent (or 346 random group contestants divided by 879 strategic group contestants). Table 3 summarizes the end of the contest ratios of the random to strategic group according to membership in the performance rank intervals.

Membership in each of the ranks greater than the expected ratio would indicate a relatively high performance of the random group. For example; in the top 100 performers, there are 15 random selection contestants compared with 68 strategic contestants which results in a ratio of 22 percent compared with an expected ratio of 39.36 percent.

The data indicates that random contestants have a lower percent of membership at the higher "winners" ranks and a higher percentage of membership in the lower "losers" ranks. At the higher rank, there was a less than expected number of random contestants and a continuing rise in the percentage of these contestants in the lower ranks, until the random contestants reach the expected ratio of 39.36 percent at the lower ranks.

To test the statistical significance of the ratios in the top 100 and top 500-ranks, a non-parametric Z-test was performed. The results indicate that the probability of the rejection of all ratios hypotheses is zero.

There are a statistically significant lower number of random selection contestants in the top 100 rank and a significant higher number of random contestants moving towards the bottom 100 rank. This result indicates that the random contestants' performance is deteriorating over the 12 weeks in comparison with the performance of the strategic group. These results are presented in Table 4 below.

Table 3: Ratio of Number of Random to Strategic Selection Participants at the End of the Contest

Ranks	Number of Participants with Random Selection	Number of Participants with Strategic to Select Stocks	Cumulative Number of Participants with Random Selection	Cumulative Number of Participants with Strategic Selection	Ratio of Cumulative Number of With Random Vs Strategy Selection
50	9	34	9	34	26.471%
100	6	34	15	68	22.059%
150	13	32	28	100	28.000%
200	11	34	39	134	29.104%
250	11	32	50	166	30.120%
300	7	41	57	207	27.536%
350	8	37	65	244	26.639%
400	15	25	80	269	29.740%
450	15	29	95	298	31.879%
500	17	28	112	326	34.356%
550	8	35	120	361	33.241%
600	8	34	128	395	32.405%
650	13	35	141	430	32.791%
700	8	32	149	462	32.251%
750	20	25	169	487	34.702%
800	14	30	183	517	35.397%
850	10	35	193	552	34.964%
900	10	30	203	582	34.880%
950	13	32	216	614	35.179%
1000	10	28	226	642	35.202%
1050	21	26	247	668	36.976%
1100	8	33	255	701	36.377%
1150	11	31	266	732	36.339%
1200	18	26	284	758	37.467%
1250	17	28	301	786	38.295%
1300	13	35	314	821	38.246%
1350	17	26	331	847	39.079%
1400	15	32	346	879	39.363%

Table 4: Test of Proportion for the Distribution of Random Selection Participants

Rank	Contestants with Random Stock Selection	Contestants with Strategic Stock Selection	Est. of Prop	Expected Prop	St Err	Z	Probability of Null Hypothesis Acceptance
1st 100	15	68	22.059%	39.363%	1.396%	-12.4259	≈0%
1st 500	112	326	34.356%	39.363%	1.396%	-3.61631	≈0%
Last 500	143	297	48.148%	39.363%	1.396%	6.322979	≈0%
Last 100	32	58	55.172%	39.363%	1.396%	11.35516	≈0%

DISCUSSION

The analysis of the results of the Hampton Roads Stock Picking Contest indicates that in the short-run, stock selection based on some specific strategy outperformed stock selection based on random selection. This difference in the performance can be attributed to the idea that in the short-run, investor behavior may play a greater role in stock price values of companies and the distribution of returns may not reflect rational pricing. Hence, it seems possible that specific strategies can be used to out-perform a random selection stock portfolio at least in the short-run. For example: the Tidewater area of Virginia has a large military presence and a large number of high performing contestants selected companies that were operating in the defense industry. It is possible that contestants' existing or newly acquired knowledge of defense spending or pending contracts to defense companies influenced selection. Such a strategy was proven correct since the largest gainer in the Virginia based selection population of companies was United Defense Industries, Inc. which rose over 55 percent in the three month contest period.

Research Shortcoming

The main drawback to this research is that the contest structure although consistent results in a less than realistic financial environment. For example: Although the possibility of winning a $1,000 saving bond was an adequate incentive resulting in 1,391 contestants, the analysis is based on hypothetical buys into the market without "real" financial gain or loss to contestants, and no impact-up or down- on the security market. The short-term horizon of the contest also limits the strength of results noted and conclusions reached. The limited population of the companies subject to selection also places a constraint on the investment frontier. Moreover, the non-realignment structure of the contest "locked in" some investor positions with firms that may have experienced a loss in stock value over the contest period. For example: At the beginning of the contest, the Fannie Mae Corporation was hit with a major accounting scandal resulting in the resignation a number of its chief executive officers. It would be expected behavior that many contestants/investors would have reduced holdings in such stock and taken positions in other firms. The contest was not structure to allow "losers" to rebalance portfolios to reduce of loss positions. It is because of these reasons that the authors cautious against "sweeping conclusions" based on the results reported.

CONCLUSIONS AND FUTURE RESEARCH ISSUES

In the short-run, a stock selection strategy appears to be superior to a random strategy based on the observed hypothetical portfolio performance. On average, contestants, with a specific stock selection strategy out-performed investors lacking a selection strategy (in the short-term). The number of strategic stock selection investors had a higher population of membership than expected among the top performing portfolios of contestants and a lower than expected membership in the number of poorest stock portfolio performers. In addition, although not shown, in 10 of 12 weeks the contestants who used a strategic portfolio selection criterion had higher average returns than the full population of the Virginia-based company's stock performance. However, the average performance of both the random selection and the strategic groups did not exceed the S&P 500 return average during any of the weeks of the contest.

A concern exists regarding the issue of short-term versus long-term investment performance. It is believed that results noted over a 52 week period, would result in a greater power of tests of significance and provide stronger conclusions regarding differences noted between portfolios. In addition, since the current structure of the contest "locks in" each contestant's selection of stock portfolios, greater realism may be achieved by reducing this constraint to allow each contestant an opportunity to rebalance their portfolios, at some point in the game. Future research would address some of the shortcomings noted above. A subsequent working paper would include items which could be readily changed such as: (1) restructuring the game to conclude after a year, (2) allowing a rebalancing of portfolios each quarter and

(3), matching the size of the portfolios on a "first in" basis. The authors also considered (4) the expansion of the game's stock selection horizon to include the selection of "any" 5 stocks on the NEW YORK or the NASDAQ Stock Exchanges.

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