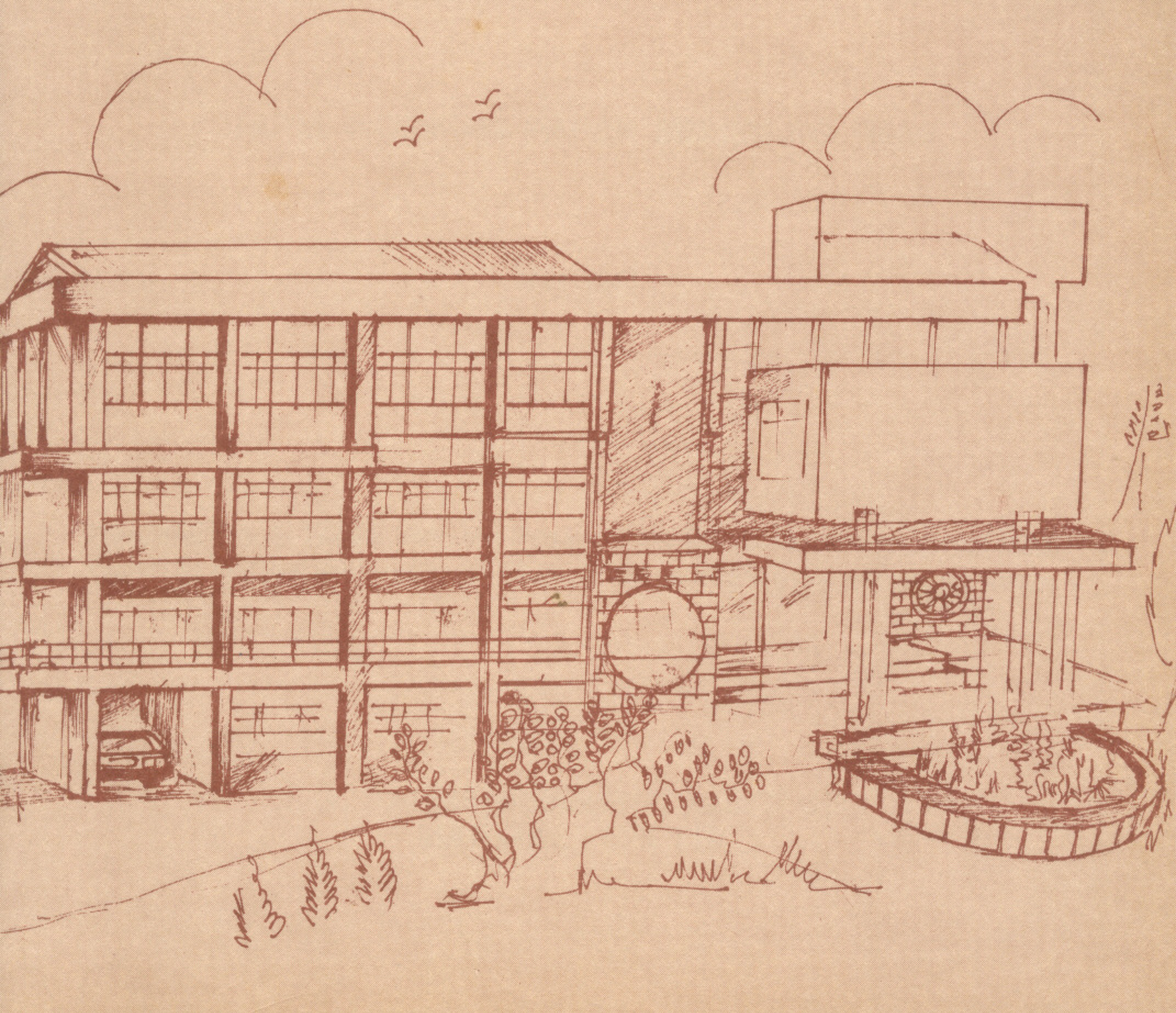
TAPMI LIBRARY
MANIPAL.

TAPMI
Working Paper Series
No. 16

VALUATION OF INDIAN SHARES

By
PITABAS MOHANTY
Assistant Professor



VALUATION OF INDIAN SHARES

By

PITABAS MOHANTY
Assistant Professor

TAPMI WORKING PAPER SERIES NO. 98/06

May 1998

The objective of TAPMI Working Paper series is to help faculty members of TAPMI to test out their research ideas/findings at the pre-publication stage.

T. A. PAI MANAGEMENT INSTITUTE
MANIPAL - 576 119

Valuation of Indian shares.

Abstract: The dividend discounting models used in the standard corporate finance text books are not applicable to most Indian companies. Most Indian companies follow a dividend policy that is completely different from those adopted elsewhere. This paper is an attempt to design models that can be used in the Indian context to solve the above problem.

Section I

Introduction:

Mohanty (1998) has found that dividend payout ratio plays a very insignificant role in most companies' dividend policies. Most companies prefer to maintain a constant dividend rate (defined as the ratio of dividend per share and the face value of the share). The companies generally reward their shareholders through the issue of bonus shares and by keeping the dividend rate constant. Of course, there are certain companies that maintain a constant payout ratio. However, they are in numeric minority.

Most dividend discounting models we encounter in the corporate finance text book assume that the dividends grow at constant rate. The dividend discounting model has been originally developed by Williams (1938). Durand (1957), Gordon and Shapiro (1956), and Gordon (1959) have further developed this model and its different variants. These models assume that the dividend growth rate is constant. Similarly, Fuller and Hsia (1984) developed what is called the H Model. This model assumes that dividend grows at a higher rate in the beginning in the first stage and then the growth rate remains constant. In the first stage the dividend rate declines from the higher rate to the lower rate. There are many other variations of this dividend discounting model. They can be found in Damodaran (1994).

One cannot use such models in India because the payout ratios of most companies do not remain constant. Thus when the profit after tax increases even at a constant rate the dividend per share does not increase at the same rate. Often the dividend per share remains constant for some years before it increases to a new level only to remain constant there for some more years.

This paper is an attempt to design models that are similar to the standard dividend discounting models but can be used in the Indian context. The next section discusses briefly the dividend policies of the Indian companies. Section III develops models that can be used in the Indian context. Finally, section IV discusses some of the potential applications of the model.

Section II

One can divide the Indian companies into broadly four categories based on their dividend policies. The companies in the first category *do* maintain a constant payout ratio. In this category will fall most of the MNCs in India. For example, Asea Brown Boveri used to follow a payout ratio of 20% till 1995. The payout ratio of Colgate Palmolive, similarly, is around 85%. Of course, there are some MNCs where the payout ratio does not remain constant. The payout ratio of Nestle India, for example, varied between 37% to 101% between 1992 to 1996.

For the category 1 companies valuation of the shares is easy. One needs to know the returns the shareholders expect the company to generate, and the expected growth rate in the dividend per share. One can use the Gordon's growth model or the H model depending on whether the growth rate remains constant or not.

In the second category will fall firms whose dividend behaves as a step function. This has been diagramatically illustrated at the end of this paper. Of, course, some times there will be minor deviations. But for all practical purpose, it can be assumed that the dividends remain constant for some years and then increase. Indian Aluminum company, for example, issued bonus shares in the ratio of 1:1 in June 1995. The dividend rate, however, remained constant at 40%, that is Rs. 4 per share both before and after the bonus issue. Saw Pipes similarly issued bonus shares in January 1994 in the ratio of 1:2. The dividend rate was 30% before the bonus issue. It continued to remain at 30% for the next three years. One can similarly give many examples of companies where the dividend rate remains constant both before and after the bonus issue.

Mohanty (1998) has observed that some of the firms are not able to maintain the dividend rate after the bonus issue. It has been found in this paper that there is a sustainable bonus ratio for such companies. As explained in the next section, this sustainable bonus ratio is a function of the return the shareholders expect on their investment. If the bonus ratio of a company exceeds this sustainable bonus ratio, then such companies will not be able to maintain the existing dividend rate on the bonus shares.

Thirdly, there are certain firms, where there is an almost proportional decline in dividend rate after the bonus issue. The dividends increase after that before another bonus issue is made. For example, Ingersoll Rand had a bonus issue in January 1990 in the ratio of 1:1. The dividend rate before the bonus issue was 45%. It declined to 25% after the bonus issue. The next two years' dividend rates are 35% and 45% respectively. Godfrey Philips, similarly, had a bonus issue in December 1992 in the ratio of 1:1. The dividend rate before the bonus issue was 50%. The dividend rates in the three years following the bonus issue are 30%, 37.5% and 50% respectively.

If one looks at the behaviour of dividends per share of the category 3 companies, one will notice some similarities with the category 1 companies. The major difference is that the payout ratio is constant for the category 1 companies. Another difference is that here the dividend per share increases more or less by a constant rupee amount. Of course, there are cases when the dividend per share does not exactly increase by a constant amount every year. KSB Pumps, for example, had a bonus issue in the ratio of 1:1 in January, 1990. The dividend rate before the bonus issue was 30%. It declined to 20% after the bonus issue. However, it remained at 25% for the next two years before increasing to 35% in the fourth year after the bonus issue. Here KSB Pumps has been put in category 3 because its dividend pattern broadly follows the dividend pattern of a category 3 firm.

Finally, there are certain companies where the dividend pattern is found to be totally erratic. Whirpool of India, for example, had a bonus in January 1992 in the ratio of 1:1. The dividend rate was 10% before the bonus issue. The dividend rates in the following three years are 0%, 12%, and 0% respectively.

Section III

We know from Williams (1938) that the stock price should equal the present value of dividends.

$$P_0 = d_1 / (1+k_e) + d_2 / (1+k_e)^2 + d_3 / (1+k_e)^3 + \ldots\ldots \infty \qquad (1)$$

where P_0 is the current ex-dividend stock price, d_t is the expected dividend in year t, and k_e is the return expected by the shareholders.

The Gordon valuation model assumes that the growth rate in dividend per share is constant. These two assumptions together imply that the dividend per share grows at a constant rate. Then from eqn (1), one can derive the following constant growth model.

$P_0 = d_1 / (k_e - g)$.

In India, however, the dividend per share does not grow at a constant rate. In fact, as has been discussed earlier, for most Indian companies the dividend per share remains constant for a certain duration and then it suddenly increases after the bonus issue and remains at the higher level till the next bonus issue is made. The actual dividend pattern of some other companies broadly follows this pattern, though the actual dividend rate may differ across years by a few basis points. For certain other companies the dividend per share increases every year by a constant amount rather than by a constant percentage point. Again for these categories of companies, the standard dividend valuation models cannot be used.

Hence in this paper two new models have been developed that can value shares of Indian companies belonging to the second and the third categories.

Model for category 2 shares:

Variables: Here the following notations have been used in the models.

d_t is the dividend per share in year t.

f is the number of years before the next bonus issue will be made.

b is the bonus ratio. If the bonus ratio is m:n, then b is equal to m/n.

k_e is the return shareholders expect the company to generate on their equity.

P_0 is the current market price. Here it has been assumed that the last year's dividend has been paid and the next dividend will be paid exactly after one year.

The following assumptions have been made to develop the model.

1. The dividend per share remains constant and is equal to d_1. This dividend will be paid exactly after one year from now. It will remain constant till the next bonus issue is made. After the next bonus issue is made (after f years), the dividend per share will be equal to d_1 (1+b). Actually, the dividend per share will remain constant even after the bonus issue.

However, the number of shares the shareholder has will also increase. Here no adjustment has been made for the increase in the number of shares. This helps comparison of cash flows both before and after the bonus issue.

2. Secondly, it has been assumed that the number of years between succeeding bonus issues is constant and is equal to ‘f’. This assumption looks a bit restrictive in the beginning. However, there is really no way a rational investor can predict when the next bonus issue will be made.

If we introduce these assumptions in equation (1), we get

$P_0 = d_1 / (1+k_e) + d_1 / (1+k_e)^2 + d_1 / (1+k_e)^3 + ... + d_1 / (1+k_e)^f + d_1(1+b) / (1+k_e)^{f+1} + d_1 (1+b) / (1+k_e)^{f+2} + ... + d_1 (1+b) / (1+k_e)^{2f} + ... \infty$ (2)

Multiplying both sides of eqn (2) with $(1+b)/(1+k_e)^f$, we get (removing subscripts for d)

$P_0 (1+b) / (1+k_e)^f = d (1+b) / (1+k_e)^{f+1} + ... + d(1+b)/(1+k_e)^{2f} + d(1+b)^2/(1+k_e)^{2f+1} + ... \infty$ (3)

Subtracting eqn (3) from eqn (2), we get

$P_0 [1-(1+b)/(1+k_e)^f] = [d/(1+k_e) + ... + d/ (1+k_e)^f]$

This gives us

$P_0 = [d/(1+k_e) + ... + d/ (1+k_e)^f] / [1- (1+b)/(1+k_e)^f]$. (4)

The numerator on the right side of eqn (4) is an arithmetic progression. Hence eqn (4) can be further simplified as

$$P_0 = \frac{\dfrac{d (1+k_e)^f - d}{k_e (1+k_e)^f}}{\dfrac{(1+k_e)^f-(1+b)}{(1+k_e)^f}}$$

$$= \frac{d (1+k_e)^f - d}{k_e [(1+k_e)^f - (1+b)]} \quad (5)$$

The above equation has got some interesting features. Firstly, one can see that when f becomes infinitely large, the above formula reduces to the standard valuation model where

$P_0 = d / k_e$.

This can be proved by dividing both the numerator and the denominator in eqn (5) above with $(1+k_e)^f$ and then taking the limit. Thus this formula is a generalised version of the constant dividend model.

Again if we assume that f = 1, then the above equation will reduce to the constant growth model. Here, we must understand that 'b' is the same as the growth rate in dividend per share. This is because, when f=1, that is, when the company makes a bonus issue every year and keeps the dividend rate constant, the dividends actually grow at the rate equal to 'b'. Of course, the number of shares increase after the bonus issue. However, what matters to the shareholders is the cash inflow in the form dividends and not how many shares they have. A bonus issue does not make any economic difference to the shareholders' wealth in a perfect capital market.

Equation (5) has an interesting feature that deserves attention. From equation (5), we can see that $[(1+k_e)^f - (1+b)]$ has to be positive for P_0 to be positive. That is,

$(1+k_e)^f - (1+b) > 0$

$\Rightarrow (1+k_e)^f > (1+b)$

$\Rightarrow b < (1+k_e)^f - 1. \qquad (6)$

Initially it is not obvious why such a restriction should at all be imposed on the bonus ratio. However, if one assumes that f = 1, then one gets, the condition that b should be less than k_e. If the company makes a bonus issue every year, then b effectively becomes equal to the growth rate in the dividends. Thus the above restriction is a more generalised version of the restriction that $g < k_e$. (Found in Gordon's valuation model.) Thus by making some simple assumptions one can derive Gordon's growth model from the above model. The above term (that is, $(1+k_e)^f - 1$) can be called the upper limit of **sustainable bonus ratio**.

If the bonus ratio is higher than that suggested by eqn (6), then the company will not be able to maintain a constant dividend rate after each bonus issue. Mohanty (1998) has observed that in case of a few companies the dividend rate actually declines after remaining constant for some years. This phenomenon can probably be explained by this concept of sustainable bonus ratio.

It is natural to expect that as the 'f' becomes smaller, the share price should increase. Thus any share valuation model should have this desirable feature. Here it can be proved that when f increases, P_0 decreases.

$$\partial P_0/\partial f = \frac{k_e\,[(1+k_e)^f - (1+b)][d(1+k_e)^f \ln(1+k_e)] - \{d(1+k_e)^f - d\}\{k_e(1+k_e)^f \ln(1+k_e)\}}{[k_e\{(1+k_e)^f - (1+b)\}]^2}$$

Here the numerator is equal to

$$d\,k_e\,(1+k_e)^f \ln(1+k_e)[(1+k_e)^f - (1+b) - \{(1+k_e)^f - 1\}]$$

$$= d\,k_e\,(1+k_e)^f \ln(1+k_e)\,[(1+k_e)^f - (1+b) - (1+k_e)^f + 1]$$

$$= -\,b\,d\,k_e\,(1+k_e)^f \ln(1+k_e).$$

The above term is clearly negative. The denominator being the square of a real number is also positive. Hence $\partial P_0/\partial f < 0$. *(End of proof)*

Uses of this model:

1. It can give us a reasonable estimate of the intrinsic value of a stock. We can find the intrinsic value of a share of Finolex Cables. Using CAPM the cost of equity of Finolex Cables has been estimated to be 22.25%. (This is based on a risk-free return of 12.3%, and a market risk premium of 12.3%. See Balasubramanium (1997) for details. The beta has been computed by regressing the weekly returns on those of Sensex. The beta has been found to be equal to 0.93.) Finolex Cables issued bonus shares in 1989 in the ratio of 4:5, in 1992 in the ratio of 1:1, and in 1994 in the ratio of 1:1. Here it has been assumed that 'b' is equal to 1, f is equal to 4 years. The dividend rate has been equal to 55% since the last five years. Hence d has been assumed to be equal to Rs. 5.50 paise per share.

If we fit all these values into eqn (5), we get P_0 as equal to Rs. 130.5 per share. The actual market price is hovering between Rs. 110 and Rs. 127 per share in the last three months. In the above example, we assumed that Finolex cables is going to make the next bonus issue in 1998. If in an example, the next bonus issue is made after some 'k' number of years, then the model will give the value of the share immediately after the bonus issue. Hence, to find the intrinsic value, the present value of the intrinsic value after 'k' years and the present value of all the intervening dividends have to be found. In this case the model appears to have overvalued the stock because of our estimate of 'f'. May be the market thinks that the next bonus will be made later. One also can take the example of ACC here. The cost of equity of ACC is computed to be 20.8%. On past experience one can use a bonus ratio of 3:5 (or 0.6 using our terminology). If one assumes that ACC will issue bonus shares in 3 years time, then the intrinsic value is coming to be equal to Rs. 1126. This is based on the assumption that the dividend per share is going to be Rs. 50 per share. Though the last year's dividend was Rs. 30 per share, a higher figure has been used based on the experience of ACC in the last five years. Since the next bonus is expected to be made in 1999, we have to find the present value of Rs. 1126 and the dividend to be paid in 1998 and 1999. This present value comes to Rs. 847 per share. The actual market price is hovering between Rs. 1100 and Rs. 1200 per share now. The above example has been deliberately given to show that the model is very sensitive to the estimation of parameters. One has to be very meticulous in estimating the parameters. It will always be better to talk to the management and get their opinion on when the next bonus issue is going to be made. This will always be better than an estimate based on past experience.

2. It can estimate the cost of equity of a stock if the other parameters are known. This, of course, requires the assumption that the market valuation of the stock is correct. In the Finolex Cables case, for example, if we take Rs. 120 to be the correct price, then the implied cost of equity is coming to around 22.55 %. This number is pretty close to the one we got by using CAPM.

3. If we have an estimate of the cost of equity, then we can also find the bonus the market expects the company to give to the shareholders. We can do a similar exercise for Finolex Cables or for that matter any company that follows this type of a bonus policy.

4. We can also find out the sustainable bonus ratio for a company at any point of time. If a company at any time is giving a bonus that is higher than this sustainable bonus ratio, then we can be reasonably sure that the company will not be able to keep the current dividend rate for a longer time period and hence the share price will fall later. Here we can explain this with an example. Bajaj Auto made a bonus issue in 1997 in the ratio of 1:2. The dividend rate in both 1996 and 1997 have remained at 100%. The previous two bonus issues were made in 1991 and 1994 respectively both in the ratio of 1:1. The cost of equity of Bajaj Auto is 21.39%. Thus the maximum sustainable bonus ratio lies between 7:10 and 8:10 (for an estimated 'f' equal to 3 years.). If Bajaj Auto insists on a 1:1 bonus issue then the interval between two bonus issues has to be equal to 4 years. This probably explains why the bonus ratio was 1:2 in 1997.

Model for category 3 shares.

We have already seen that the dividend policies of companies like Ingersoll Rand and Godfrey Philips are completely different and again one cannot use the standard dividend valuation models to value such shares. Sometimes, the dividend pattern of such companies will approximate the dividend pattern of the first types of companies. However, here the dividends, instead of increasing at a geometric rate, increase by a constant rupee amount. For such companies, one needs to use a different model to find the present value of dividends.

Here $P_0 = d_1/ (1+k_e) + (d+a)/(1+k_e)^2 + (d+2a)/(1+k_e)^3 + ...\infty$ (7)

Here it has been assumed that the dividend increases by a constant rupee amount.

This can be further simplified to

$P_0 = d/(1+k_e) + d/(1+k_e)^2 + ...\infty + a / (1+k_e)^2 + 2a / (1+k_e)^3 + 3a / (1+k_e)^4 + ... \infty$

$= d / k_e + X$ (say),

where $X = a / (1+k_e)^2 + 2a / (1+k_e)^3 + 3a / (1+k_e)^4 + ... \infty$ (8)

Dividing both sides of equation (8) with $(1+k_e)$, we get

$X/(1+k_e) = a / (1+k_e)^3 + 2a / (1+k_e)^4 + 3a / (1+k_e)^5 + ... \infty$ (9)

Subtracting eqn (9) from eqn (8), we get

$X (k_e/(1+k_e)) = a/ (1+k_e)^2 + a/ (1+k_e)^3 + ... \infty.$

The right hand side of the above equation is an arithmetic progression and it can be shown that its value is equal to

$a / (k_e (1+k_e))$.

If we put this value in eqn (8), we get

$X = a /(k_e)^2$.

Thus for the third categories of companies, we can write that

$$P_0 = \frac{d}{k_e} + \frac{a}{(k_e)^2} \qquad (10)$$

Here, we have taken next year's dividend as equal to d. One can however replace d with (d+a) in eqn (7), and get a similar value for P_0. It can be shown that here P_0 will be equal to $[a / (k_e^2(1+k_e))] + d/k_e$. It can be shown that both the formulations are equivalent.

One has to be very careful in estimating 'a' in eqn (10). As can be seen the value of P_0 is very sensitive to the estimation of 'a'. This is because the value of ke will be very small and hence will have a magnifying effect on the value of P_0.

There is a very interesting difference between the first and the second model. In the first model we have to impose a restriction on the maximum bonus ratio that the company can give if it wants to maintain the existing dividend rate. In the second model, however, there is no such restriction on the value of 'a'. The reason for this is that in the second model the dividend per share increases only arithmetically.

Section IV

A word of caution: It is important to understand that these two models are very sensitive to the estimation of the different parameters. Hence if we make mistake in estimating any one parameter, we may get totally wrong results. It is advisable to use this model to get reasonable estimates of the different parameters (only one can be found out at any time) by taking the market price as given. One will make mistakes the magnitude of which can be disastrous if one makes wrong estimates of any of the parameters. The example of ACC very eloquently explains this point.

Conclusion: An attempt has been made in this paper to develop two models that can be used in the Indian context. Of course, all Indian companies do not fit into these two models. However, a great majority of them do fit in and to that extent an analyst can find these two models useful in finding the intrinsic value of the two stocks. A closer examination of the models will reveal that, like the standard models, the value of the stock is also very sensitive to the parameters used in the model. Hence it is advisable to take the market price as given and to use this model to find reasonable proxies for the parameters given the stock price.

References:

1. Balasubramanian, N., “Equity Returns in India: An empirical study of the experience in the Nineties”, Working paper no. 6/1997. UTI - IIMB Centre for Capital Markets Education and Research. 1997. IIM Bangalore.
2. Damodaran, A., “Damodaran on Valuation”, John Wiley & Sons, Inc. 1994. Chapter Six.
3. Durand, D., “Growth stocks and the Petersburg Paradox”, Journal of Finance; September 1957. pp 348-363
4. Fuller, R J., and C Hsia, “A simplified common stock valuation model”, Financial Analysts Journal, 1984. pp 49-56.
5. Gordon, M.J., “Dividends, earnings, and stock prices”, Review of Economics and Statistics 41; May 1959. pp 99-105.
6. Gordon, M J., and E Shapiro, “Capital Equipment Analysis: The required rate of profit”, Management Science, 3; October 1956. pp 102-110.
7. Mohanty, P. “On the dividend and bonus policies of Indian companies”, TAPMI Working Paper Series. 1998. No 9801.
8. Williams, J B., “The Theory of Investment Value”, Harvard University Press, Cambridge, Mass; 1938. Chapter V.

Figure 1