

University of Nevada, Reno

The IBD 100: Does It Really Beat “The Market”?

A thesis submitted in partial fulfillment of the requirements for the degree of
Master of Science in Finance

by

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We recommend that the thesis
prepared under our supervision by

BHARMAN GULATI

entitled

THE IBD 100: DOES IT REALLY BEAT "THE MARKET"?

be accepted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE

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Abstract

IBD 100 proclaims itself to be the number one investing strategy and that it has yielded far better returns since its inception than S&P500 during the same period. I examine the validity of these claims by analyzing the performance of IBD100 stock recommendations made between July 2005 and Dec 2009. Although IBD yielded 5.54% in comparison to -8.18% by S&P500 during the study period, deeper analysis of the relative performance to the benchmark index reveals that IBD100 stocks are smaller and more growth oriented than those of S&P500 and that when comparing the returns of the IBD 100 to more appropriate benchmarks, the excess performance disappears.

Acknowledgement

I take this opportunity to express my deep sense of gratitude to my committee members, Prof. Stone, Prof. Bhargava and Prof. Nichols. I would especially like to thank my advisor, Prof. Stone for walking me step by step through this endeavor and going the extra mile to make sure I finish my journey.

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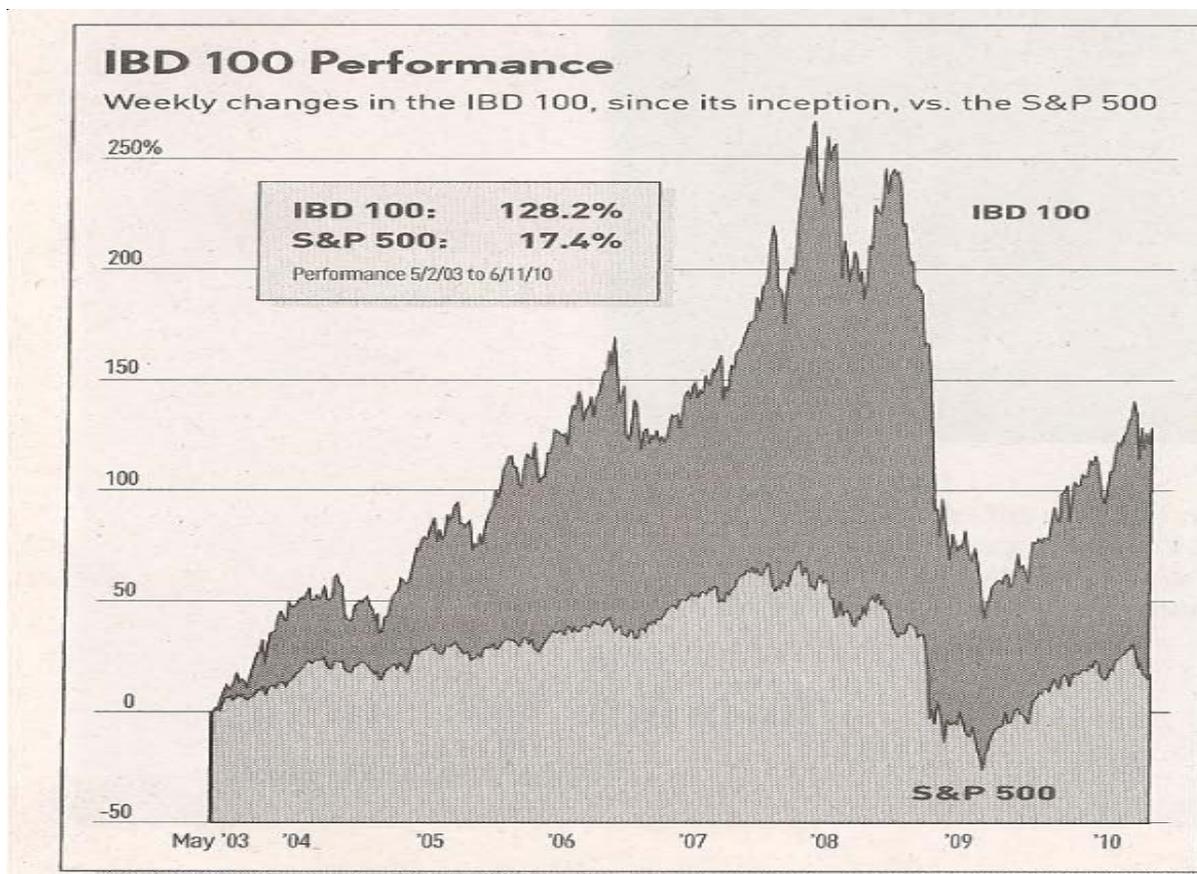
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I. Introduction

Efficient Market Hypothesis (EMH) is the cornerstone of modern finance. Developed independently during 1960's by Paul Samuelson and Eugene Fama, EMH states that in an active market with well informed and rational investors securities will be appropriately priced and fully reflect all available information. If a market is efficient, no information or analysis can be expected to outperform an **appropriate** benchmark. EMH is a hotly debated topic between academics and finance professionals. Some empirical studies have shown existence of 'technical anomalies' and 'stock market anomalies' to contradict efficiency of markets, however, the proposed advantages resulting from these anomalies subsequently disappeared or proved impossible to exploit because of transaction costs.

Investors Business Daily (IBD) claims to yield better returns than "the market". As per the following chart published in the IBD print edition, IBD claims that since its inception in May 2003 to June 2010 IBD100 has yielded a return of 128.2% in comparison to S&P500 which yielded only 17.4% during the same period.



IBD 100 is a computer generated list of stocks IBD defines as the “leading” one hundred stocks. These stocks are ranked on the basis of combination of factors: recent record of profit growth, IBD’s Composite rating and relative price performance over a period of prior year. The composite rating includes key measures like Return on Equity, Sales Growth and Profit Margins.

IBD 100 is a proprietary list which started in April 2003. Investors Business Daily publishes the list of 100 top ranked companies every Monday. The companies listed on the IBD 100 and their rankings are revised after the market closes every Friday. IBD 100 Index launched in May 2003 tracks the performance of stocks listed in the IBD 100. The Index tracks the performance of each stock for the duration that it remains on the IBD 100 list. Once a stock is removed from the list, it is no longer tracked in the index.

Like many practitioner oriented publications, Investors Business Daily uses the S&P500 Index as a benchmark to gauge their performance and consider it “the market”. However, academic theory would define the market as all investable assets. Since the S&P500 is made up of 500 large capitalization companies, it really does not precisely fit the academic definition of “the market”.

IBD releases every Monday a list of 100 recommended stocks using their stock selection process, based on these stocks' performance in prior week. As an investor following IBD, my strategy is to buy these hundred stocks on Monday morning as soon as the list is released and sell them on Friday evening. This way I buy and hold a portfolio of IBD100 recommended stocks every week and calculate weekly return from this portfolio. I similarly calculate returns from holding a portfolio of S&P500 stocks every week. The data is collected over a period of 232 weeks from July 2005 to Dec 2009. Initial analysis of the data reveals that during this period IBD100 produced returns of 5.54% while S&P500 produced negative returns of 8.18%. This analysis also reveals that majority of stocks recommended by IBD100 during this period were from small cap and mid-cap companies. S&P500 index primarily represents large cap companies in US economy. The difference in performance, with respect to composition of each portfolio raises the question if S&P500 is 'appropriate' benchmark for IBD100. IBD100's claim of consistently beating S&P500 since former's inception clearly challenges EMH. I intend to research the validity of these claims by investigating whether IBD 100 is comparing its performance to appropriate benchmark. Empirical studies have shown that small and mid cap companies have different risk-return profile than large cap companies. Considering this fact is it fair to compare IBD100 performance to S&P500? I focus on choice of appropriate benchmark for IBD100 and analyze of its relative performance to that benchmark.

Transaction costs, taxes and other hidden costs have significant impact on net gains made by an investor. It shall be interesting to see if IBD100 can still outperform S&P500 after accounting for these costs and taxes.

2. Literature Review

The book 'How to Make Money in Stocks' authored by William O'Neil, talks about his investment strategy called CANSLIM. CANSLIM is an acronym with each letter representing one of the seven characteristics they use for stock selection.

- C Current Quarterly Earnings per share
- A Annual Earnings Increases
- N New Products, New Management, New Highs
- S Supply & Demand
- L Leader or Laggard
- I Institutional Sponsorship
- M Market Direction

William O'Neil is also founder of Investor's Business Daily. IBD releases list of top 100 stocks every Monday based on its stock selection strategy following the CANSLIM approach. These stocks are ranked from 1-100 based on composite rating of their relative strength ranking, EPS (Earnings Per Share) ranking, SMR (Sales + Margins + Return on Equity) ranking and Group Relative Strength ranking.

Fama and Macbeth (1973) find that there is simple positive relation between average stock returns (on New York Stock Exchange common stock during the pre-1969 period) and beta (β).

Recent empirical research has highlighted contradictions to the Sharpe, Lintner and Black model. Banz (1981) highlighted that size effect in explaining the average returns besides Market Beta. Bhandari (1988) documented the positive relationship between leverage and average return. Fama and French (1992) in their breakthrough research use two risk factors, size and book to market equity, in addition to excess returns of a stock market portfolio, to capture the cross-sectional variation in average stock returns. Fama and French (1993), further identify two bond market factors, related to maturity and default risks, besides overall market factor, firm size and book to market equity, to explain average returns on stocks and bonds. In this paper I apply similar methodology to find what risk factors besides excess weekly returns of S&P500 explain the cross section of weekly IBD100 returns. I include factors for size and nature of stock along with market returns. I find that size does play an important role on weekly IBD returns.

Gilovich, Vallone and Tversky (1985) investigate the origin and the validity of common beliefs regarding “the hot hand” and “streak shooting” in the game of basketball. They find that the belief in the hot hand and the “detection” of streaks in random sequences is attributed to a general misconception of chance according to which even short random sequences are thought to be highly representative of their generating process. I intend to investigate existence of ‘hot hand’ or ‘streak shooting’ in IBD100’s stock selection process. My analysis does show evidence of ‘hot hand’, but only for a short time period during the entire study period.

Choi (2000) investigates the performance of Value Line Investment Surveys rankings. He finds that the recommendations did yield abnormal returns; however when transaction costs were accounted , these abnormal returns disappeared.

3. Data Description

The data set includes the IBD100 list from July 2005 to December 2009, spanning 232 weeks. After filtering out outliers and duplicate entries total 1360 companies appeared in the dataset in the aforementioned period. Berkshire Hathaway Class A shares (BRKA) appeared twice in the IBD100 list, during week 131 and 132 (week ending Jan 18, 2008 and Jan 25, 2008), at closing price of \$ 131200 & \$ 139100 respectively. Due to the magnitude of the price of this security on the list, it was removed from the dataset.

This left a sample of 1241 US based companies. Out of 119 non US based companies, 55 were American Depository Receipts (ADRs) and 64 American Depository Share (ADS). Out of these 55 ADR's, 4 (7%) were from India and 5 (9%) from China. Similarly, out of 64 ADS, both India and China had 4 ADS each. During the study period , 15 companies renamed, 8 turned private and total 55 companies did not have complete information regarding the market capitalization and/or price to book ratio and/or Standard Industrial Classification (SIC), including those which turned private. A prominent company in this category was Bear Sterns Inc (BSC), which collapsed during the financial crisis of 2008. Apple Inc (APPL) with 147 appearances appeared maximum number of times on IBD100 list during this period.

From the dataset, the total 1312 companies were categorized by SIC code. The largest number of companies came from the Manufacturing sector (37.21%) followed by Services (17.79%) and Finance, Insurance and Real Estate (12.06%) sector. Nonclassifiable Establishments followed by Agriculture, Forestry and Fishing at 0.07% and 0.37%, respectively had minimal representation in the list during the study period. No company from Public Administration sector made it to the list.

The following table highlights the composition of companies in IBD100 list during the study period, on the basis of SIC (Standard Industrial Classification) code.

Table 1 ***Composition of companies in IBD100 list by SIC code***

SIC Classifications	Number of Cos.	%
AGRICULTURE, FORESTRY AND FISHING	5	0.37%
MINING	105	7.72%
CONSTRUCTION	26	1.91%
MANUFACTURING	506	37.21%
TRANSPORTATION, COMMUNICATIONS & UTILITIES	133	9.78%
WHOLESALE TRADE	45	3.31%
RETAIL TRADE	85	6.25%
FINANCE, INSURANCE & REAL ESTATE	164	12.06%
SERVICES	242	17.79%
PUBLIC ADMINISTRATION	0	0.00%
NONCLASSIFIABLE ESTABLISHMENTS	1	0.07%
	1312	96.47%

This list is published in Investors Business Daily every Monday and is available to members. All 1,360 companies were sorted alphabetically along with the prices for the weeks in which they appeared in the IBD100 list. Closing prices for the subsequent week when a company last appeared were found from CRSP (Center for Research in Security Prices) to compute the holding

period return for every week a company was on the list. The closing price for a company was adjusted accordingly in case it had a stock split in that particular week.

Information regarding Market Capitalization, Price to Earnings Ratio, Price to Book ratio and SIC code were found from Compustat and CRSP. Market Capitalization, stock price, P/E ratio and P/B ratio were found for the week when security of a particular company came for the first time in the IBD100 list during this period. Market Capitalization is in millions of US Dollars (for the current quarter when the security made it to the list), Initial stock price is in US dollars and cents, and P/E ratio and P/B ratio are in percentage.

IBD100 return – To calculate weekly holding period return for the study period, closing price for the subsequent week when security from a company last appeared in the list were found. Average return for all the companies that made it to the list in that specific week gave the weekly return from the portfolio of IBD100 stocks.

S&P 500 return – Change in closing prices of S&P500 Index every Friday evening gave the holding period return for that week.

Risk-Free Rate – Five year Treasury Note used as risk free rate. The yield on this note was 4.04% on July 18, 2005.

IBD100 Book to Market Ratio – Book to market ratio is the book value of the company per share divided by the share price. This data was found from Compustat. Average book to market ratio for IBD100 portfolio was 0.33.

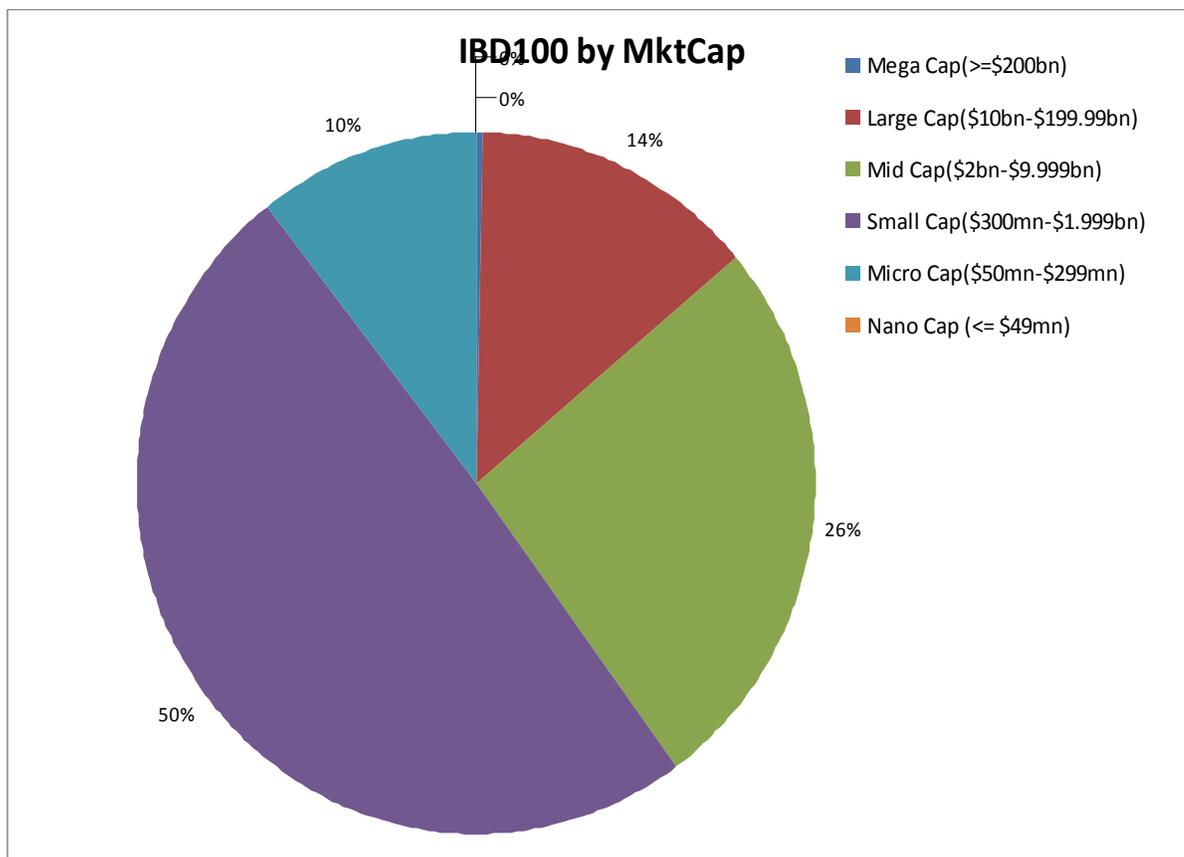
S&P500 Book to Market Ratio – Similarly, Book to Market ratio for S&P500 companies was also found from Compustat. This ratio is reported on monthly basis in Compustat. It is assumed to

remain same for all the weeks during that month. Weekly book to market ratio was calculated as average book to market ratio of all 500 companies for that particular week.

IBD100 Market Capitalization – Market capitalization figures for all companies for the week when each arrived for the first time during the study period were found from Compustat. Dividing market capitalization and the stock price for each company when it first arrived in the list gave the number of shares outstanding for each company. Total shares outstanding were multiplied with stock price for every week the company made it to the list. Subsequently this figure was multiplied by holding period return for that week to factor the change in prices during that week on the current market capitalization for that particular company.

The average market capitalization of weekly IBD100 portfolio was \$7,823.34 million dollars. Highest market capitalization during the study period was that of Exxon Mobil Corp. for \$471 billion during the first week of Jan 2009. The median market capitalization of all the companies that were in IBD100 list during the study period is \$1299.75 million. Figure1 shows the percentage of companies by market capitalization that made it to IBD100 list during the study period. Maximum number of companies (50%) came from Small cap universe followed by Mid Cap (26%), Large Cap (14%) and Micro Cap (10%). There were two companies from Mega cap and one from Nano cap universe.

Figure 1 **IBD100 Composition by Market Capitalization**



S&P500 Market Capitalization – Data for Daily Market capitalization for S&P500 Index was found at www.standardandpoors.com. Factoring the daily change helped calculate market capitalization for prior periods till July 2005. Market Capitalization of S&P500 as on Friday of every week during the period of study was taken as Market Capitalization of the Index. S&P500 market capitalization is in trillions of US dollars.

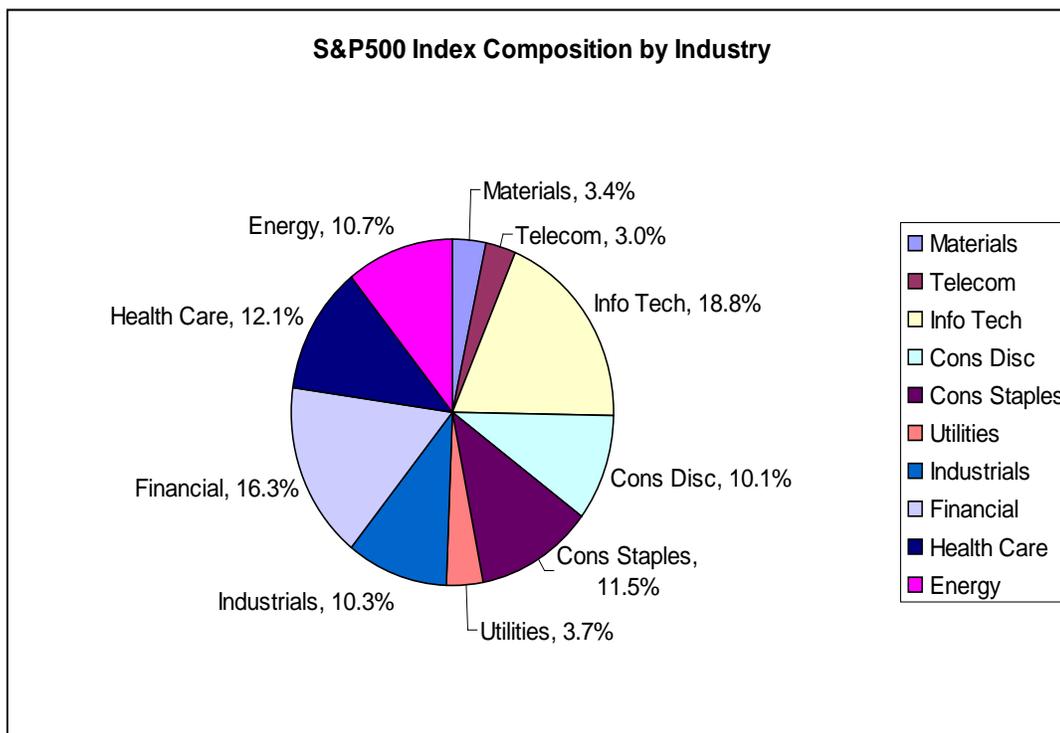
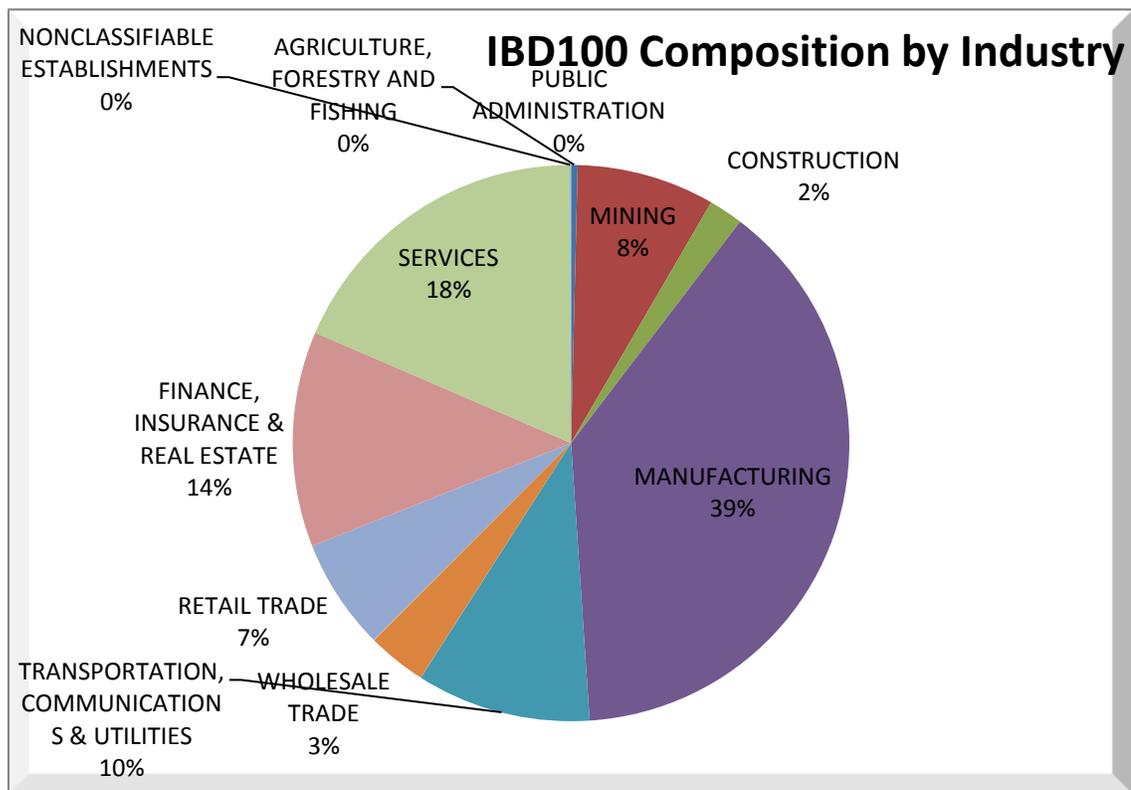
Figure2 **S&P500 Index Composition by Industry**

Figure 3 **IBD100 Compositions by Industry**



IBD100BooktoMarket -S&P500BooktoMarket – difference between book to market ratios of IBD100 and S&P500 for 232 weeks is calculated to capture the effect of nature of stock in the portfolio. Stocks with high book-to-market ratio are regarded as “value” stocks while those with low book-to-market ratio are regarded as “growth” stocks.

IBD100MarketCap -S&P500MarketCap – difference between market capitalization of IBD100 list and S&P500 Index is calculated for entire study period to capture the effect of size on returns.

Autocorrelation and stationarity tests were conducted. To check for autocorrelation Breusch-Godfrey Test was conducted. The test yielded χ^2 (chi-square) value of 2.998 for 1 degree of

freedom, which being less than critical value of 3.84, indicates that I am unable to reject the null hypothesis and conclude that there is no autocorrelation.

To test for stationarity of variables, the Dickey Fuller test was conducted. Following table illustrates the variables and their respective Dickey-Fuller test statistic along with the critical value:

Table 2 ***Tests Statistic from Dickey-Fuller Tests***

Variable	Test Statistic	5% Critical Value
ibd100rrf	-11.009	-2.881
sp500rf	-10.269	-2.881
ibd1360sp500mcap	-1.047	-2.881
ibd1360sp500b2m	-1.744	-2.881

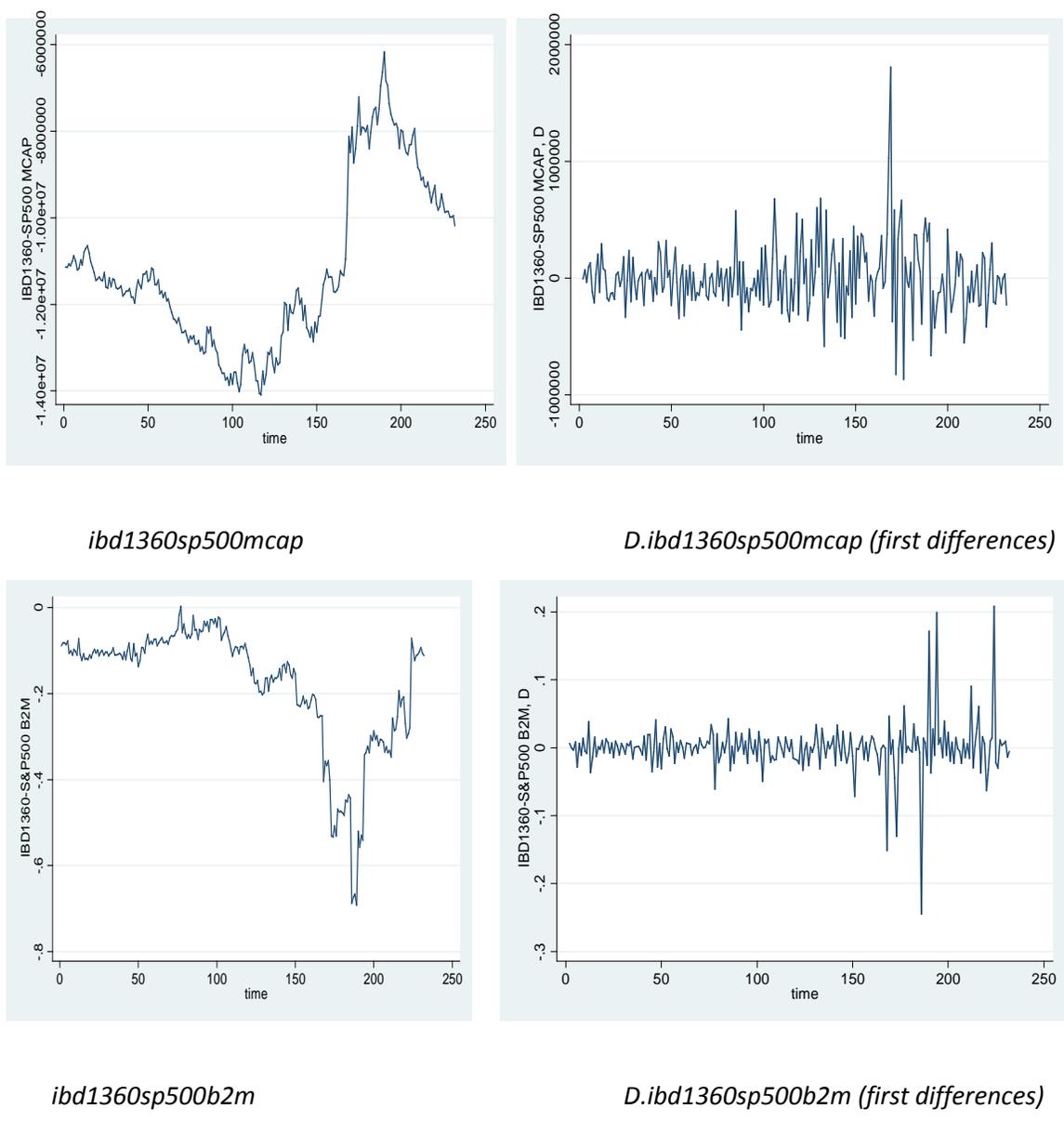
The test statistic for variables representing 'size' (ibd1360sp500mcap) and 'nature of stock' (ibd1360sp500b2m), respectively are greater than the 5% critical value. In this case I do not reject the null hypothesis and find that the series' for these two variables are non-stationary. In the next step I check for the order of integration for both series. I conduct Dickey-Fuller test on first differences. Again the null hypothesis is that the first differences of respective series are non-stationary. Following are the test-statistic and comparative critical value for these two variables:

Table 3 ***Tests Statistic from Dickey-Fuller Tests on First Differences***

Variable	Test Statistic	5% Critical Value
D.ibd1360sp500mcap	-15.797	-1.950
D.ibd1360sp500b2m	-17.326	-1.950

The test statistic for both variables is less than the 5% critical value. I reject the null hypothesis and conclude that the series' for both variables is first differenced stationary or Integrated of Order 1, i.e. I (1). Following are the graphs of these variables and their first differences respectively:

Figure 4 **Graphs of Non-Stationary Variables and their first differences**



So far analysis of the time series show that variables 'ibd100rrf', 'sp500rf' are stationary while 'ibd1360sp500mcap' and 'ibd1360sp500b2m' are non-stationary but Integrated of order 1 or first difference stationary. In order to ensure our regression results are not spurious and further analysis is valid I check if variables for 'size' and 'nature of stock' are co-integrated. Co-integration implies that these variables share same stochastic trend and their least square residuals never diverge too far from each other. For this purpose I test the stationarity of their least square residuals and conduct Engle-Granger Test. The test yields test-static of -3.893 which is less than 5% critical value of -3.37. I reject the null hypothesis of non-stationarity of residuals and conclude that the series' for these two variables are co-integrated.

The statistical results show that variables 'ibd100rrf', 'sp500rf' are stationary and 'ibd1360sp500mcap' and 'ibd1360sp500b2m' are co-integrated gives the confidence that least square estimators from regression on these variables are consistent¹.

¹ Consistency means that as $T \rightarrow \infty$, the least square estimator converges to true parameter value.

4. Performance Evaluation Methodology

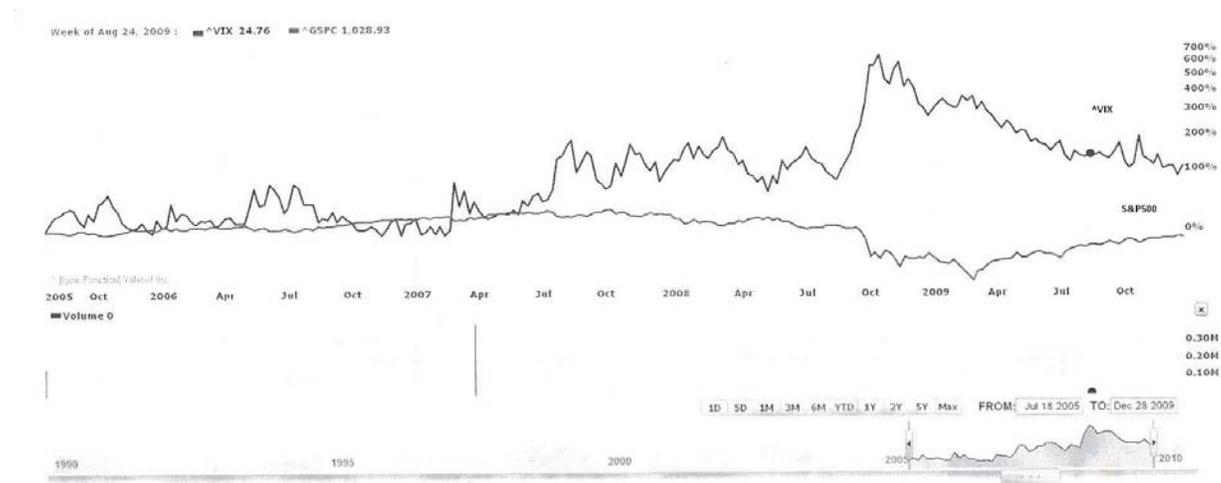
The data for study spans for 232 weeks from July 2005 to December 2009. During this period US Economy experienced high volatility. The Volatility Index which started at 10.52 in week of July 18 2005, reached high of 79.13 in week of Oct 20, 2008 to fall back to 21.68 in last week of December 28, 2009. Correspondingly, S&P 500 was at 1233.68* in week of July18, 2005, reached low of 683.38* in week of March 2, 2008 to reach back to 1115.10* in last week of December 28, 2009. In order to effectively gauge the performance of IBD100 list versus the market(S&P500), in times of unprecedented volatility during the study period, it was decided to divide the study period in three sub-periods. Each sub-period intends to capture the impact prevailing economic conditions on capital markets which can be described as '**normal**', '**collapse**' and '**rebound**', respectively.

The first sub period from July 18, 2005 to October 5, 2007 spans 116 weeks. Relative to other two sub-periods in our study, this period can be termed as 'normal'. Market witnessed positive returns and relatively low levels of volatility during this period. The second sub period from October 12, 2007 to February 27, 2009 spans 73 weeks. This period can be regarded as the most volatile of the three sub-periods with market witnessing 'collapse' from peak of 1561.8* to low of 683.8*, fall of Lehman Brothers and bursting of residential real estate bubble. The US economy was officially declared to be in recession in this sub-period. The final sub period from March 2, 2009 to December 28, 2009 spans 43 weeks. This sub-period, although marked by high volatility, witnessed S&P500 and other major bourses on a 'rebound'. S&P500 rose from its lowest level to reach 1115.10* in December 2009.

**close price*

The following chart shows the movement of Volatility Index and S&P500 during the study period. It gives an idea of the high level of volatility during these times.

Figure 5 **Volatility Index (^VIX) and S&P500 from July'05-Dec'09**



www.finance.yahoo.com

For the preliminary analysis I try to find absolute returns produced by IBD100 and S&P500 Index first during the entire study period and then during three sub-periods. This helps calculate the returns an investor would make by investing in IBD100 and S&P500 during the study period, respectively.

Volatility represents the risk associated with these returns. This information for the three sub-periods tells how IBD100 and S&P500 relatively performed under prevailing economic conditions during the each sub-period. Table 4 highlights the results from this analysis:

Table 4 *IBD100 and S&P500 Relative Performance during different time periods*

Time Period	<u>IBD100</u>		<u>S&P500</u>	
	Returns	Volatility	Returns	Volatility
Normal	45.95%	33.50%	26.84%	15.72%
Collapse	-51.55%	36.02%	-52.81%	36.50%
Rebound	49.27%	19.15%	53.38%	20.78%
Week 1-232	5.54%		-8.18%	
Annual	1.22%	25.50%	-1.89%	21.83%

I find that IBD100 yielded return of 5.54% while S&P500 of -8.18% during the entire study period. Annually IBD100 produced a return of 1.22% while S&P500 produced -1.89%. Results show that IBD100 did perform better than S&P500. We do further analysis to find its performance in different time periods and what factors contributed in its performance.

Returns are calculated by buying the stocks on Monday and selling them on Friday every week. The weekly returns are found for 232 weeks for both IBD100 list and S&P500 Index. This data is used along with data from other variables for preliminary and statistical analysis. I first conduct single factor regression between IBD100 weekly returns and S&P500 weekly returns followed by multifactor regression to study the impact of different variables on IBD100 returns. Data collected during three sub-periods was also analyzed in similar fashion to compare the performance of IBD100 list with S&P500.

I also conduct Runs test² to determine existence of 'hot hand'³ or 'streak shooting' between IBD100 weekly returns and S&P500 returns. The Runs tests are conducted for the study period and separately for each sub-period.

A. Factor Regressions

I conduct ordinary least squares regression on our primary variables of interest i.e. IBD100 weekly excess returns and S&P500 weekly excess returns. Following is the form of estimation equation:

$$R_{IBDt} - RFR_t = \alpha + \beta_{1t} (R_{SPt} - RFR_t) + e_t$$

where,

$R_{IBDt} - RFR_t$ = the return of IBD100 less the risk free rate at time t

$R_{SPt} - RFR_t$ = the return of S&P500 less the risk free rate at time t

Results from this regression are displayed in Table 5. The constant term has a coefficient of 0.0008. Intuitively this indicates the abnormal rate of return earned from investing in IBD100 list over one week in comparison to market return over the same period(0.08%). Annually this would produce a positive alpha of 4.16%, without factoring in transaction costs and other associated costs. However, the t-statistic shows that it is not significant.

² Also called Wald-Wolfowitz test, is a non-parametric test that checks whether a string of data is occurring randomly given a specific distribution.

³ A player who produces longer sequences of hits than those produced by tossing a coin can be said to have a 'hot hand' or described as a 'streak shooter'.

Table 5 ***Regression Results from Single Factor Model for 232 weeks, July'05-Dec'09***

lbd100rrf	Coefficient	t	p> t
sp500rf	.9493	21.17	0.000
_cons	.000748	0.55	0.582
$R^2 = 0.6609$			

The results from this regression show that S&P500 weekly returns have a significant impact on IBD100 weekly returns and market beta (β) adequately describe the crosssection of IBD100 weekly returns. Close to 95% of IBD100 returns are explained by S&P500 returns. R^2 value of 0.66 indicates the level of diversification of IBD100 with respect to the market. Although IBD100 is relatively less diversified than the market, its returns are extensively explained by market returns. Higher returns for low level of diversification from IBD100 relative to the market perhaps indicates that significant number of stocks in the IBD100 list could be from smaller companies.

Recent research in Finance show that other factors like market size, book-to-market ratio, leverage and momentum explain crosssection of returns in a portfolio. Banz (1981) finds that market equity (a stock's price times number of shares outstanding) plays a prominent role in explaining the crosssection of average returns provided by market betas(β s). Bhandari(1988) conjectures that there is positive relationship between leverage and average returns. Fama & French (1992) found that size and book-to-market ratio are important variables in explaining crosssection of average stock returns. Similarly I try to analyze weekly IBD100 returns to find the factors that explain the crosssection of these returns. For this purpose besides S&P500 weekly returns, I include two more variables 'ibd1360sp500mcap' (difference between average market

capitalization of IBD100list and market capitalization of S&P500, over every week) and 'ibd1360sp500b2m' (difference between average book-to-market ratio of IBD100 and book-to-market ratio of S&P500, every week). These two variables intend to capture the effect of 'size' and effect of 'nature of stock' on the average weekly returns of IBD100, respectively. Keeping these factors in mind I conduct an OLS regression with weekly IBD100 excess returns, weekly S&P500 excess returns, weekly difference in market capitalization of IBD100 and S&P500 and weekly difference in book-to-market ratio of IBD100 and S&P500. With last three variables being predictors, we intend to see the impact each of these variables have in explaining average returns of IBD100. Following is the form of estimation equation:

$$R_{IBDt} - RFR_t = \alpha + [\beta_{1t} (R_{SPt} - RFR_t) + \beta_{2t} MCap + \beta_{3t} B2M] + e_t$$

where,

$R_{IBDt} - RFR_t$ = the return of IBD100 less the risk free rate at time t

$R_{SPt} - RFR_t$ = the return of S&P500 less the risk free rate at time t

$MCap$ = the difference in market capitalization of IBD100 and S&P500

$B2M$ = the difference in book-to-market ratios of IBD100 and S&P500

As mentioned earlier, in this equation variable $MCap$ and $B2M$, intend to capture the effect of 'size' and 'nature of stock', respectively on IBD100 returns. Following are the results from this regression, covering entire study period of 232 weeks:

Table 6 *Regression Results from Multi-Factor Model, from 232 weeks, July'05-Dec'09*

lbd100rrf	Coefficient	t	p> t
sp500rf	.94624	21.14	0.000
ibd1360sp500mcap**	-2.184	-1.74	0.084*
ibd1360sp500b2m	-.0169	-1.00	0.318
_cons	-.0267	-1.60	0.112
R ² = 0.6662			

*Significant at 0.10 level

**Scaled by \$ bn

Regression results for entire study period show that weekly S&P500 returns still has significant effect on average weekly IBD100 returns. The test statistic of 21.14 and p-value endorse this observation. The variable 'ibd1360sp500mcap', although statistically significant, economically does not appear to be important. It indicates the statistical significance of 'size of company' on average weekly IBD100 returns. Third variable 'ibd1360sp500b2m' does not seem to have significant impact on IBD100 returns.

Also, R² value is similar to that of Single factor regression indicating similar level of diversification between IBD100 and market during the study period.

This analysis gives some idea about the impact each of these variables has on average weekly IBD100 returns. I further try to see the impact these variables have during three sub-periods of our study. As observed earlier capital markets witnessed different economic conditions during this period and through each sub-period I try to capture the relative performance of IBD100 and

S&P500 during those specific conditions. Following table highlights the key results from multifactor regression during each of these sub-periods.

Table 7 **Regression Results from Multi-factor Model in different sub-periods**

<i>(Regression Results during Normal times, Jul'05- Oct'07)</i>			
<u>lbd100rrf</u>	<u>Coefficient</u>	<u>t</u>	<u>p> t </u>
sp500rf	1.597	13.14	0.000
ibd1360sp500mcap**	-7.590	-3.10*	0.002
ibd1360sp500b2m	-.2110	-2.59*	0.011
_cons	-.1091	-3.12*	0.002
R ² = .7066			
<i>(Regression Results during Collapse, Oct'07- Mar'09)</i>			
<u>lbd100rrf</u>	<u>Coefficient</u>	<u>t</u>	<u>p> t </u>
sp500rf	.8454	13.83	0.000
ibd1360sp500mcap**	-1.539	-0.46	0.648
ibd1360sp500b2m	-.0124	-0.28	0.782
_cons	-.0214	-0.44	0.660
R ² = .7514			
<i>(Regression Results during Rebound, Mar'09-Dec'09)</i>			
<u>lbd100rrf</u>	<u>Coefficient</u>	<u>t</u>	<u>p> t </u>
sp500rf	.7467	8.68	0.000
ibd1360sp500mcap**	-7.570	-1.41	0.165
ibd1360sp500b2m	-.0342	-0.76	0.454
_cons	-.0738	-1.27	0.210
R ² = .7197			

*Significant at 0.05 level

**Scaled by \$ bn

In the first sub-period, from July 2005 to Oct 2007, markets were relatively calm. During this period all the variables had a significant impact on average weekly IBD100 returns. In other words, variables like size and nature of stock did significantly explain weekly IBD100 returns. The coefficient for size and nature of stock show that stocks from small cap companies and growth companies contributed significantly to weekly IBD100 returns. The coefficient of S&P500 weekly returns, 1.597, indicates the relatively high level of risk adjusted returns from IBD100 with respect to their benchmark index. It is evident that during this sub-period IBD100 recommended predominantly small cap and growth stocks. Inherently these stocks were also more risky relative to the benchmark index.

This is also evident when I compare the holding period returns for this period between IBD100 and S&P500. IBD100 yields a return of 45.95% during this period while S&P500 yields 26.84%. Comparing the risk and returns from table# 2 with the regression results during this period shows that although IBD100 had better returns, they selected more risky stocks in their list compared to S&P500.

The second sub-period, from Oct 2007 to Mar 2009 is the most volatile period. This was the period when stock markets in US and major economies of the world witnessed exceptional erosion in wealth followed by high unemployment. During this time US economy was officially declared to be in recession. Regression results during this period show that S&P500 weekly returns was the only significant predictor for IBD100 average weekly returns. The two variables intending to capture the effect of size and nature of stock, respectively, did not play any significant role in explaining IBD100 average weekly returns. In terms of performance, IBD100 list did not do any better than S&P500 either. Returns were down 51.55% compared to -52.81%

of S&P500. This is despite the fact that IBD100 selected relatively less risky stocks during this period.

Third sub-period, from Mar 2009 to Dec 2009, saw major upswing in US stock markets. At least in our entire study period this was the time when markets started ascending from the bottom. In this period again S&P500 weekly returns was the only variable that played a significant role in predicting average weekly IBD100 returns. Other two variables, to explain the effect of size and nature of the stock, did not play any significant role. Surprisingly, during this period of rebound, S&P500 yielded better returns in comparison to IBD100 stocks.

The level of diversification in IBD100 with respect to S&P500, as measured by the value of R^2 , ranges from 0.7066 in first sub-period to 0.7514 in second sub-period to 0.7197 in final sub-period. During the period of economic meltdown in second sub-period, it is closest to S&P500. This indicates that composition of IBD100 list during this period was biased towards large cap companies as S&P500 is predominantly a large cap index.

B. Runs Test

I further conduct Runs test on IBD100 weekly returns and S&P500 weekly returns during the study period and three sub-periods to see if there is existence of 'hot hand' or 'streak shooting'. This analysis would help us gauge the effectiveness of IBD100 stock selection process.

For this purpose I compare weekly excess returns of IBD100 and S&P500 for all 232 weeks. Then I find the difference in weekly returns for both. There are binary outcomes in this test, 0 and 1. Every week when IBD100 average returns beat S&P500 returns, it is allotted 1 otherwise 0. Every consecutive series of similar kind of outcome constitutes a 'run'. At the end of the period

the number of 'runs' are analyzed to see if there is existence of 'hot hand' in their stock selection process. I also conduct binomial test and chi-square goodness of fit on expected frequencies and observed frequencies of runs to validate the results. These tests are conducted again for three time periods to find evidence of 'hot hand' in IBD's stock selection process in different economic conditions.

Table 8 **Results from Runs Test and Binomial Test of Randomness in different time periods**

<i>(Run Test Results for 232 weeks, July'05-Dec'09)</i>							
Obs	N (runs<= 0)	N (runs> 0)	N(runs)	z	Prob> z	χ^2	p
232	105	127	125	1.2	.23	2.09	.1486
<i>(Binomial Test Results)</i>							
Variable	N	Observed k	Expected k	Assumed p	Observed p		
runs	232	127	116	0.50000	0.54741		
Pr (k <= 105 or k >= 127) = 0.167845							
<i>(Run Test Results during Normal times, July'05-Oct'07)</i>							
Obs	N (runs<= 0)	N (runs> 0)	N(runs)	z	Prob> z	χ^2	p**
116	48	68	65	1.49	.14	3.45	.0633
<i>(Binomial Test Results)</i>							
Variable	N	Observed k	Expected k	Assumed p	Observed p		
runs	116	68	58	0.50000	0.58621		
Pr (k <= 48 or k >= 68) = 0.077262							
<i>(Run Test Results during Collapse, Oct'07- Mar'09)</i>							
Obs	N (runs<= 0)	N (runs> 0)	N(runs)	z	Prob> z	χ^2	p
73	33	40	42	1.15	.25	.67	.4126
<i>(Binomial Test Results)</i>							
Variable	N	Observed k	Expected k	Assumed p	Observed p		
runs	73	40	36.5	0.50000	0.54795		

Pr (k <= 33 or k >= 40) = 0.48279							
<i>(Run Test Results during Rebound, Mar'09-Dec'09)</i>							
<u>Obs</u>	<u>N (runs<= 0)</u>	<u>N (runs> 0)</u>	<u>N (runs)</u>	<u>z</u>	<u>Prob> z </u>	<u>χ^2</u>	<u>p</u>
43	24	19	19	-1	.32	.58	.4458
(Binomial Test Results)							
<u>Variable</u>	<u>N</u>	<u>Observed k</u>	<u>Expected k</u>	<u>Assumed p</u>	<u>Observed p</u>		
runs	43	19	21.5	0.50000	0.44186		
Pr (k <= 19 or k >= 24) = 0.542384							

** $\alpha = 0.10$

The results from Runs Test in the overall period of 232 weeks do not show existence of any 'hot hand'. The test statistics from both Binomial test and Chi-square goodness of fit show that the 'runs' during this period are not significantly different from the expected values.

In the first sub-period, the results show that IBD100 had significantly higher number of runs over S&P500. The test statistic indicates some evidence for existence of 'hot hand' in IBD stock selection process. It is important to remember that this period was the only time which can be considered 'normal' during the entire study period. The regression results in this time period show that size of the company and nature of the stock did play important role in IBD stock selection process. Majority of stocks recommended during this period were 'small cap' and 'growth'. Research has shown that such stocks have relatively higher returns during periods of 'normal' economic conditions.

Results from second time period, 'Collapse', do not indicate existence of any 'hot hand' in IBD100 performance. This was the time period when markets were in turmoil. Similar results are observed for third time period, when markets were on 'Rebound'. There is no existence of any

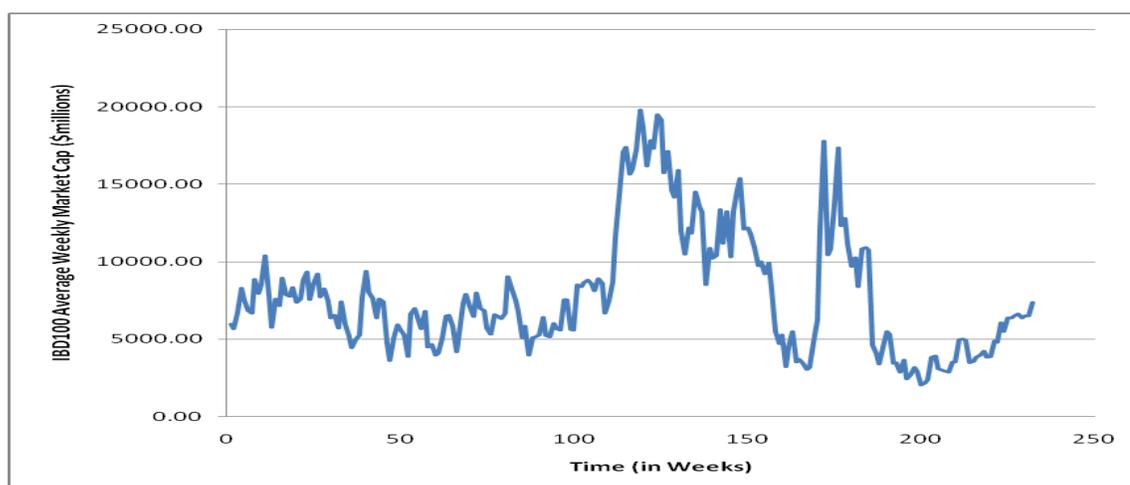
'hot hand' during this period either. Regression results for the corresponding time periods also did not show any significant impact of 'size' and/or 'nature of stock'.

5. Results

A. The Big Picture

So far the results have shown that market returns(S&P500 weekly returns) and size of the company play a role in explaining IBD100 weekly returns. These results and preliminary analysis of data throw some light on the IBD's stock selection process. It is apparent from statistical analysis so far that majority of stocks recommended in the list are small cap or mid-cap in size. Our preliminary analysis of the companies during the entire study period shows that 75% of the stocks recommended were from small cap (49.54%) and mid cap companies (26%). At the same time 85% of companies had book-to-market ratio of 0.5 or less. This indicates that majority of stocks in the list during the study period were what can be called 'growth stocks'. Results have shown that both 'size' and 'nature of stock' had significant impact on IBD weekly returns during the first sub-period of 116 weeks. The median market capitalization of IBD100 list during this period was \$6.8 bn, which makes it evident that majority of stocks were from small cap and mid cap companies.

Figure6 *IBD100 Weekly Average Market Capitalization, July 2005 – December 2009*



Although these variables for 'size' and 'nature of stock' were not significant during second and third sub-period, however second sub-period was one such time when globally major stock markets collapsed and recession engulfed all major economies. Even fundamentally strong companies were undervalued as bearish sentiment prevailed in the market. It was one of the periods when emotions and uncertainty overrode fundamentals. The median market capitalization of IBD100 list during this period was about \$11 bn. With steep decline in valuations due to global recession, market capitalization was bound to decrease; on the other hand the median market capitalization of IBD100 companies is greater than previous period. It is obvious that considering the prevailing economic conditions IBD100 made a major shift in their stock selection and recommended large cap stocks. Large cap stocks are considered safe relative to small cap or mid cap stocks during period of high volatility. If not worse, IBD100's performance was not any better than S&P500 during this period. Both IBD100 and S&P500 fell -51.55% and -52.81% respectively. Again this can be attributed to shift to large cap stocks which were relatively able to weather the downturn better than small cap and mid cap stocks.

Finally in the third sub-period, IBD100 yielded returns of 49.27% compared to 53.38% of S&P500. Median market cap for IBD100 during this period shows that majority of stocks recommended during this period were small cap and/or mid cap. Comparatively, S&P500 was still predominantly Large Cap Index during this period as well. It can be assumed that recovery in large cap stocks was robust compared to small cap and/or mid cap stocks.

B. Is S&P 500 appropriate benchmark for IBD100?

From our preliminary analysis on composition of IBD stocks and statistical tests during the entire period and three sub-periods it is obvious that size did play an important role in the stock selection process. Majority of stocks recommended during the study period as well in first and third sub-period were small cap and mid-cap stocks. It was only during second sub-period IBD100 recommended large cap stocks. On the other hand, S&P500 Index is predominantly made up of stocks from Large Cap companies. The minimum threshold market cap for any company to be selected in S&P500 is \$ 3.5bn. Besides there are other important conditions that a company must fulfill to be eligible to make it to S&P500 Index like, there must be a public float of at least 50%, companies should maintain adequate liquidity and reasonable price. Another important stipulation is that ADRs' and ADS are ineligible for inclusion in the index. However our analysis of the stocks of the companies recommended by IBD100 during the study period highlights some significant differences between composition of IBD100 list and S&P500.

a. There is no minimum limit in terms of market capitalization of a company to be included in IBD100 list. I have already observed that majority of companies recommended during the study period were small cap and mid cap.

b. Unlike S&P500 Index, IBD100 list recommended 55 ADRs' and 64 ADS in their list during the study period.

c. There are no minimum stipulations regarding liquidity, public float etc. for a stock to be included in IBD100.

Considering these fundamental differences between IBD100 list and S&P500, one must ask whether S&P500 an appropriate benchmark to compare their performance as claimed by IBD.

From this perspective, I do relative analysis of other popular indexes to find appropriate benchmark to compare IBD100 performance. The approach is to find an index that matches closest to major characteristics of IBD100 list i.e. small cap and growth stocks. Following are few the indexes that were considered as appropriate benchmark index for IBD100.

Russell 3000 Index: The Russell 3000 Index measures the performance of the largest 3000 U.S. companies representing approximately 98% of the investable U.S. equity market⁴.

Russell 2000 Index: The Russell 2000 Index measures the performance of the small-cap segment of the U.S. equity universe. The Russell 2000 Index is a subset of the Russell 3000® Index representing approximately 8% of the total market capitalization of that index. It includes approximately 2,000 of the smallest securities based on a combination of their market cap and current index membership⁵.

Russell 2000 Growth Index: The Russell 2000 Growth Index measures the performance of the small-cap growth segment of the U.S. equity universe. It includes those Russell 2000 companies with higher price-to-book ratios and higher forecasted growth values. The Russell 2000 Growth Index is constructed to provide a comprehensive and unbiased barometer for the small-cap growth segment⁶.

⁴ http://www.russell.com/indexes/data/fact_sheets/US/Russell_3000_Index.asp

⁵ http://www.russell.com/indexes/data/fact_sheets/us/Russell_2000_Index.asp

⁶ http://www.russell.com/indexes/data/fact_sheets/us/Russell_2000_Growth_Index.asp

Table10 highlights the characteristics of some of the major indices with respect to 'size' and 'nature of stock' of the companies listed in them. It is evident again that majority of companies in S&P500 Index are large cap. Out of the remaining indices, Russell 2000 Growth is deemed appropriate index because of its focus on small cap and growth companies.

Table 9 **Comparison between IBD100 and different Indices**

	IBD100	SP500	Russell2000*	Russell2000Growth*
Comp. Size by Median MktCap (\$ bn)	1.299	9.35	0.468	0.492
Average Book-to-Market ratio	0.33	0.46	0.51	0.32

* As on April 30, 2010

Figure 7 **Average book-to-market ratio, IBD100 and different Indices**

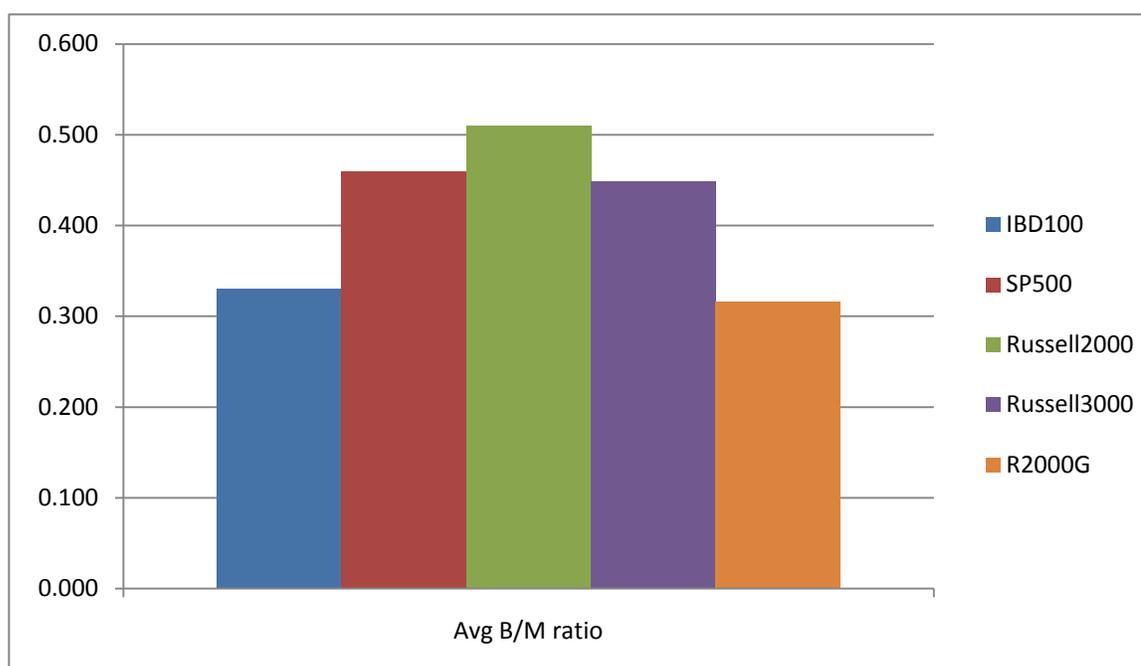


Table 11 displays Beta, Intercept and R^2 , from single factor regressions between IBD100 average weekly excess returns and S&P500 weekly excess returns, Russell2000 weekly excess returns and Russell2000 Growth weekly excess returns respectively. Following is the form of estimation equation:

$$R_{IBDt} - RFR_t = \alpha + \beta_{1t} (R_{it} - RFR_t) + e_t$$

where,

$R_{IBDt} - RFR_t$ = the return of IBD100 less the risk free rate at time t

$R_{it} - RFR_t$ = the return of Index 'i' less the risk free rate at time t

Table 10 **Results from Single Factor Regressions between IBD100 and Indices**

	<u>Russell2000</u>	<u>SP500</u>	<u>Russell2000Growth</u>
Intercept	0.00045 (0.35)*	0.00077 (0.55)*	0.00020 (0.09)*
β	0.77 (22.74)*	0.95 (21.17)*	0.81 (26.59)*
R^2	0.6921	0.6610	0.7545

* *t*-statistic

Market betas are significant for all three indices, with beta for S&P500 being the highest among all three indices. R-square is highest with Russell 2000 Growth Index followed by that from Russell 2000 Index and S&P500 Index. This indicates that Russell2000 Growth Index is a better fit

for IBD 100 than S&P500. It again validates our previous observation that IBD100 shares similar characteristics with Russell2000 Growth Index than S&P500 Index.

So far our analysis has shown that Russell2000 Growth Index is an appropriate benchmark index to compare IBD100 performance during our study period. I further analyze the relative performance between IBD100 and Russell2000 Growth Index.

Table 11 highlights the relative performance of IBD100 and various indices during the study period. At the end of 232 weeks, IBD100 yielded return of 5.54% while S&P500 and Russell 2000 yielded returns of -8.18% and -4.30%, respectively. Russell 2000 Growth is the only index which yielded positive returns of 2.31%. The table also highlights the annual rate of returns along with volatility for the corresponding period for IBD100 and all indices. As expected, S&P500 has least volatility while Russell2000 Growth Index has the highest. The returns do indicate better performance of IBD100 over S&P500 and other indices.

Table 11 ***Comparative Returns in different time periods***

<u>Weekly Period</u>	<u>IBD100</u>	<u>S&P500</u>	<u>Russell2000</u>	<u>Russell2000G</u>
Normal	45.95%	26.84%	27.16%	33.49%
Collapse	-51.55%	-52.81%	-53.91%	-53.05%
Rebound	49.27%	53.38%	63.29%	63.25%
Week 1-232	5.54%	-8.18%	-4.30%	2.31%
Annual Return	1.22%	-1.89%	-0.98%	0.51%
Annual Volatility	25.50%	21.83%	27.52%	27.30%

Continuing our research, the relative performance of IBD100 vis-à-vis S&P500 and Russell2000 Growth Index is further analyzed using alternative measures like Sharpe ratio, Treynor's ratio, Information Ratio and Jensen's measure.

Table 12 **Comparative Benefit- to- Cost Ratio Analysis**

	<u>IBD100 & SP500</u>	<u>IBD100 & R2000G</u>	
Tracking Error*	4.36 %	4.00 %	
Information Ratio	0.712	0.176	
Jensen's Alpha*	4.08 %	1.04 %	
	<u>IBD100</u>	<u>SP500</u>	<u>R2000G</u>
Sharpe Ratio *	-0.111	-0.272	-0.129
Treynor Ratio*	-0.030	-0.059	-0.043

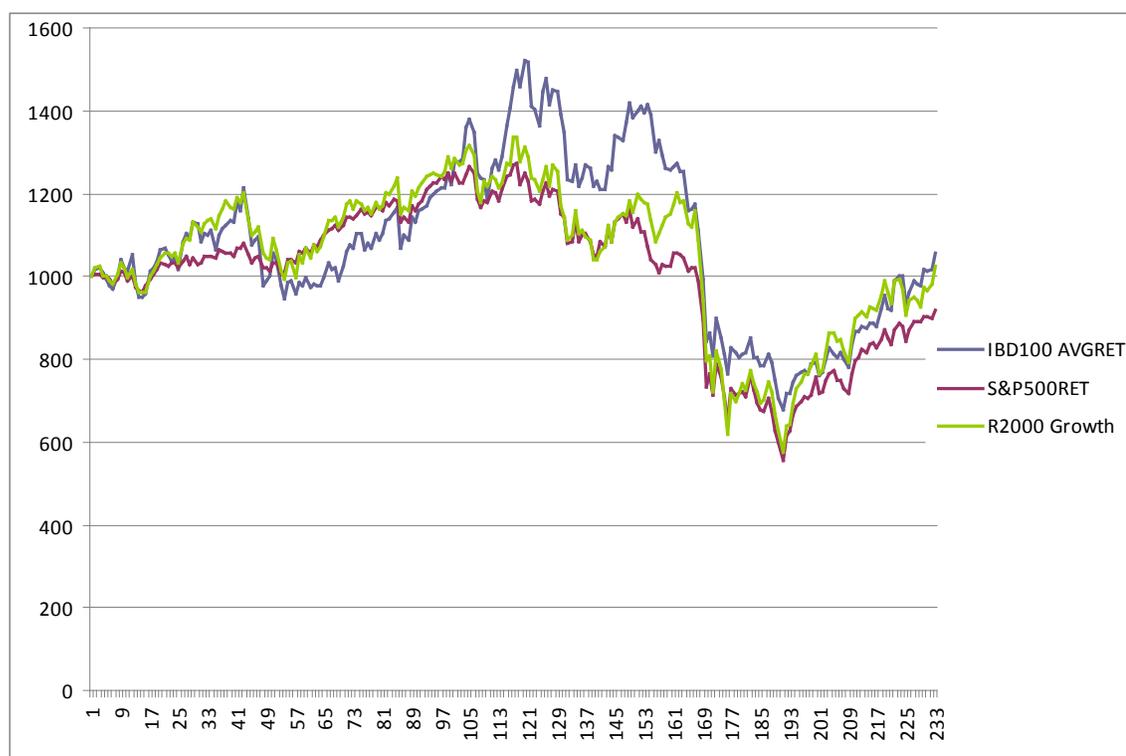
* Annually

Sharpe Ratio and Treynor Ratio for IBD100 and both indices are negative because of economic meltdown during the study period. Sharpe's ratio and Treynor's ratio for IBD100 was relatively higher than both indices which indicates that IBD100 had relatively better returns than both indices during the study period. Jensen's alpha using single index market model indicated positive intercepts but none were statistically significant.

Grinold and Kahn (2000) argued that reasonable Information Ratio (IR) levels should range from 0.5 to 1, with an IR of 0.5 being good and 1.0 being exceptional. Going by the same standard, IR of 0.712 between IBD100 and S&P500 is pretty impressive. However, IR of 0.176 between IBD100 and relatively appropriate benchmark, Russell2000 Growth Index is not so impressive.

IBD100 has a tracking error of 4.36% with respect to S&P500. This metric is higher in comparison to 4.0% from Russell 2000 Growth Index. It indicates that IBD100's return volatility is relatively higher with S&P500 Index than with Russell2000 Growth Index. Alford, Jones and Winkelmann (2003) suggested that tracking error can be a useful measure to categorize a fund's investment style. Measuring by their standards, IBD100's tracking error indicates that it is actively managed fund.

Figure 8 **Chart for IBD100, S&P500 and Russell2000 Growth Index**



6. Conclusion

The paper investigates the validity of IBD's claims that they have better returns than the market, S&P500 Index. To test this, weekly data from July'05 to Dec'09 was analyzed for IBD100 list and S&P500 Index. I found that during this period IBD100 yielded returns of 5.54% in comparison to a loss of -8.18% for the S&P500 Index. This meant annual returns of 1.22% and -1.89% respectively. Initially, the study period was divided into three sub-periods to capture the effect of different economic conditions and analyze how IBD100 fared in comparison to S&P500 during these sub-periods. Each of these sub-periods had unique economic situations to check the validity of IBD100 claims. First sub-period from July'05-Oct'07 can be regarded as normal considering the volatility during this period, the second sub-period from Oct'07-Mar'09 can be regarded as most volatile because of the financial crisis and the last sub-period though had high volatility also witnessed rebound in US stock markets. The results showed that IBD100 had better returns in first sub-period, the loss in value during second sub-period was slightly less than S&P500 while S&P500 had better returns during the last sub-period.

The initial analysis on stocks recommended by IBD100 during entire period showed that majority of stocks recommended were growth stocks from small cap and mid cap companies.

I conducted multifactor regression on IBD100 average weekly returns, S&P500 weekly returns, difference in IBD100 and S&P500 weekly market capitalization and difference between IBD100 and S&P500 book-to-market ratios. I found that besides market beta (β), difference in size of the companies did play some significant role in explaining IBD100 average weekly returns. Multifactor regressions were again conducted for different sub-periods to gauge the significance of these variables on IBD100 weekly returns. Interestingly I found that 'size' and 'nature of

stock' were significant only during first sub-period and did not have significant impact during remaining other two sub-periods. My results also indicated shift in stock selection process towards large cap companies during second sub-period and back to small cap and mid cap stocks during last sub-period.

I also conducted Runs Test and Binomial Test of Randomness during entire study period and three sub-periods to find any evidence of 'hot hand' in their selection process. The results again show that the only time we see some evidence of 'hot hand' is during the first sub-period. During the entire 232 weeks and last two sub-periods I did not find existence of 'hot hand' in their stock selection process.

The entire study period of 232 weeks witnessed extreme volatility as a result of bearish sentiment on the bourses, but this can also be regarded the best time to analyze any fund's performance. Barring the second and third sub-period, IBD100 did yield superior returns to S&P 500 but this was also the time when majority of stocks it recommended were from small and mid cap companies. On the other hand S&P 500 is a predominantly large cap index. I also find that unlike S&P500, IBD100 does recommend ADR's and ADS in their list. Unlike IBD100, companies have to qualify certain conditions relating to their size, liquidity, public float etc. to make it to S&P500 Index. On the other hand, for a company to make it to IBD100 list it does not have to pass through similar selection criteria. This raises a question whether S&P500 Index an appropriate benchmark to compare their performance. From that perspective I search for benchmark that would have predominantly similar characteristics, in terms of 'size of the company' and 'nature of stock', to that of IBD100. Comparing Russell 2000, Russell 3000, and Russell 2000 Growth Index on these two parameters I find that Russell 2000 Growth Index is a more appropriate Index for IBD100 than the S&P500.

IBD100 performance is compared to that of S&P500 Index and Russell2000 Growth Index to have a better idea about its relative performance. I find that during the study period Russell2000 Growth had a return of 2.31% or 0.51% on an annual basis. Out of all other Indices only Russell2000 Growth had positive return during the study period. Although IBD100 returns are better than Russell 2000 Growth Index, alternative measures like IR (Information Ratio) show that IBD100 performance relative to Russell2000 Growth was not as impressive as it was relative to S&P500 Index. As expected Russell 2000 Growth Index gives a better picture of IBD100 performance than S&P500 Index.

I find that IBD100 performance is better than S&P500 and slightly better than Russell 2000 Growth Index. However there are still some unanswered questions that could serve as basis for further research on this topic.

First is the impact of transaction costs on net returns to the investor. Any investor who buys all the stocks in IBD100 list at the beginning of the week and sells them at the end of the week will have to bear transaction costs on all hundred stocks in form of brokerage fee and bid-ask spread. Considering that majority of stocks in IBD100 list were small cap stocks which generally have high bid-ask spread due to their poor liquidity, this could result in expensive transaction costs that could have substantial impact on the net position at the end of the week for the investor. Again during periods of economic uncertainty bid-ask spreads become wider and could further substantially erode any gains.

Another factor that could hurt this strategy is the effect of taxes on an investor's gains/losses. Buying and selling stocks on IBD100 list weekly would involve some capital gains and losses. Assuming an investor has net capital gains at the end of the week, the amount of taxes he would

owe as Short term Capital Gain would have substantial impact on his net gains. During our study period, Short Term Capital Gains Taxes ranged from 10%-35% while Long Term Capital Gains Taxes from 5%-15%, depending upon the investor's tax bracket. Researching the effect of transactions costs and taxes on net returns would give a better idea about IBD's performance.

A further area for research would be studying the effect of momentum on IBD100 returns. Some stocks are recommended in IBD100 consecutively for weeks. Including an additional risk factor may account for the affinity of firms with positive (negative) past returns to produce positive (negative) future returns. Carhart (1997) extended the Fama-French three factor model by including variable for momentum. He demonstrated that this factor had significant explanatory power on the returns.

The idea of this research is not to undermine IBD's stock selection process or raise questions about their methodology. I recognize that these results may vary tremendously depending upon the time period selected for research. The results do reflect the conditions that prevail in the capital markets during that time. How an investor uses IBD100 list depends upon his investment strategy and also when he actually invests following IBD100. Studying IBD's capability in terms of market timing could be another topic of research on this subject.

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