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Fundamental analysis and stock returns: An Indian evidence

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This paper investigates the relationship between accounting information and stock returns of selected Indian stocks pertaining to Information Technology, Banking and Pharmacy sectors over the past ten years starting from 2001 to 2010. In this research work a simple financial score is designed to capture short term changes in firm's operating efficiency, Profitability and Financial policy. Investigating accounting information and stock returns is a method adopted in Fundamental analysis, which is helpful in predicting future stock returns and for explaining the momentum phenomenon in stock prices. For the purpose of this research work were chosen from Banking, Pharmacy and Information Technology. For a period of ten years the data pertaining to operating efficiency, profitability and financial policy was ascertained. All this data is then put into F SCORE as developed by Piotroski in the year 2000. The score values and market returns as provided by the companies were correlated to investigate the relationship between the score and the market adjusted returns. The goal of this paper is to show that investors can create a stronger value portfolio by using simple historical financial performance.

Keywords: Fundamental analysis, Financial Statements, Return on assets, Book to market ratio,

INTRODUCTION

The mobility and usage of assets determine the Economic development of a nation. Conducive Economic environment attracts investments, which in turn influences the development of the Economy. One of the essential criteria for the assessment of the Economic development is the quality and quantity of assets in a nation at a specific time. Real assets comprise the Physical and Intangible items available to a society.

Physical assets are used to generate activity and result in positive or negative contribution to the owner of the asset. Intangible assets also result in a positive or negative contribution to the owner, but are different in that they do not have a physical shape or form. In fact, intangible assets help physical assets in generating activity. Intangible assets can be said to be behind the scene with respect to productive activities. Besides real assets, the Economy is supported by another group of assets called Financial Assets. The major component of the Financial Assets is cash, also some other examples of financial assets are Deposits, Debt Instruments,

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Shares and Foreign Currency Reserves. Assets in any Economy can thus be broadly grouped into Physical, Financial and Intangible assets, based on their distinct characteristics. Physical assets can be classified into fixed assets and working capital assets. Intangible assets are Goodwill, Patents, Copyrights, and royalties. In a Macro sense, financial assets are regulated by the Government of an Economy. Financial assets smoothen the trade and transactions of an Economy and give the society a standard measure of valuation. At the Macro level, financial assets represent the Currency/Future value of physical and intangible assets. The Current/Future value of financial assets on the Current/Future return expectations from these financial instruments. The important component of such financial asset is Shares, which worldwide is accepted as a major financial asset to speculate and earn higher returns by the market participants. While doing such speculation one has to be more prudent by forecasting the future market developments.

Fundamental Analysis

Fundamental analysis is a method of finding out the future price of a stock which an investor wishes to buy. It relates to the examination of the intrinsic worth of a company to find out whether the current market price is fair or not, whether it is overpriced or under priced. It believes that analyzing the economy, strategy, management, product, financial status and other related information will help to choose shares that will outperform the market and provide consistent gains to the investor. It is the examination of the underlying forces that affect the interest of the economy, industrial sectors and companies. It tries to forecast the future movement of the capital market using signals from the Economy, Industry and Company. It requires an examination of the market from a broader perspective. The presumption behind fundamental analysis is that a thriving economy fosters industrial growth which leads to development of companies. Estimate of real worth of a stock is made by considering the earning potential of the company which depends on investment environment and factors relating to specific industry, competitiveness, quality of management, operational efficiency, profitability, capital structure and dividend policy.

LITERATURE REVIEW

The origin of Fundamental analysis for the share price valuation can be dated back to Graham and Dodd (1934) in which the authors have argued the importance of the fundamental factors in share price valuation. Theoretically, the value of a company, hence its share price, is the sum of the present value of future cash flows discounted by the risk adjusted discount rate. This

conceptual valuation frame work is the spirit of the renowned dividend discount model developed by Gordon (1962). However, the dividend discount model valuation involves the forecast of future dividend payment which is difficult due to the changes in firm's dividend policy. Thus, the subsequent studies along this line of literature searched for the cash flow that is unaffected by the dividend policy and can be obtained from the financial statements.

Ou and Penman (1989) use financial statement analysis of income statement and balance sheet ratios to forecast future earnings. The primary motivation for this research is to identify mispriced securities. However, these authors demonstrate that the information in the earnings prediction signals is helpful in generating abnormal stock returns.

Fama and French (1992) show that value stocks (high book/market) significantly outperform growth stocks (low book/market). The average return of the highest book/market decile is reported go be one percent per month higher than the average return for the lowest book/market decile.

Jagadeesh and Titman (1993) document that over a horizon of three to twelve months, past winners on an average continue to outperform past losers by about one percent per month.

Lev and Thiagarajan (1993) use conceptual arguments to study their ratios. They demonstrate that the earnings prediction signals in variables like growth in accounts receivables relative to sales growth and gross margin rate are incrementally associated with contemporaneous stock returns and are significant in predicting future earnings.

Joseph. D. Piotroski (2000) examines whether a simple accounting based Fundamental Analysis strategy, when applied to a broad portfolio of high Book to Market firms, can shift the distribution of returns earned by an investor. The research shows that the mean returns earned by a high Book to Market investor can be increased by at least 7.5% annually through the selection of financially strong high Book to Market firms.

Pascal Nguyen, (2003) constructs a simple financial score designed to capture short term changes in firm operating efficiency, profitability and financial policy. The scores exhibit a strong correlation with market adjusted returns in the Current fiscal period and the same continues in the following period also.

Statement of the Problem

Analyzing the stock returns is a matter to contemplate among the equity researchers. To analyze the predictability of stock returns the researchers use various tools and techniques which might not give assured results. Therefore, to facilitate such prediction Academicians as well as the Equity Researchers have developed several innovative techniques and one such

technique is F-Score as developed by Piotroski (2000). The current research work emphasizes on the work of Piotroski in the Indian context. The technique of F-score is applied to the Indian Banking, Pharmacy and Information Technology stocks and the process is evaluated as suggested by Piotroski. The current research work concentrates on eight fundamental signals to measure financial efficiency, Profitability and Operating efficiency of the said firms in the Indian context.

OBJECTIVE

Constructing F-Score to evaluate Information Technology, Pharmacy and Banking firms in the Indian context.
The objective of the study can be concluded by
- Usage of Eight fundamental signals to measure three areas of Firm's financial condition: Profitability, Operating efficiency and Financing Decision
- Classification of companies as "Good" or "Bad" depending on the signal's implications for future prices and profitability.
- Constructing aggregate signal to measure the overall strength of the firm's financial position.

METHODOLOGY

The current research work is contemplated after thoroughly reviewing the above mentioned literature. For the purpose of this work firms are broadly categorized as Information Technology, Pharmacy and Banking. At the first instance Book-to-Market ratio is calculated to identify firm's having high Book-to-Market ratio. After this calculation a comprehensive FSCORE was constructed for those firms having high book-to-market ratio. Firms having highest FSCORE were given the first rank followed by those having lower FSCORE. For these firms Stock returns, Earnings per Share and Price Earning were ascertained for ten years.

The present work considers eight fundamental signals to measure three areas of the firm's financial condition; that is, Profitability, Operating efficiency and Financing decisions. The firm's signal realization is classified as either "good" or "bad" depending on the signal's implication for future prices and profitability. An indicator variable for the signal is equal to one is assigned if the signal's realization is good otherwise zero is assigned if it is bad. The aggregate measure is the sum of eight signals; portfolios examined are based on the strength of the aggregate signal.

An insight into FSCORE

FSCORE is a composite indicator which incorporates various fundamental aspects of the firm and it is constructed to examine the future performance of the firm. The concept of FSCORE was developed JOSEPH.D.PIOTROSKI, Professor, The University of Chicago, Graduate School of Business, in the year 2000. The goal of this research work is to show that investors can create stronger value portfolios by using simple historical financial performance.

Professor Piotroski identifies three broad heads to measure the financial performance of a company which are identified as Financial Performance Signals. They are:

Profitability Signals

Under this category four variables are identified to measure the Profitability related factors. These include, Return on Assets (ROA), Cash Flow From Operations (CFO) and Change in Return on Assets (AROA) and Accrual which is the difference between ROA and CFO. Return on Assets (ROA) and Cash Flow From Operations are assigned a value equal to One if they are positive, Zero otherwise. Cash flow from operation is considered because it is a better indicator for profitability than earnings for early stage firms. If firms experience positive change in return on assets, that is when the firms is improving its ability to generate profits. Then the variable AROA is assigned a value of one and zero otherwise.

Operating efficiency

The second group of fundamental variables used to measure firm's overall health are operating efficiency related, which includes, DMARGIN (Change in Gross Margin) and DTURN (Change in Asset Turnover). Firms experience positive change in gross margin when they employ better cost reduction or have better pricing power for their products. A higher gross margin represents improvement in generating profits and should be considered a good signal about future operations. The variable DMARGIN is assigned a value of one if it is positive and zero otherwise. The firms with positive DTURN is expected to have better future performance and financial soundness. Therefore, the variable DTURN is assigned a value of one and zero otherwise.

Solvency and Liquidity

Solvency and Liquidity are the two measures which indicate the Long term and Short term obligations of the business. Solvency is the ability of a firm in repaying its Long term obligations whereas, Liquidity is the ability of a firm in repaying its current obligations. These variables are identified as DLEVER (Change in Leverage), DLIQUID (Change in Current ratio) and EQOFFER (equity issuance). As the pecking order theory (Myers

and Majluf—1984) argued, firms issue debt when the internally generated funds are not available. The increase in use of financial leverage indicate firm's difficulty in generating capital internally and could be a bad signal for future operations. Therefore, the variable DLEVER, is assigned a value of one if the firm decreases its use of financial leverage from last year and zero otherwise.

Similarly, the variable DLIQUID is assigned a value of one if the firm decreases its current ratio from last year and zero otherwise. The last signal related to firm's Solvency and Liquidity is EQOFFER which is indicator variable equal to one if the firm had not equity issuance in the previous year and zero otherwise. This indicator variable is again is based on the pecking order theory in which equity issuance is the last resort of raising capital for a firm because of its large degree of asymmetric information. Equity issuance by a firm suggests its difficulty in raising capital from its own operations or long term debt. Therefore, it is a bad signal for the overall financial strength and future prospects of a firm if it used equity financing.

Given these nine signals discussed above, Piotroski (2000) constructed a composite score to assess the financial soundness of a firm and the author named it as FSCORE. The sum of these nine indicator variables ranges from zero to nine with nine indicating a firm with more good signals and zero indicating a firm having less good signals.

Thus, the final score is represented as follows:

FSCORE= ROA+AROA+CFO+ACCRUAL+DMARGIN+DTURN+DLEVER+DLIQUID+EQOFF

Above table presents the Correlation results of Fundamental Variables and Top F_Score firms. It is very apparent that all the variables are achieving a positive correlation indicating the relationship of financial variables and health of a business. The table above investigates the relationship between Financial Statement Analysis and firm's financial health. Nine variables as suggested by Piotroski (2000) are considered for Top 30 (thirty) F_Score companies comprising of Banking, Pharmacy and Information Technology. Although all the variables are not statistically significant at 1% and 5% significance levels, the positive correlation implies that firm's future returns are dependent upon historical financial data. In addition to this, the positive correlation also denotes that the fundamental factors inform the investors about the future return performance.

This result is in consistent with the evidence presented by Jaouida Elleuch, Jaouida Elleuch, 2009, Fundamental Analysis Strategy and the Prediction of Stock Returns, International Research Journal of Finance and Economics, Issue 30, page 95-108. (Faculty of Economics and Management Sciences, University of Sfax, Tunisia) http://www.eurojournals.com/finance.htm, in this research work also, all the variables are not achieving significance at 1% and 5% level of significance. But, the results show that fundamental signals have a positive and significant correlation with future earnings performance and the winner portfolio have future earnings realization that out performs loser portfolio.

Following sequence presents the results of correlation between individual signals, the results are measured at 1% and 5% level of significance.

Return on Assets

ROA is an important profitability variable and as such it is having a strong correlation coefficient with variables such as Accrual, De Lever, Equity offer and D Margin. ROA is calculated by dividing Profit after Tax with Total Assets, the variables which have achieved strong correlation majorly contribute towards the augmentation of profits. Hence, it can be concluded that the variables identified are having larger influence on ability of the company in maximizing its profits.

Accrual as a variable taken as the difference between Return on Assets and Cash Flow from Operations, according to the quoted research works Accrual should be negatively related to firm's future expected returns. High negative accrual indicates effective usage of fixed assets and hence, good return on assets. The current research work founds that all the high score firms are achieving negative accrual and because of this toper firms are having healthy Return on Assets. Accrual is significant at 1% level.

De Lever as a variable taken as Financial Leverage which is widely recognized as Trading on Equity. The Debt Equity combination provides leverage for a business in terms of maximizing its profits and various other returns. In the current analysis, it aptly correlates with Return on Assets and this correlation is significant at 1% level.

Equity Offer is another variable having a significance at 1% level, and as interpreted above the combination of debt and equity mix augments future returns and increases the quality of earnings of the business.

D Margin is another variable achieving significance at 5% level with Return on Assets. Gross Margin is an indicator of overall efficient performance of a business. The variable aptly correlates with Return on Assets indicating the contribution of Assets towards the augmentation of the Gross Margin. High score firms Assets are contributing towards the growth of the Gross Margin and over a period of 10 years all high score firms Gross Margin is monotonously increasing. The above results are in consistent with the evidence as shown by Piotroski (2000)

AROA and D LIQUID

AROA as a variable is correlating with D LIQUID and the result is significant at 1%. D LIQUID as a variable establishes the relationship between Current Assets and

Table 1. Correlation among fundamental Variables and TOP F Score

		ROA	AROA	CFO	ACCRUAL	DMARGIN	DTURN	DLEVER	DLIQ	EQOFFER	FSCORE
ROA	Pearson Correlation	1	-.122	.253	.535**	-.445*	-.221	-.580**	.228	.558**	.218**
	Sig. (2-tailed)		.522	.177	.002	.014	.240	.001	.225	.001	.002
	N	30	30	30	30	30	30	30	30	30	30
AROA	Pearson Correlation	-.122	1	.038	-.126	.141	.060	.270	-.752**	.086	.041*
	Sig. (2-tailed)	.522		.840	.508	.458	.753	.150	.000	.651	.029
	N	30	30	30	30	30	30	30	30	30	30
CFO	Pearson Correlation	.253	.038	1	-.682**	-.313	-.164	-.326	.012	.011	.174*
	Sig. (2-tailed)	.177	.840		.000	.093	.388	.079	.949	.955	.035
	N	30	30	30	30	30	30	30	30	30	30
ACCURAL	Pearson Correlation	.535**	-.126	-.682**	1	-.063	-.025	-.154	.162	.413*	-.013
	Sig. (2-tailed)	.002	.508	.000		.740	.898	.418	.392	.023	.945
	N	30	30	30	30	30	30	30	30	30	30
DMARGIN	Pearson Correlation	-.445*	.141	-.313	-.063	1	.843**	.692**	-.139	-.094	.145*
	Sig. (2-tailed)	.014	.458	.093	.740		.000	.000	.463	.621	.044
	N	30	30	30	30	30	30	30	30	30	30
DTURN	Pearson Correlation	-.221	.060	-.164	-.025	.843**	1	.360	-.049	-.038	-.033
	Sig. (2-tailed)	.240	.753	.388	.898	.000		.051	.795	.844	.862
	N	30	30	30	30	30	30	30	30	30	30
DLEVER	Pearson Correlation	-.580**	.270	-.326	-.154	.692**	.360	1	-.220	-.139	.394*
	Sig. (2-tailed)	.001	.150	.079	.418	.000	.051		.243	.464	.031
	N	30	30	30	30	30	30	30	30	30	30
DLIQ	Pearson Correlation	.228	-.752**	.012	.162	-.139	-.049	-.220	1	.008	-.032
	Sig. (2-tailed)	.225	.000	.949	.392	.463	.795	.243		.965	.869
	N	30	30	30	30	30	30	30	30	30	30
EQOFFER	Pearson Correlation	.558**	.086	.011	.413*	-.094	-.038	-.139	.008	1	-.096
	Sig. (2-tailed)	.001	.651	.955	.023	.621	.844	.464	.965		.614
	N	30	30	30	30	30	30	30	30	30	30
FSCORE	Pearson Correlation	.218**	.041*	.174*	-.013	.145*	-.033	.394*	-.032	-.096	1
	Sig. (2-tailed)	.002	.029	.035	.945	.044	.862	.031	.869	.614	
	N	30	30	30	30	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Current Liabilities. Change in Return on Assets correlating with current ratio indicates that current assets are contributing towards the positive change in Return on Assets.

Accrual, ROA and CFO

As quoted by Sloan (1996) Accrual is negatively related to firms future expected returns and firms having positive Accrual will have a tedious task in maximizing returns in future. The current research endorses this fact by finding positive correlation between ROA and CFO which is significant at 1% level, indicating the close relationship between the variables. This further strengthens the view that Accrual is negatively related to firm's future returns. Therefore, all top score firms will have capability in maximizing returns in future. Hence, this builds up the confidence of investors to choose those firms having

negative accrual, anticipating good future returns. This result is in consistent with the evidence shown by Sloan (1996).

D Margin, D Turn, De Lever and ROA

Gross profit margin finds itself correlated with D Turn and De Lever which has significance at 1% level and ROA at 5% level of significance. This clearly endorses the fact that change in assets turn over, debt equity mix along with positive return on assets achieves higher gross margin. D Turn is an operating efficiency variable which exactly correlates with another operating efficiency variable that is, D Margin. De Lever is a solvency variable, solvency and operating efficiency are also positively correlated which establishes the fact that operating efficiency assures solvency.

Table 2. Correlation among Fundamental Variables and Bottom F_Score

		ROA	AROA	CFO	ACCURAL	DMARGIN	DTURN	DLEVER	DLIQ	EQOFFER	FSCORE
ROA	Pearson Correlation	1	-.006	.548**	.518**	-.016	.042	.125	-.042	-.475**	-.151
	Sig. (2-tailed)		.977	.002	.003	.932	.825	.511	.824	.008	.426
	N	30	30	30	30	30	30	30	30	30	30
AROA	Pearson Correlation	-.006	1	.129	-.172	.084	-.059	-.048	.837**	-.068	.144
	Sig. (2-tailed)	.977		.497	.362	.660	.756	.803	.000	.722	.449
	N	30	30	30	30	30	30	30	30	30	30
CFO	Pearson Correlation	.548**	.129	1	-.386*	-.101	-.011	-.174	.074	-.105	.220
	Sig. (2-tailed)	.002	.497		.035	.596	.953	.357	.697	.582	.244
	N	30	30	30	30	30	30	30	30	30	30
ACCURAL	Pearson Correlation	.518**	-.172	-.386	1	.102	.098	.388*	-.118	-.424*	-.490**
	Sig. (2-tailed)	.003	.362	.035		.590	.608	.034	.534	.020	.006
	N	30	30	30	30	30	30	30	30	30	30
DMARGIN	Pearson Correlation	-.016	.084	-.101	.102	1	.117	.086	.147	.223	.291
	Sig. (2-tailed)	.932	.660	.596	.590		.538	.653	.439	.237	.118
	N	30	30	30	30	30	30	30	30	30	30
DTURN	Pearson Correlation	.042	-.059	-.011	.098	.117	1	.527**	-.109	-.144	.080
	Sig. (2-tailed)	.825	.756	.953	.608	.538		.003	.567	.447	.673
	N	30	30	30	30	30	30	30	30	30	30
DLEVER	Pearson Correlation	.125	-.048	-.174	.388*	.086	.527**	1	-.026	-.249	-.009
	Sig. (2-tailed)	.511	.803	.357	.034	.653	.003		.892	.184	.962
	N	30	30	30	30	30	30	30	30	30	30
DLIQ	Pearson Correlation	-.042	.837**	.074	-.118	.147	-.109	-.026	1	-.106	.192
	Sig. (2-tailed)	.824	.000	.697	.534	.439	.567	.892		.577	.310
	N	30	30	30	30	30	30	30	30	30	30
EQOFFER	Pearson Correlation	-.475**	-.068	-.105	-.424*	.223	-.144	-.249	-.106	1	.175
	Sig. (2-tailed)	.008	.722	.582	.020	.237	.447	.184	.577		.354
	N	30	30	30	30	30	30	30	30	30	30
FSCORE	Pearson Correlation	-.151	.144	.220	-.490**	.291	.080	-.009	.192	.175	1
	Sig. (2-tailed)	.426	.449	.244	.006	.118	.673	.962	.310	.354	
	N	30	30	30	30	30	30	30	30	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

D Turn and D Margin

As it is evident from the above interpretation that D Margin and D Turn are correlating, in the next part of analysis D Turn is compared with the rest of the variables, interestingly D Turn is correlating with D Margin indicating the relevance two variables for measuring Operating Efficiency. Both the variables together measure the Operating Efficiency of a firm.

D Lever, ROA, D Margin and Equity Offer

D Lever as a variable is compared with rest of the variables in the score, results exhibit that ROA, D Margin are closely related to this variable as it is having a significance at 1% level and Equity offer is significant at 5 % level. All the mentioned variables have correlated at the said significance levels when the same was compared with the respective variables as per the sequence in the F_Score. This clearly indicates that the variables are correlating at the corresponding levels in the composite score and therefore, it will have positive impact on performance of the business.

F_Score and corresponding variables

F_Score as a measure combines various indicators such as Profitability, Liquidity and Operating Efficiency. Above information concludes the fact that all variables included in the score are getting a positive correlation with the score and variables such as ROA, AROA, CFO, D Margin and D Lever are having significance at 1% and 5% significance levels. Return on Assets and the composite F_Score are closely related. Any improvement in ROA improves the score and vice-versa. The other variables which have close relationship with the score are related

to Profitability and Operating efficiency. This clearly indicates that together Profitability and Operating efficiency improves the performance of any given business and such improvement reflects in the stock prices.

Analysis of statistical results of bottom F_score firms

The first variable to interpret is Return on assets which is correlating with CFO and Accrual and has significance at 1% level. This indicates the relevance of these two variables in augmenting the return on assets. The next variable in the sequence is AROA and incidentally it is correlating with D Liquid, with which top firm's AROA was also been matched with. This clearly indicates the relevance of Current ratio in influencing changes in return on assets.

Again in the analysis of bottom score firms Accrual is having a positive significance at 1% with ROA and CFO. Accrual is the Derivative of ROA and CFO. Accrual is negatively related to firm's future expected returns. All low score firms are achieving high positive Accrual which clearly endorses the fact as laid down by Piotroski (2000) that low score firms with high Book to Market ratio fail to achieve future expected returns and their future is bleak when it comes to earning expected returns in future. This result is in consistent with the evidence as shown by Piotroski (2000).

D Margin does not achieve any correlation among the different variables, as the average D Margin of low score firms is showing negative growth. On an average all the low score firms are achieving negative gross margin therefore, none of the variable are correlating with this variable.

D Turn and D Lever correlate with each other by having significance at 1% level. These are operating efficiency variables having matched them selves while analyzing top score firms also.

The final variable in the sequence is Equity offer which is apparently correlating with ROA by having significance at 1% level. This variable also has correlated with the same while analyzing top score firms. This signifies the relevance of equity issue on ROA. As equity is a long term capital and any amount of equity issuance will be deviated towards the investment of fixed assets. Therefore, the variables are achieving positive correlation.

CONCLUSION

The above analysis has investigated the relationship between financial statement information and stock returns. The score is based on set of accounting

information as formulated by Piotroski (2000). This is considered as a composite score which combines information related to Profitability, Liquidity and Operating efficiency of any given firm. One striking observation is that, taken on an average, market adjusted returns are monotonously increasing with the score in the contemporaneous accounting period. This is in consistent with the view that markets are rapidly integrating information into stock prices.

Finally it is concluded that all individual accounting signals have a positive correlation with future stock returns and for most of the signals, correlation is significant at 1% and 5% significance levels. This necessitates identifying those individual signals contributing in defining successful fundamental strategies. The positive correlation between aggregate fundamental signals and high score firms identifies it as a winner portfolio having a earning realization of close to 300%.

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