Evaluating Momentum and Contrarian Strategies For Technology Stocks During Excessive Speculation

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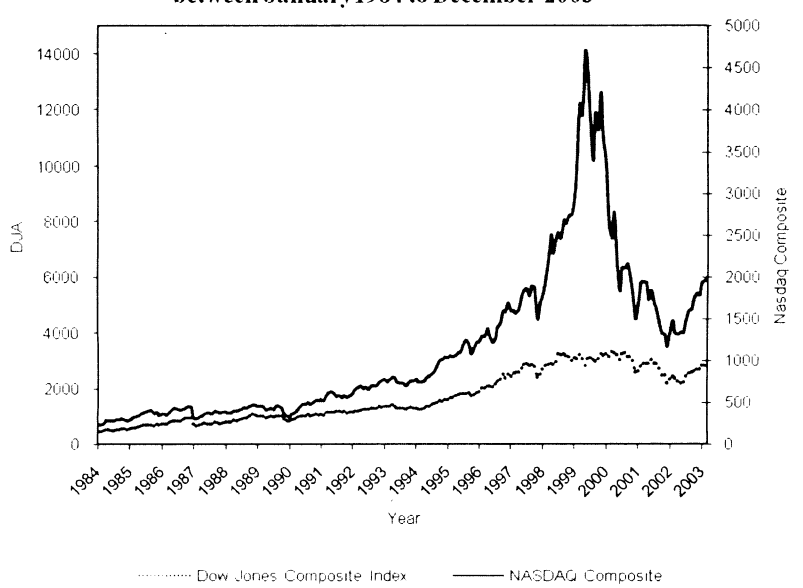
I. INTRODUCTION

There exist two important portfolio-investment strategies that have captured tremendous interest of financial academics and professionals alike in recent years: momentum strategy and contrarian strategy. The relative attractiveness of these two trading strategies depends on their relatively simple trading rules: the momentum strategy is based on price continuations and the contrarian strategy is based on price reversals. Under the momentum strategy, past winners are bought and past losers are shorted or sold. Under the contrarian strategy, past losers are bought and past winners are shorted or sold. Many recent studies have presented strong empirical evidence that abnormal profits of momentum and contrarian strategies exists in the US and non-US equity markets. For example, DeBondt and Thaler (1985, 1987) investigate return patterns over extended period of time and find that contrarian strategies perform well over 3-5 year horizons. Jegadeesh and Titman (1993) document return continuations in intermediate horizons over 3-12 month holding periods where on average, past winners continue to outperform past losers. Ahmet and Nusret (1999) find abnormal profits of long-term contrarian strategies in the stock markets of seven non-US industrialized countries. Chang et al. (1995) find abnormal profits of long-term contrarian strategies in the Japan market. Rouwenhorst (1998) examines the momentum return patterns of twelve European markets over the period of 1978 through 1995 and finds the existence of momentum profits. Hameed and Kusnadi (2002) find that a momentum strategy generates small but statistically significant profits in six Asian stock markets. Shen et al. (2005) investigates linkages between value versus growth investment styles and momentum strategies in international markets and find the evidence of profitability of momentum strategies.

Figure 1: Tech and non-tech stock prices between January 1984 to December 2003



In this paper, we investigate the performance of technology stocks by using these two widely followed investment strategies during a speculative boom period.Between the periods of second quarter of 1995 to the first quarter of 2000, stock market representing technology sectors witnessed a phenomenal increase in their value in the western nations. For example, between 1995 and 2000, the technology heavy National Association of Securities Dealers Automated (NASDAQ) composite index went from 600 to 5000 points (Figure 1). Even though Dow Jones Industrial Average (DJIA) index also gained modestly during the same time period, the growth in NASDAQ was quite significant as compared to non-tech stock prices. Many of

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the hot stocks were from the new technology firms that represented biotech, healthcare, and most notably internet sectors and related fields. In this paper, we investigate various short-term contrarian and momentum strategies for the technology stocks during dotcom bubble period. Our basic objective is to see effectiveness of various long and short trading strategies for a well balanced sample of technology stocks during the period of unprecedented stock market growth. Even though the dotcom bubble was merely speculative in nature, for a short period of time it provided an excellent trading and investment opportunity. The profitability of momentum and contrarian strategies during stock market mania of excessive speculation is not only interesting to finance academics but also to investment professionals.Therefore it is imperative to see if there exists in the market, opportunities for short term profits that can be recognized by simply monitoring daily stock returns during the bubble period and by forming various portfolios based on short and long positions. The remainder of the paper is organized as follows. In the next section, we introduce the data and sample selection procedures used throughout the paper. In section III, we describe our portfolio formation and basic methodology to analyze the data. The following section contains our main result concerning the profitability of various buy and sell strategies. In section V, we present some empirical evidence on the relationship between market beta and volatility utilizing our momentum and contrarian returns. The paper ends with a brief conclusion.

II. DATA AND SAMPLE SELECTION

Our sample consists of daily stock return data of technology stocks obtained from the Center for Research in Security Prices (CRSP). Our sample period covers the entire span of excessive speculation in the technology sector: from 17 September 1997 to 28 January 2000. The sample period excludes the previous two years of the technology bubble (that was in its mild form at the beginning) because only by September 17, 1997 a sizable number of technology stocks began trading in the market. Therefore, for implementation of various buy and selling strategies, the sample provides us enough stocks for our analysis to be relevant and meaningful. At the beginning of our sample period, there were forty-four technology stocks trading in the market and by early 2000, the trading number went up close to 150. Gradually, we see an increase in technology IPO's over the entire span of our sample period except between December 1998 to January 1999 when various technology stocks were taken off the list as they stopped trading at the market. In our sample selection basket of technology firms, we continuously adjust the newly-traded stocks addition and existing stocks exit chronologically. For the technology stocks that were dropped from the list, we adjust our sample to delete those stocks one day prior to their last trading day.

III. PORTFOLIO FORMATION AND METHODOLOGY

In evaluating various combinations of buy and selling strategies, we use the methodology employed in Lo and MacKinlay (1990) and Jegadeesh and Titman (1995). Given a series of stock prices $\{S_0, S_1, \ldots\ldots, S_T\}$, we define continuously compounded returns for period t as

$$r_t = 100\,[\ln (S_t/S_{t-1})], \quad t = 1, 2, \ldots\ldots, T.$$

We consider buying and selling stocks at each time period *t* based on their performance on that day. Specifically, at each time *t* we rank our sample of stocks in descending order and select the top *m* performers and bottom *m* performers based on r_t. The number of firms at the top and bottom of the list, *m* that we consider in our analysis are 3, 5, 7 or 10. We then construct various portfolios for each time period *t*, based on the performance of the top and bottom ranked stocks. The portfolio with the highest stock returns is the winner portfolio and the portfolio with the lowest stock return is the loser portfolio. Depending on what part of the ranking we consider, our strategy is to consider four basic short and long positions in various portfolios. They are - *buy the top m, sell the bottom m, sell the top m* and *buy the bottom m performers*. Next we utilize our set up to consider the momentum strategy of buy the top *m* and sell the bottom *m* performers simultaneously, as well as contrarian strategy of sell the top *m* and buy the bottom *m* performers at the same time. We adjust our daily returns to take transaction costs into account by incorporating a bid-ask spread of 0.30% and a nominal transaction fee of $6. As we will show it later, the main results of this paper are not sensitive to our basic specification.

IV. EVALUATION OF VARIOUS BUY AND SELL STRATEGIES

Given our portfolio formation strategies described in the previous section, based on top and bottom portfolios for each day, we essentially ended up with six possible combinations of buy and sell strategies: (i) buy the top, (ii) sell the bottom, (iii) buy the top and sell the bottom (also known as momentum), (iv) sell the top, (v) buy the bottom, and (vi) sell the top and buy the bottom (also known as contrarian). For evaluation purpose, we execute each strategy the following day. For example, for contrarian strategy, the following day the bottom performers are purchased and top performers are sold. At the end of the day we closed out all the accounts and start the evaluation process for next day's transactions. In order to compare the effectiveness of various portfolio strategies, we construct a synthetic, equally weighted buy-and-hold portfolio of internet

stocks for each day. We call this hybrid combination a benchmark portfolio and compare each individual portfolios performance with respect to benchmark portfolios return.

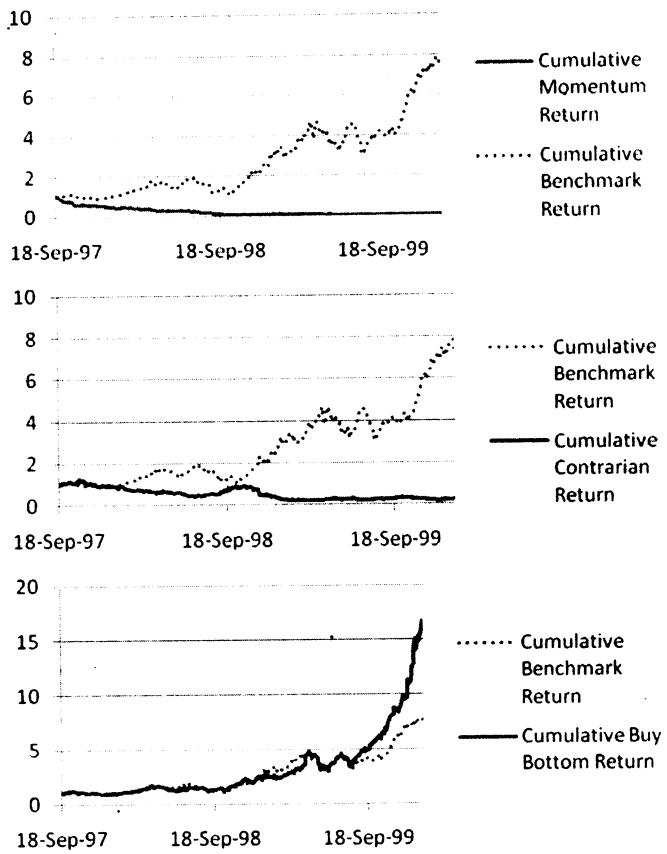
Table 1 presents the average returns, standard deviation and other useful summary statistics for all six possible strategies in addition to benchmark portfolio return. The first panel shows the results for portfolios formed on top 3 and bottom 3 performers, the second panel is for portfolios formed on top 5 and bottom 5 performers, the third panel is for portfolios formed on top 7 and bottom 7 performers, and the fourth panel illustrates the results for portfolios formed on top 10 and bottom 10 performers. It is evident that for the portfolio formed on top 3 and bottom 3 performers, the momentum strategy generated lowest average return (-1.94% daily) and highest standard deviation compared to other five strategies as well as benchmark portfolio. The momentum return is also highly skewed and shows non-normal pattern in terms of high excess kurtosis. The same conclusion is true for the portfolios formed on top 5 and bottom 5 as well as top 7 and bottom 7 performers. As the summary table indicates, both contrarian and buy bottom strategies generated a higher return than the benchmark portfolio return for portfolio formed on top 3 and bottom 3 as well as top 5 and bottom 5 performers. However, for portfolios formed on top 7 and bottom 7 as well as top 10 and bottom 10, with the exception of buy bottom strategy, all our strategies underperforms compared to benchmark portfolio returns. For example, buy bottom strategy generated a return of 0.63% daily versus a return of 0.19% daily for contrarian strategy for portfolios formed on top 7 and bottom 7 performers. For portfolios formed on top 10 and bottom 10, the average return is 0.53% daily for buy bottom strategy compared to 0.37% daily for benchmark portfolio. The portfolio return based on buy top strategy always has negative average return with the exception of the portfolios formed on top 10 and bottom 10 performers. Moreover, expected benchmark portfolio always has the lowest standard deviation and its return distribution is much closer to normal distribution.

The above observations are also clearly visible when we compare the cumulative distribution of various buy and sell strategies. The cumulative return measures the return over the relevant time period from various trading strategies and is a useful tool for measuring overall portfolio performance. For example, in Figure 2, we plot the cumulative benchmark return for portfolios formed on top 10 and bottom 10 performers with respect to three trading strategies separately: cumulative momentum, cumulative contrarian and cumulative buy bottom returns. From the time series plot of first two panels, it is evident that for momentum and contrarian portfolio, the cumulative return underperforms compared to benchmark cumulative return. It is only buy bottom strategy that has generated a cumulative return higher than the benchmark portfolio cumulative return as shown in the last panel of Figure 2.

It is well known that NASDAQ structures its pricing around the bid-ask and reduction of bid-ask spread in the marketplace is a likely motive for exchange listing. For example, Grammatikos and Papaioannou (1986) show that price effects associated with switching to another marketplace are directly related to the size of the spread the stocks had in the original marketplace. Therefore, it is desirable to see whether the bid-ask spread has any bearing on the profitability of the various buy and sell strategies. In Table 2 and 3, we provide the descriptive statistics for six stock strategies and benchmark portfolios with a bid-ask spread of 20% and 40% respectively. Interestingly, the results in Table 2 and 3 also indicate that buy bottom strategy always generates a higher average return compared to benchmark portfolio. In addition, for portfolios formed on top 3 and bottom 3 as well as top 5 and bottom 5 performers, the contrarian strategy always over performs and provides an average return that is comparable to benchmark portfolio. The momentum strategy always underperforms and generates lowest average return compared to other five trading strategies as well as benchmark portfolio. The magnitude of the negative return of momentum strategies also becomes higher when bid-ask spread estimate is 40% instead of 20%. Irrespective of any portfolio size we consider, momentum and contrarian trading strategies always has the highest standard deviation.

Overall, our results shows that both contrarian and buy bottom strategy is preferable for portfolios formed on top 3 and bottom 3 as well as top 5 and bottom 5 performers. However, when we consider portfolios formed on top 7 and bottom 7 as well as top 10 and bottom 10 performers, it is only buy bottom strategy that is more desirable with respect to technology stocks during the bubble period. We conjecture that speculative nature of the technology stock market may partially explain the behavior. Starting 1996-1997, investors and analysts were extremely over optimistic on the NASDAQ and most technological companies. Even though the firm fundamentals were difficult to value, the PC makers, semi-conductor manufacturers, telecommunications and wireless players, internet startups, and biotech firms were seen with spectacular stock prices and high growth rate potentials. As a result, investors overvalued the technology stocks and overreacted to conflicting information on a daily basis. For example, at their peak, the average Price to Earnings (P/E) ratios on the NASDAQ (excluding stocks with no earnings) approached 120, as compared to the Standard and Poor's historical average of 14. As a result, despite higher transaction costs, by executing a buy bottom strategy, a technology investor could take advantage of the overreactions in order to generate higher returns.

Figure 2: Performance of Momentum, Contrarian and Buy Bottom Cumulative Returns With Respect To Benchmark Cumulative Returns



V. ROBUSTNESS TO TIME VARYING MARKET RISK AND VOLATILITY

In this section, we investigate the relationship between the expected return of our two main investment strategies – momentum and contrarian, and the benchmark portfolio return as well as NASDAQ composite index return by employing the following two equations:

$$Y_t = \beta_1 + \beta_2 X_t + u_t \quad (1)$$

$$Y_t = \beta_1 + \beta_2 X_t + u_t, h_t = \text{Var}(Y_t | Y_{t-1}, Y_{t-2}, \ldots \ldots) = \delta_1 + \delta_2 u^2_{t-1} + \delta_2 h_t\text{-}1 \quad (2)$$

For the dependent variable Y_t we use momentum returns and contrarian returns separately, and for independent variable X_t we use benchmark returns and NASDAQ composite index returns separately. For both equations, the slope (β_2) is the factor loading with respect to benchmark portfolio return or NASDAQ composite index return in the time series regression, while β_1 is the intercept of the regression line and u_t is the error term. For equation 2, h_t represents the time-varying conditional variance - popularly known as generalized autoregressive conditional heteroskedasticity (GARCH) model. In this way, the error term has a conditional variance that is a function of the magnitudes of past error. We include the GARCH part in our framework to tackle temporal dependence and existence of conditional heteroskedasticity. Before moving into GARCH estimation, we evaluate some summary statistics about the sample moments and test for dependence of the residual for equation 1 (not reported). The sample skewness and kurtosis for all four models in first panel of Table 4 and the Jarque-Bera normality tests statistics indicate high non-normality. In addition, the Ljung-Box Q-statistics for residuals and squared residuals indicates significant temporal dependence and existence of conditional heteroskedasticity. In other words, it justifies the estimation of all of our models with time varying conditional variance. We also employed the Augmented Dicky-Fuller unit root test to test for nonstationarity for four models investigated in this table and do not find any evidence of nonstationarity.

Estimates of different models are given in the top and bottom panel of Table 4. The result shows that the intercept (β_1) is indistinguishable from zero for two out of four models at the 1-percent level. The slope coefficient for the benchmark

returns and NASDAQ composite index returns are highly significant for all models. However, the inclusion of conditional variance makes benchmark portfolio negatively correlated with only contrarian returns. Estimation results of the GARCH model part indicate a significant presence of conditional variance, since all δ_2 coefficients in equation 2 for four conditional models are significant. The volatility is found to be persistent for contrarian returns since the coefficient of lagged volatility δ_3 is positive and significant only for model 2 and 4, indicating that high conditional variance is followed by high conditional variance. Additionally, it is worth noting that the slope coefficient (portfolio betas) for mean part increases in absolute value almost always once the equation for conditional variance has been added to the model. In terms of overall model performance, we observe some improvements with respect to R^2. The values of R^2 ranges between 0.41 to 0.60, indicating that the independent variables help explain about 60% of the variation in the dependent variable. We also see that the differences between betas of momentum and contrarian portfolios based on all strategies are not always statistically significant. The statistical insignificance of the beta difference between the loser and winner indicates that the beta risk alone cannot explain the contrarian and momentum profits documented in top panel of Table 4. In other words, since the degree of uncertainty in stock returns varies over time, the compensation required by risk averse economic agents for holding various winner and looser portfolios based on those risky assets, must also be time varying.

VI. CONCLUSION

The profitability of various buy and sell trading strategies during stock market mania of excessive speculation is not only interesting to finance academics and but also to investment professionals. In this paper, we highlight the judiciousness of some of those trading strategies in terms of simple average return and risk. Our result shows that contrarian strategy is preferable compared to momentum strategy for any portfolio size and bid-ask spread. Also, the buy bottom strategy always over performs and provides an average return that is higher than benchmark portfolio average return. Even though buy bottom strategy has higher risk; a technology investor could take advantage of it to generate surpassing returns despite higher transaction costs. An important area of future research would be the inclusion of different time horizons besides daily indicators and an alternative asymmetric weighting scheme for top and bottom performers. Also, the construction of a more refined version of benchmark portfolio based on equally-weighted index would be an interesting exercise.

Table 1

Descriptive statistics for 7 stock portfolios formed on various trading strategies (with a bid-ask spread of 0.30%): 17 September 1997 to 28 January 2000, 596 observations

		Descriptive Statistics				
Trading Strategies	Average	Std. Dev	Max	Min	Skewness	Kurtosi
		Portfolios formed on top 3 and bottom 3				
Buy Top	-0.28	7.04	48.27	-18.17	1.54	7.61
Sell Bottom	-1.66	5.92	15.26	-46.08	-1.26	6.23
Momentum	-1.94	8.55	47.09	-43.92	0.32	4.02
Benchmark	0.37	2.53	11.28	-12.79	-0.50	2.94
Contrarian	0.95	8.55	42.96	-48.11	-0.32	4.01
Sell Top	-0.21	7.04	17.59	-48.81	-1.54	7.61
Buy Bottom	1.16	5.93	45.66	-15.68	1.27	6.27
		Portfolios formed on top 5 and bottom 5				
Buy Top	-0.14	5.38	32.87	-17.00	1.16	5.53
Sell Bottom	-1.32	4.60	14.82	-28.51	-0.63	3.22
Momentum	-1.47	6.46	34.34	-31.86	0.29	3.86
Benchmark	0.37	2.53	11.28	-12.79	-0.50	2.94
Contrarian	0.48	6.46	30.78	-35.36	-0.28	3.86
Sell Top	-0.35	5.38	16.70	-33.23	-1.16	5.51
Buy Bottom	0.83	4.61	28.09	-15.24	0.65	3.25
		Portfolios formed on top 7 and bottom 7				
Buy Top	-0.05	4.78	28.79	-19.56	1.05	6.02
Sell Bottom	-1.13	3.95	12.28	-22.20	-0.48	2.36
Momentum	-1.18	5.38	23.28	-23.37	0.22	2.98
Benchmark	0.37	2.53	11.28	-12.79	-0.50	2.94
Contrarian	0.19	5.38	22.29	-24.18	-0.21	2.97
Sell Top	-0.44	4.77	19.26	-29.15	-1.04	6.01
Buy Bottom	0.63	3.95	21.78	-12.70	0.49	2.39

Trading Strategies	Average	Descriptive Statistics				
		Std. Dev	Max	Min	Skewness	Kurtosi
		Portfolios formed on top 10 and bottom 10				
Buy Top	0.17	4.17	33.23	-16.06	0.97	7.91
Sell Bottom	-1.02	3.56	13.22	-16.89	-0.23	2.62
Momentum	-0.85	4.47	27.40	-19.10	0.21	4.02
Benchmark	0.37	2.53	11.28	-12.79	-0.50	2.94
Contrarian	-0.14	4.46	18.02	-28.24	-0.20	4.00
Sell Top	-0.66	4.17	15.76	-33.59	-0.96	7.85
Buy Bottom	0.53	3.56	16.29	-13.76	0.24	2.64

Table 2

Descriptive statistics for 7 stock portfolios formed on various trading strategies (with a bid-ask spread of 0.20%): 17 September 1997 to 28 January 2000, 596 observations

Trading Strategies	Average	Descriptive Statistics				
		Std. Dev	Max	Min	Skewness	Kurtosi
		Portfolios formed on top 3 and bottom 3				
Buy Top	-0.20	7.04	48.36	-18.07	1.54	7.61
Sell Bottom	-1.57	5.92	15.33	-46.01	-1.27	6.24
Momentum	-1.77	8.55	47.26	-43.76	0.32	4.02
Benchmark	0.38	2.53	11.29	-12.78	-0.50	2.94
Contrarian	1.11	8.55	43.12	-47.94	-0.32	4.01
Sell Top	-0.13	7.04	17.68	-48.72	-1.54	7.61
Buy Bottom	1.24	5.93	45.73	-15.61	1.27	6.26
		Portfolios formed on top 5 and bottom 5				
Buy Top	-0.06	5.38	32.93	-16.95	1.16	5.52
Sell Bottom	-1.24	4.60	14.89	-28.44	-0.64	3.23
Momentum	-1.30	6.46	34.51	-31.68	0.29	3.86
Benchmark	0.38	2.53	11.29	-12.78	-0.50	2.94
Contrarian	0.65	6.46	30.96	-35.19	-0.29	3.86
Sell Top	-0.27	5.38	16.75	-33.17	-1.16	5.51
Buy Bottom	0.91	4.61	28.16	-15.17	6.49	3.25
		Portfolios formed on top 7 and bottom 7				
Buy Top	0.03	4.78	28.85	-19.51	1.05	6.02
Sell Bottom	-1.04	3.95	12.35	-22.13	-0.48	2.37
Momentum	-1.01	5.38	23.43	-23.19	0.22	2.98
Benchmark	0.38	2.53	11.29	-12.78	-0.50	2.94
Contrarian	0.35	5.38	22.47	-24.03	-0.22	2.97
Sell Top	-0.36	4.77	19.31	-29.09	-1.04	6.01
Buy Bottom	0.71	3.95	21.85	-12.63	0.49	2.39
		Portfolios formed on top 10 and bottom 10				
Buy Top	0.25	4.17	33.29	-16.01	0.97	7.90
Sell Bottom	-0.94	3.56	13.31	-16.79	-0.23	2.63
Momentum	-0.69	4.47	27.54	-18.92	0.21	4.02
Benchmark	0.38	2.53	11.29	-12.78	-0.50	2.94
Contrarian	0.03	4.46	18.20	-28.10	-0.20	4.00
Sell Top	-0.58	4.17	15.81	-33.53	-0.96	7.86
Buy Bottom	0.61	3.56	16.39	-13.67	0.24	2.63

Note: All the regression results are based on Portfolios formed on top 10 and bottom 10 performers. For model 1, the dependent variable is momentum returns and independent variable is benchmark returns. For model 2, the dependent variable is contrarian returns and independent variable is benchmark returns. For model 3, the dependent variable is momentum returns and independent variable is NASDAQ composite index returns. For model 4, the dependent variable is contrarian returns and independent variable is NASDAQ composite index returns. (*) indicates that the coefficient is significant at 1% significant level. (**) indicates that the coefficient is significant at both 1% and 5% significance level. For ordinary lest squares estimation, the standard errors are corrected for heteroskedasticity and autocorrelation.

Table 3

Descriptive statistics for 7 stock portfolios formed on various trading strategies (with a bid-ask spread of 0.40%): 17 September 1997 to 28 January 2000, 596 observations

		Descriptive Statistics				
Trading Strategies	Average	Std. Dev	Max	Min	Skewness	Kurtosi
		Portfolios formed on top 3 and bottom 3				
Buy Top	-0.36	7.05	48.48	-18.72	1.54	7.61
Sell Bottom	-1.74	5.92	15.19	-46.15	-1.26	6.23
Momentum	-2.01	8.55	46.92	-44.08	0.32	4.02
Benchmark	0.35	2.53	11.27	-12.80	-0.50	2.94
Contrarian	0.79	8.55	42.80	-48.28	-0.32	4.01
Sell Top	-0.29	7.04	17.50	-48.90	-1.54	7.61
Buy Bottom	1.08	5.93	45.59	-15.75	1.27	6.27
		Portfolios formed on top 5 and bottom 5				
Buy Top	-0.22	5.39	32.81	-17.05	1.16	5.53
Sell Bottom	-1.41	4.60	14.75	-28.58	-0.63	3.22
Momentum	-1.63	6.46	34.17	-32.04	0.29	3.86
Benchmark	0.35	2.53	11.27	-12.80	-0.50	2.94
Contrarian	0.32	6.46	30.60	-35.53	-0.28	3.85
Sell Top	-0.43	5.38	16.65	-33.29	-1.16	5.50
Buy Bottom	0.75	4.61	28.02	-15.31	0.65	3.26
		Portfolios formed on top 7 and bottom 7				
Buy Top	-0.13	4.78	28.73	-19.61	1.05	6.03
Sell Bottom	-1.21	3.95	12.21	-22.27	-0.47	2.36
Momentum	-1.34	5.38	23.13	-23.55	0.22	2.98
Benchmark	0.35	2.53	11.27	-12.80	-0.50	2.94
Contrarian	0.03	5.38	22.11	-24.33	-0.21	2.97
Sell Top	-0.52	4.77	19.21	-29.21	-1.04	6.01
Buy Bottom	0.55	3.95	21.71	-12.77	0.50	2.39
		Portfolios formed on top 10 and bottom 10				
Buy Top	0.17	4.17	33.23	-16.89	-0.97	7.91
Sell Bottom	-1.02	3.56	13.22	-16.89	-0.23	2.62
Momentum	-0.85	4.47	27.40	-19.10	0.21	4.02
Benchmark	0.35	2.53	11.27	-12.80	-0.50	2.94
Contrarian	-0.14	4.46	18.02	-28.24	-0.20	4.00
Sell Top	-0.66	4.17	15.76	-33.59	-0.96	7.85
Buy Bottom	0.53	3.56	16.29	-13.76	0.24	2.64

Table 4

Estimate of the regression of momentum and contrarian portfolios on benchmark portfolio and NASDAQ composite index returns: 17 September 1997 to 28 January 2000, 596 observations

Coefficient and Diagnostics	Model 1	Model 2	Model 3	Model 4
		Ordinary least squares estimation		
β_1	-.009(**)	-.005	.001	-.001
β_2	0.23(*)	-.23(*)	-.008	-.001
R^2	0.31	0.40	0.29	0.43
		GARCH model estimation		
β_1	-.01(*)	0.001	-.009(**)	-.001
β_2	0.28(**)	-.28(**)	.002(**)	.002(**)
δ_1	.009(**)	0.001	.001(**)	.001(**)
δ_2	0.28(**)	0.28(**)	0.29(**)	0.27(**)
δ_3	0.25	0.25(*)	0.16	0.17(*)
R^2	0.52	0.60	0.41	0.60

(Continued on page 21)

Corporation of India and 9 general insurance companies in addition to 4 state owned companies viz. The United India Insurance, New India Assurance, Oriental Insurance and National Insurance Company, the private insurers have already proved their success by way of their performance during the current financial year with 71% growth in the premium income. The investors worldwide are eagerly waiting for establishing their insurance business in India with a fond hope of government of India announcement on the increased capital in FDI investment and FII in the Indian insurance segment.

India: Life Insurance scenario

	Premium U/W 2004-05[1] Rs. In lakhs	Premium U/W 2003-04 [2] Rs. In lakhs	Premium growth over previous year (%)	Premium market share (%)	Policies market share (%)
LIC	1,978,593.20	1,624,042.67	21.83	78.07	91.50
ICICI prudential	158,408.46	75,091.03	110.95	6.25	2.34
Bajaj Allianz	86,001.80	17,970.51	378.57	3.39	1.10
Birla Sunlife	62,128.31	44,986.19	38.11	2.45	0.76
HDFC Standard	48,615.08	20,933.26	132.24	1.92	0.79
SBI Life	48,293.56	20,247.71	138.51	1.91	0.49
Kotak Mahindra old mutual	37,475.21	12,408.24	202.02	1.48	0.24
Tata AIG	30,022.07	18,015.47	66.65	1.18	0.57
ING Vysya	28,162.46	7,255.66	288.14	1.11	0.42
Max New York	22,469.01	13,148.80	70.88	0.89	0.83
Aviva	19,229.27	7,713.84	149.28	0.76	0.32
AMP Sanmar	9,118.44	2,788.16	222.04	0.36	0.13
Met life	5,603.71	2,338.16	139.66	0.22	0.18
Sahara Life	167.09	—	0.01	0.04	—
Total	2,534,120.58	1,866,939.70	1963.89	100.00	100.00

Source : IRDA Journal, May 2005, [1] Fiscal Year ending March 2005, [2] Fiscal Year ending March 2004

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