Growth Measures and Stock Returns

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Abstract

This study examined the aptness of important growth measures in the form of sustainable growth, asset growth, and sales growth in explaining stock returns of firms in the Indian manufacturing sector. Using panel data regression analysis, results provided evidence that sustainable growth rate; a forward looking approach for assessing firm's performance, emerges as a significant variable in explaining the stock returns. Results remain unchanged even after introducing the established determinants of stock returns such as BE/ME and firm size in the regression equations. Asset growth emerged as an important channel through which sustainable growth can be linked with stock returns.

Key words: **growth, asset pricing, panel data, manufacturing, India**

JEL Classification : C23, G12, G14

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Association of various accounting and macroeconomic variables with asset prices has captured the attention of managers and researchers for quite some time. Although considerable investigative endeavours have been made to study this association more precisely and accurately, there are a number of potential reasons why these relationships need to be further explored. Recent research has established the existence of new factors like asset growth and liquidity that can explain variations in asset prices. Stock returns were found to have a negative relationship with capital expenditures (Anderson & Feijoo, 2006 ; Titman, Wei, & Xie, 2004 ; Xing, 2008), market share (Hou & Robinson, 2006), relative efficiencies (Nguyen & Swanson, 2009), and total assets (Cooper, Gulen, & Shill, 2008).

Multiple aspects such as earnings yield (Demirtas & Zirek, 2011), expected dividend yields (Khrawish, 2011), income statement information (Beisland, 2011), economic growth (Buenafe, Bohnett, & Patrick, 2009), macroeconomic variables (Guru Gharan, Rahman, & Parayitam, 2009), book-to-market (Dash & Singh, 2007), non - earnings performance metrics (Francis, Schipper, & Vincent, 2003), diversification (Matsusaka, 2001), and long term output growth (Lee, 1996) have been used to establish a relationship with stock returns. Zaremba and Konieczka (2014), in their research, found the existence of value, size, and momentum premiums not only on

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intra-market stock level, but also in inter-country level as well. The Fama-French three factor model is widely used in typical finance studies to predict stock returns. The word has always been *'growth'* when it comes to evaluation of a firm's performance. Plentiful of studies are available on examination of growth related measures and their impact on firms' performance. Cooper et al. (2008) studied the impact of asset growth on stock returns. Buenafe et al. (2009) studied the impact of economic growth on performance of firms. Long term output growth was found to have a significant positive relationship with stock performance (Lee, 1996). 'Growth' in a firm has become a widely accepted aim of any business. Although a generation of managers believe that a higher growth rate is better, a rapid growth rate requires support of a huge investment in fixed assets. This may cause problems, especially in times of economic crisis where the firm may have to incur significant higher costs and debt burdens. The concept of sustainable growth emerges as an important parameter to gauge and resolve this problem. Acquainted with intense discussion on relationship between stock returns and other variables, the corporate finance literature depicting the future growth rate in the form of sustainable growth has not been comprehensively used to find a relation with stock returns.

The present study contrasts the previous studies as it uses the future growth rate of a firm in the form of 'sustainable growth rate' to establish a relationship with stock returns. Sustainable growth is the "maximum rate at which a company's sales can increase without depleting financial resources" (p. 117, Higgins, 2007). It is the annual percentage of increase in sales that is consistent with a defined financial policy of the firm (in terms of target debt to equity ratio, target dividend payout ratio, target profit margin, target ratio of total assets to net sales etc.). Sustainable growth is a multifaceted metric that can be split into separate components or drivers that reflect the firm's retention policy, cost containment ability, asset utilization efficiency, and financing strategy, all of which are key determinants of firm performance (Lockwood & Prombutr, 2010).

The relationship between firm's growth, shareholders' equity, and retained earnings says that given expansion opportunities, a firm's growth rate is a function of returns it makes on its shareholders' equity and the portion of its earnings that it ploughs back into that equity. For calculating the growth of a firm in its "true" sense, a firm is required to have a certain level of profitability. And it is the growth in the shareholders' equity that, over the long term, will drive the stock price. It can then be said that a firm's sustainable growth rate shows the firm's potential to deliver the kind of growth that will eventually contribute towards its stock returns (value of its stock). Stock returns are undoubtedly a function of the rate of growth of expected corporate earnings. An increased return on equity leads to an enhanced level of retained earnings provided that the firm has sufficient growth opportunities. Retained earnings can then be utilized for multiple purposes, asset growth being one of the major constituent sharing the pie. Li, Becker, and Rosenfeld (2012) attributed the asset growth effect to mispricing or systematic risks. Their mispricing explanation suggests that investors' overreaction to information on firms' asset growth estimated by extrapolating the past growth rates of assets to the future can be a reason why stock returns attenuate with asset growth rates. The second explanation on systematic risk being explained by asset growth assumes that assets in place [*] are less risky than growth options (Berk, Green, & Naik, 1999). Firms always use a mix of assets in place and growth options, thus making a change in this mix when it makes investments in assets.

The movement from growth options to assets in place reduces risks and thus affects subsequent returns. A simple explanation to this is that an enhanced level of assets in place results in increased revenues of firms in the form of sales growth. Anthony and Ramesh (1992) posited the response of stock market to sales growth and capital investment. The present research is an attempt to establish the impact of important growth measures in the form of sustainable growth rate, asset growth, and sales growth on stock returns of a firm. In particular, drawing on work in the field of asset pricing from Fama and French (1992), Lockwood and Prombutr (2010), and Li et al. (2012), this study links stock returns to different growth measures of a firm.

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[*] The securities, real estate, and other assets that a company already holds and ,therefore, does not need to buy in order to implement a particular investment strategy.

Brief Literature Survey

Lockwood and Prombutr (2010) argued that high sustainable growth firms tend to have low default risk, low book to market ratios, and low subsequent returns. Their model used sustainable growth, firm size, and BE/ME ratio as predictors of stock returns. Net profit margin (a component for calculating sustainable growth) emerges as a significant variable determining subsequent returns and the results persist even after controlling for asset growth and capital expenditure growth. Chan, Karceski, and Lakonishok (1999) argued that the three factor model is adequate for selecting the minimum-variance portfolio. They proposed that suboptimal behaviour of a typical investor is an important factor responsible for value strategies (high B/M) yielding higher returns, and not that these strategies are fundamentally riskier (also see Lakonishok, Shleifer, & Vishny, 1994).

A different line of argument, though reaching a similar conclusion follows from Berk (2005), who argued that the findings of a cross sectional relationship between average returns and variables such as book-to-market is neither surprising nor informative in itself. A contradictory view came from Banko, Conover, and Jensen (2006), who argued that even after controlling other relevant factors, both inter and intra-industry variation in BE/ME (book-to-market equity) are relevant in explaining stock returns. Sustainable growth does not contain a market value component and, therefore, does not suffer from investor sentiment or mispricing (Lockwood & Prombutr, 2010). Cooper et al. (2008) compared asset growth with the previously documented determinants of cross section of stock returns, that is, BE/ME, firm capitalization, lagged returns, accruals etc. and found that firms' annual asset growth rate emerges as economically and statistically significant predictor of stock returns. They found book to market capitalization and lagged returns as almost insignificant in explaining cross section of stock returns.

Parmar, Reddy, and Chauhan (2015) also argued that firms cannot increase their performance indefinitely with increase in their sizes. Firms have been shown to have achieved negative returns after substantially increasing capital investments (Titman et al., 2004). Hou and Robinson (2006) argued that firms in more concentrated industries earn lower returns, even after controlling for size, book to market, momentum, and other return determinants. Fama and French (1992) examined variables like size, E/P, book to market, and leverage to explain cross section of stock returns and found that size and book to market capture the cross sectional variation of average stock returns. Leverage has been found to have a significant impact on firm profitability and shareholders' wealth (Vijayalakshmi & Manoharan, 2014). The importance of the study of earnings management has been highlighted by Kaur, Mehra, and Khanna (2015). To understand the impact of misaligned growth of assets on stock returns, systematic risk acts as a key component in understanding the phenomenon as firms always use a mix of assets in place and asset growth options. Asset growth, in turn, is associated with a level of systematic risk (Li et al., 2012).

An incentive to study the determinants of stock prices in terms of growth measures arises because prior studies considered the past indicators of firm performance ; whereas, this research attempts to examine the impact of future growth potential of firms in the form of sustainable growth on its stock returns. Examining the relatively similar variable qualifications in explaining stock returns from the review of literature, this paper signifies the primary implications of varying growth rates in explaining the stock returns of firms in the Indian manufacturing sector.

Data and Methodology

(1) Data and Methodology : This study encompasses an association of growth measures with equity returns for 203 firms in the Indian manufacturing sector. The firms have been considered from nine industries. Data has been used for a period from 1999 to 2014. Use of financial year closing values has been made to calculate different accounting variables considered in the study. The firms which have only common equity were selected to be a part

of the sample (refer Lockwood & Prombutr, 2010). Book equity for the firms has been defined as book value of common equity plus the previous reserves and surpluses. Firms with a negative value of book equity in any of the years of the sample period have not been included in the study. Market capitalization (price times shares outstanding) has been taken as a measure for firm size. Natural logarithmic values have been taken so that the data are even out for all variables considered in the study. Panel data regression analysis has been used to investigate the impact of growth measures on stock returns. Financial year adjusted closing prices of shares have been used to calculate stock returns using natural log of current year as compared to the previous year.

(2) Growth Measures : The theory of sustainable growth rate is not a new finding. The origin of sustainable growth rate dates back to Babcock (1970). It was further extended by Higgins (1977), where he discussed the calculation of sustainable growth rate for discrete time frameworks.

The present study uses the following formula for assessing the sustainable growth of a firm:

$$SGR = ROE \times b / [1 - (ROE \times b)]^{\#} \qquad (1)$$

where,
SGR is the sustainable growth rate of the firm, *ROE* is the return on equity, and *'b'* is the profit retention ratio of the firm.

Use of measures related to growth in total assets of a firm as suggested by Cooper et al. (2008) has been made as under:

$$Asset\ Growth = [Total\ Assets_t / Total\ Assets_{t-1}] - 1 \qquad (2)$$

Sales growth has been calculated as year on year percentage change in sales of the firms as:

$$Sales\ Growth = [Net\ Sales_t / Net\ Sales_{t-1}] - 1 \qquad (3)$$

As initial warm-up, the means of the decile portfolios on the basis of *SGR* for various proposed determinants of stock returns have been reported in the Table 1. For each portfolio and year, each variable is averaged across stocks. Means have been calculated as time series averages computed over a period of 1999 to 2014. The data indicates that firms with lower rates of sustainable growth tend to have lower return on equity and lower asset growth rate. Portfolios where sales growth exceeds their sustainable growth rate point towards a potential cash problem as indicated by the Figure 1. Inclusion of financial data related to firms across different industries over a period of time brings in considerable heterogeneity in the units under consideration. The techniques of panel data estimation can take such heterogeneity explicitly into consideration by allowing for specific variables (see Gujarati, Porter, & Gunasekar, 2013).

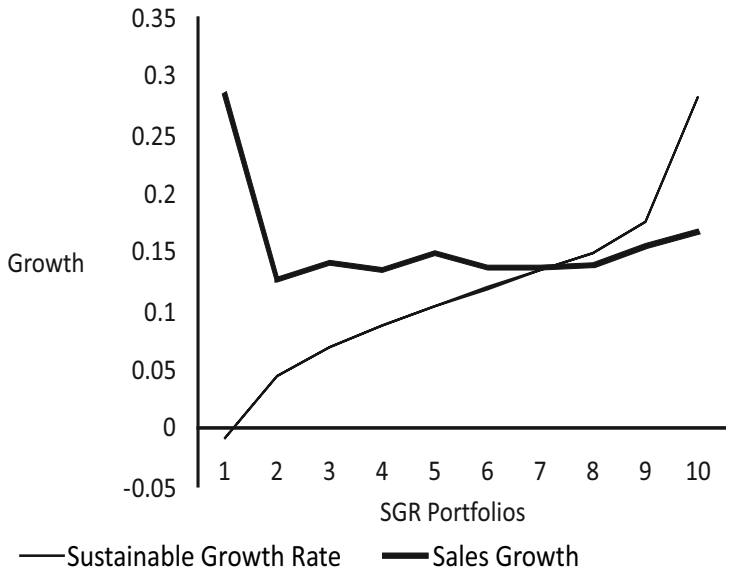
 # : Textbooks seem to be deficient in uniformity with regard to the calculation of sustainable growth rates. While some texts (for example, Keown, Martin, and Petty, p. 221 or Brealey, Myers, and Marcus, p. 95) calculated the sustainable growth rate = *ROE × b*, where *b* is the retention rate or (1- the payout rate), others (Ross, Westerfield, and Jordan, p.1-3 or Cornett, Adair, and Nofsinger, p.87) used the formula as stated in equation 1. They estimated sustainable growth rate as *ROE × b*/ [1- (*ROE × b*)]. None of the formulae are incorrect if allowance is made for the different assumptions behind the calculation of *ROE.* If *ROE (NI/Equity)* is calculated using beginning equity, the correct calculation for the sustainable growth rate is *ROE × b*. However, if *ROE* were to be calculated using ending equity, then the correct calculation for the sustainable growth rate would be *ROE × b*/ [1- (*ROE × b*)] (Taken from Angell, 2011).

Table 1. Behaviour of Selected Growth Measures for Decile Portfolios of Sustainable Growth Rate

SGR Portfolio	*SGR*	*ROE*	*ROA*	*SG*	*ASSETG*
Low	-0.010	-0.015	0.004	0.286	0.052
2	0.044	0.067	0.036	0.126	0.067
3	0.068	0.089	0.043	0.141	0.115
4	0.087	0.113	0.056	0.134	0.122
5	0.103	0.146	0.066	0.148	0.121
6	0.119	0.157	0.075	0.136	0.120
7	0.135	0.194	0.090	0.136	0.122
8	0.148	0.181	0.095	0.138	0.145
9	0.175	0.201	0.100	0.155	0.163
High	0.283	-0.025	0.120	0.168	0.204

Note : *SGR* is the sustainable growth rate calculated by using the formula depicted in equation (1) ; *ASSETG* and *SG* are asset growth and sales growth as depicted by equations (2) and (3), respectively. ROE is returns on equity calculated as net income of year *t* divided by book equity of firms for year *t*. Return on assets (ROA) is net income for year *t* divided by total assets for year *t*.

Figure 1. Comparison of Sustainable Growth Rate and Sales Growth for Sustainable Growth Rate Decile Portfolios



Arriving at a conclusion based on comparison of sustainable growth rate and actual growth in sales may seem to be naive without considering other factors that might affect the performance of firms. While is it easy to arrive at a figure of these growth rates using formulas as stated in equations (1), (2), and (3), analysts should be more concerned with how these components of growth affect the stock performance of the firms. Of particular interest becomes the fundamental behaviour of the stock returns when studied in conjunction with growth measures. This issue has been addressed in subsequent sections of this study. The determinants of stock returns have been analyzed by using panel data regression analysis.

Analysis and Results

This section of the study tends to examine the performance of firms calculated as stock returns and relate it to growth measures in terms of sustainable growth, asset growth, and sales growth after sorting stocks independently on each variable. The different sets of regression specifications which examine the relationship of stock returns with these growth measures have been highlighted in the Table 3.

Table 2. Correlation Matrix of Determinants of Stock Returns

Correlations						
	SGR	***BE/ME***	***SIZE***	***ASSETG***	***SG***	***St Ret***
SGR	1.000					
BE/ME	-0.305**	1.000				
	(0.000)					
SIZE	0.085**	-0.151**	1.000			
	(0.000)	(0.000)				
ASSETG	0.341**	-0.192**	0.040*	1.000		
	(0.000)	(0.000)	(0.025)			
SG	0.224**	-0.133**	-0.009	0.407**	1.000	
	(0.000)	(0.000)	(0.619)	(0.000)		
St Ret	0.184**	-0.197**	0.007	0.072**	0.135**	1.000
	(0.000)	(0.000)	(0.711)	(0.000)	(0.000)	

**Correlation is significant at the 0.01 level; *Correlation is significant at the 0.05 level

Note : Refer footnote in Table 1 for connotation and details related to calculations of growth measures in the above table. BE/ME is the ratio of book value of equity to the market value. Firm size is the market capitalization calculated as stock price times shares outstanding. *St Ret* is the stock returns of firms.

Table 3. Results of Bivariate Pooled Regression Analysis

Regression Specification			
	Slope	R^2	***F*-statistic**
SGR	1.112	0.057	183.136
			(0.000)
ASSETG	0.458	0.021	63.359
			(0.000)
SG	0.257	0.015	44.591
			(0.000)
BE/ME	-0.920	0.660	5782.499
			(0.000)
SIZE	0.930	0.704	7080.122
			(0.000)

Note : The slopes, R^2 values, and *F* statistics with their significance level (reported beneath the parameter estimate) have been reported in the table above. All values are significant at the 5% level of significance. Refer to footnote in Table 2 for connotation and details related to calculations of growth measures and Table 3 for connotation and details related to calculation of BE/ME and firm size.

As indicated by the results of Table 2, growth measures seem to be significantly correlated with firms' stock returns. To test the degree of alliance between stock returns and the associated variables, the use of stepwise pooled regression analysis using various combinations of determinants of stock returns have been made. The regression specifications are reported in the Table 3 and Table 4. All growth measures considered in the study, that is, sustainable growth, asset growth, and sales growth have been found to be significant (*t*-statistics of 13.533, 7.960, and 6.678) in the initial tests. These results suggest that significant factors like sustainable growth have an importance in explaining stock returns. Previous research studies provide evidence that corporate events associated with asset extension tend to be followed by periods of abnormally low returns ; whereas, events associated with asset contraction tend to be followed by periods of abnormally high returns. The initial tests of this research depict contradictory results as it provides evidence that growth in assets is positively and significantly associated with stock returns.

Using a panel data set of selected firms, the regressions are conducted in which stock returns are regressed against various combinations of sustainable growth rate, asset growth, sales growth, BE/ME, and firm size :

$$R_{i,t} = \gamma_{0,t} + \gamma_{1,t} \ln(1+SGR_{it}) + \gamma_{2,t} \ln(1+ASSETG_{it}) + \gamma_{3,t} \ln(1+SG_{it}) + \gamma_{4,t} \ln(BE/ME_{it}) + \gamma_{5,t} \ln(SIZE_{it}) + \varepsilon_{it} \quad (4)$$

where, for year *t*, $R_{i,t}$ is the return on stock *i*, $\gamma_{1,t}$ is the slope associated with sustainable growth, $\gamma_{2,t}$ is the slope associated with asset growth, $\gamma_{3,t}$ is the slope associated with sales growth, $\gamma_{4,t}$ is the slope associated with BE/ME ratio, and $\gamma_{5,t}$ is the slope associated with firm size. Findings show that sustainable growth, asset growth, and sales

Table 4. Results of Multivariate Pooled Regression Analysis

Regression Specification								
	(i)	**(ii)**	**(iii)**	**(iv)**	**(v)**	**(vi)**	**(vii)**	**(viii)**
ln (1+*SGR*)	13.533			11.830			8.638	2.621
	(0.000)			(0.000)			(0.000)	(0.009)
ln(1+*ASSETG*)		7.960		4.475			6.191	1.978
		(0.000)		(0.000)			(0.000)	(0.048)
ln(1+*SG*)			6.678	3.488			-0.343	-0.322
			(0.000)	(0.000)			(0.732)	(0.748)
ln*(BE/ME)*					-76.043		-74.392	-7.189
					(0.000)		(0.000)	(0.000)
ln*(SIZE)*						84.143		18.572
						(0.000)		(0.000)

Note : Yearly returns of stocks are regressed against various combinations of natural logarithms of *Size, BE/ME,* 1+*SGR,* 1+*ASSETG,* and 1+*SG*. The table highlights the *t* - statistics and significance level (reported beneath the parameter estimates) computed using panel data of firms from 1999 to 2014. All values are significant at the 5% level of significance. Refer footnotes in Table 2 and Table 3 for connotation and details related to calculations of variables mentioned in the above table.

Table 5. Applicability of Model for Examining the Growth Related Determinants of Stock Returns

Dependent Variable	**Fixed Effects Model**		**Random Effects Model**	
	***F*-Test**	***p*- value**	**Hausman Test**	***p*- value**
Stock Returns	0.796	0.982	10.281	0.036

All values are significant at the 5% level of significance.

growth exert independent effects on stock returns. Based on the model that suggests that stock returns of a firm are affected by its sustainable growth rate and the percentage growth in its asset base, the Table 4 represents the results of regression equation (4).

The Table 3 reports the results of bivariate regression, highlighting the explanatory power of selected determinants of stock returns. All variables included in the regression model are significant in explaining equity returns. Strong contenders like BE/ME and size considerably increase the R^2 value when studied individually as well as a combination. Cooper et al. (2008) found that growth in total assets is significantly and positively correlated with subsequent stock returns. We examined sustainable growth, asset growth, and sales growth affect after introduction of BE/ME and size.

The Equation (4) captures variations in stock returns as a result of changes in sustainable growth rate and asset growth. More interestingly, the available evidence suggests that sales growth, which is significant in explaining stock returns individually and with other growth measures, loses its explanatory variable when combined with BE/ME and firm size. The main result is straightforward and reflects that two easily measured growth variables like sustainable growth and asset growth provide a simple and powerful characterization of the stock returns for a period from 1999 to 2014. Rate of returns on stocks is significantly and inversely related to BE/ME ratio. Stocks with high value of BE/ME are classified as value stocks and those with low BE/ME are classified as growth stocks. High sustainable growth firms tend to have low BE/ME ratio, indicating that the overvalued firms command lower returns with time. These results are in line with the results obtained by Lockwood and Prombutr (2010). Asset growth undoubtedly affects the expected stock returns of the investors and in turn is associated with level of systematic risk. The causal relationship of the growth measures and stock returns can further be explored in order to test the explanatory power of the said growth measures towards subsequent stock returns. However, these growth measures do not seem to be imprecise as a combination of sustainable growth and asset growth absorb the apparent roles of other explanatory variables to a considerable extent.

We further examine the applicability of the model for examining the impact of growth measures on equity returns. The results of fixed effect *F* - test and Hausman test are reported in the Table 5. The fixed effects model seems to lose its applicability with a *p* - value of 0.982. Similarly, the null hypothesis of the random effect model, that the effects across the firms are random, is rejected with a *p*- value of Hausman test being 0.036. Thus, on the basis of results of pooled regressions depicted in Table 3 and Table 4, there is evidence of the imperative role of growth measures in determining stock returns across firms with varying financial characteristics.

Discussion and Conclusion

Previous research on asset pricing focuses on past growth rates as performance indicators of firms. This paper develops a practical framework that outlines the categories of growth measures that could influence stock returns. This framework guided an analysis of Indian manufacturing firms listed on the National Stock Exchange by following an inductive approach to study the impact of sustainable growth on stock returns. The concept of sustainable growth is unique in defining the performance of a firm as it is a forward looking approach as against the traditional measures of firms' success which reflect the past performance of a business.

The paper reports important findings for policy makers and investors. Regression analysis on the firm level was employed to address the issue of usefulness of sustainable growth as a performance indicator of a business. Contrary to the results of Lockwood and Prombutr (2010), who argued that high sustainable growth firms tend to have low subsequent returns, our results show that an increase in the sustainable growth rate results in an increase in the stock returns. This relationship can be attributed to an increased level of perceived risk by the investors in terms of asset growth. High level of sustainable growth is a result of higher returns on investments, which provides an opportunity to a firm to expand its asset base. As evident from the review of literature, asset growth is associated with level of systematic risk (Li et al., 2012). An enhanced level of assets in place also poses a potential risk for the

investors and thus results in higher expected future returns. Other real world effects and variables may be considered that enhance the predictability of stock returns. In summing up, the findings indicate that sustainable growth and asset growth are significant determinants of stock returns and should be integrated into asset pricing models.

Research Implications

Our study is based on numerous converging lines of research and recommends a dynamic model of gauging the stock returns in an efficient manner when two important growth measures like sustainable growth and asset growth are jointly determined. In contrast to financial performance indicators that reflect the past performance of firms, we instead focus on the future growth potential of a firm in the form of sustainable growth rate. The present research explores a less well revealed but no less important demonstration of the relationship between growth and asset prices. Sustainable growth and asset growth are found to have a significant impact on stock returns of firms in the Indian manufacturing sector. In support of results that provide an indication of a significant relationship between growth measures and stock returns, the concepts discussed in this research can be beneficial to investors in making safer investments and to managers for better policy formulation.

Limitations of the Study and Scope for Future Research

The present research was conducted using secondary data of firms in the Indian manufacturing sector. The results may differ when the study is conducted on a sample of firms in the service industry as service firms do not rely heavily on their fixed assets. This study tends to examine the impact of growth measures on stock returns of the firms. Since, we intend to focus on the future growth potential of a firm, it would be momentous to study the ability of these variables in predicting subsequent returns. Use of causality tests and cointegration should provide evidence of a causal relationship and long term impact of the said growth measures on stock returns.

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