EQUITY VALUES, REVERSE DILUTION, AND SUSTAINABLE GROWTH

Michael F. Dunn, California State University Northridge
dunnmp@mediaone.net

ABSTRACT

The current market for equities is at or near an all time high. A firm's high price-earnings ratio may be temporarily self-justifying. A highly valued firm that continues to sell shares may experience high growth of earnings per share, even if the new funds are invested at relatively modest returns. Continued growth is dependent on continued issuance of shares and investment in new projects rather than on reinvestment of current earnings. The process creates an incentive to keep investing regardless of the quality of such investments. Like a pyramid scheme, such a process must end poorly.

This article explains this process with simplified numerical examples illustrating the results of growth through sale of shares and growth through merger. In order to diagnose this unhealthy type of growth, actual inflated growth is compared to sustainable growth. The greater the ratio of actual to sustainable, the more the firm's continual growth is dependent on reverse dilution and greater the potential for disaster. Finally, as an illustration, the growth of America Online is analyzed.

INTRODUCTION

Despite concerns expressed by economists including the Federal Reserve chair, many investors are convinced that the old rules concerning valuation no longer apply. To support this position, they may point to high earnings per share growth as a partial rationale for the historically high valuations seen in the equity market. This paper will show that a firm with a reasonably high price-earnings ratio may generate high growth in earnings per share by selling shares or merging with lower valued firms. The mechanism is mathematically similar to a chain letter or pyramid scheme. The outcome is also similar to that of a pyramid scheme. Eventually investors who rely on such growth as justification for high stock values face the probability of loss of substantial capital. Not only will the stock typically be overvalued when purchased but, because of the incentive to continue the cycle, there is a strong tendency for such a firm to accept substandard investments. Since new investments may be high relative to total firm size, a mistake may be catastrophic. Luckily, it is relatively easy to detect such unsustainable growth by comparing it to a computed sustainable growth.

GROWTH THROUGH EARNINGS RETENTION

First we will examine a firm, which is not selling shares, and is growing solely by retaining earnings and maintaining a constant ratio of debt to equity. The values in Table 1 are generated from an assumed initial equity of $100 and the ratios listed under assumptions. Although this forecast is simplified, similar results could be generated by a more detailed forecast. Also note that price earnings ratio has no effect on this model because the firm is not selling shares.

TABLE 1
NO SALE OF SHARES

	Year 1	Year 2	Year 3	Year 4	Year 5
Assumptions:					
Debt to Equity	1.00	1.00	1.00	1.00	1.00
Net Income/Beginning Assets	0.0700	0.0700	0.0700	0.0700	0.0700
Retention Rate	0.40	0.40	0.40	0.40	0.40
Price Earnings	35	35	35	35	35
New Shares issued at Year End	0	0	0	0	0
Assets (Beginning)	200.00	211.20	223.03	235.52	248.71
Liabilities (Beginning)	100.00	105.60	111.51	117.76	124.35
Equity(Beginning)	100.00	105.60	111.51	117.76	124.35
Net Income	14.00	14.78	15.61	16.49	17.41
Dividend	8.40	8.87	9.37	9.89	10.45
Shares (Ending)	100.00	100.00	100.00	100.00	100.00
Earnings per Share	0.14	0.15	0.16	0.16	0.17
Price-Earnings	35.00	35.00	35.00	35.00	35.00
Stock Price	4.90	5.17	5.46	5.77	6.09
Assets (Ending)	211.20	223.03	235.52	248.71	262.63
Liabilities (Ending)	105.60	111.51	117.76	124.35	131.32
New Equity	0.00	0.00	0.00	0.00	0.00
Equity(Ending)	105.60	111.51	117.76	124.35	131.32
Ending Equity per Share	1.06	1.12	1.18	1.24	1.31
Earnings per Share Growth		0.056	0.056	0.056	0.056
Equity per Share Growth		0.056	0.056	0.056	0.056
% Retained Earnings to Equity	5.30%	5.30%	5.30%	5.30%	5.30%

Based on the above assumptions this sample company will grow at 5.6% per year and the stock price in Year 5 will be $6.09 if investors believe that the price earnings ratio should be 35.

Note that the dividend discount model implies that investors will only earn a return of 7% assuming a payout ratio of .6 and a level growth of 5.6%. Conventional analysis would conclude the firm is overvalued. If the firm does not issue shares and does actually grow at only 5.6%, the price earnings ratio will eventually fall to that of a mature firm.

Now, given that the price earnings ratio (for whatever reason) is 35, the firm may choose to issue shares and thereby increase growth temporarily. The firm may be popular because of investor enthusiasm for its industry such as technology and Internet stocks today. It isn't important why the market values this firm at this level, it is sufficient for our example that it does.

GROWTH THROUGH SALE OF SHARES AND EARNINGS RETENTION

Now consider the effect of selling shares. The example in Table 2 is identical to that in Table 1 except that the firm will sell 15 new shares in each of the first three years.

TABLE 2: SHARES SOLD YEARS 1, 2 AND 3

	Year 1	Year 2	Year 3	Year 4	Year 5
Assumptions:					
Debt to Equity	1.00	1.00	1.00	1.00	1.00
Net Income/Beginning Assets	0.0700	0.0700	0.0700	0.0700	0.0700
Retention Rate	0.40	0.40	0.40	0.40	0.40
Price Earnings	35	35	35	35	35
New Shares issued at Year End	15	15	15	0	0
Assets (Beginning)	200.00	358.20	607.20	984.50	1,039.63
Liabilities (Beginning)	100.00	179.10	303.60	492.25	519.81
Equity(Beginning)	100.00	179.10	303.60	492.25	519.81
Net Income	14.00	25.07	42.50	68.91	72.77
Dividend	8.40	15.04	25.50	41.35	43.66
Shares (Ending)	100.00	115.00	130.00	130.00	130.00
Earnings per Share	0.14	0.22	0.33	0.53	0.56
Price-Earnings	35.00	35.00	35.00	35.00	35.00
Stock Price	4.90	7.63	11.44	18.55	19.59
Assets (Ending)	358.20	607.20	984.50	1,039.63	1,097.85
Liabilities (Ending)	179.10	303.60	492.25	519.81	548.92
New Equity	73.50	114.47	171.65	0.00	0.00
Equity(Ending)	179.10	303.60	492.25	519.81	548.92
Ending Equity per Share	1.79	2.64	3.79	4.00	4.22
Earnings per Share Growth		0.557	0.500	0.621	0.056
Equity per Share Growth		0.474	0.434	0.056	0.056

TABLE 2: SHARES SOLD YEARS 1, 2 AND 3					
	Year 1	Year 2	Year 3	Year 4	Year 5
% Retained Earnings to Equity	3.13%	3.30%	3.45%	5.30%	5.30%

Note that the growth rate of earnings per share jumps from 5.6% seen in Table 1 to 55.7%, 50% and 62.1% for the years following the sale of shares. (It was assumed that new equity would be raised the last day of each year and would affect the following year's earnings.) Under these assumptions the stock price will be $18.55 instead of $6.09 at the end of year 5. These enormous differences are entirely due to the sale of shares. Because of the high stock price, assets, equity and earnings are increasing faster than shares. This is known as reverse dilution. However, high growth is dependent on continued sale of equity. In our example, growth in year 5 will return to 5.6% since no shares were sold the previous year. Further, it is unlikely that the price earnings ratio will remain high once the market realizes that this firm is growing at only a mature growth rate. If the price earnings at the end of year 5 were to fall to 15, for example, the stock price would fall to $8.40. Any investor who had purchased shares in year 3 (for $11.44) or thereafter would lose. Often the results are much worse than this. Because of an incentive to keep the process going, the firm may continue raising capital even as it exhausts its stock of acceptable investments. If the size of a bad new investment is large enough, the survival of the firm may be threatened.

SUSTAINABLE GROWTH RATE

The sustainable growth rate is the rate that a firm can grow through earnings retention and maintenance of a constant debt to equity ratio. It is often (incorrectly) estimated as G=RB, where R is Return on Equity and B is the Retention Rate. (In our example in Table 1, RB is 5.3%.) Actually, this definition would be correct if one typically calculated financial ratios based on balances at the beginning of each year. Since we typically calculate financial ratios based on the end of each year, sustainable growth should be estimated as RB divided by (1-RB). In our example .053 divided by (1-.053) equals .056 which is the sustainable growth rate in this case. Note that Table 2 shows that growth returns to 5.6% after the sale of equity ends. (See Ross, Westerfield, and Jordan). The mechanism at work here (reverse dilution) is similar to that of any pyramid scheme. The high growth continues only as long as the firm issues new shares. The firm must find ways to invest the proceeds. In our example, the firm's assets increase from $358 to 1098 over a four-year period! The longer the process continues the more likely it is that the firm will stumble into bad investments. Eventually the pyramid will end. The firm will stop selling shares and investing the proceeds or it will make bad investments.

GROWTH THROUGH MERGER

As the pressure to invest a rapidly increasing amount builds, a firm may decide to try to continue the process by merger. If a firm with a relatively high price earnings buys one with a lower price earnings then the market may be tricked into valuing the earnings of the acquired company at the higher price earnings ratio. This possibility has long been recognized. May wrote a classic article explaining such growth over 30 years ago. He prophetically claimed "Sometime during each generation the magic of the chain letter is rediscovered." Consider Table 3.

Note that Companies A and B both earn 10% on total assets. For some reason, Company A has a Price-Earnings of 30 and B has a price earnings of only 10. If pooling of interest accounting were allowed, the increase in value would be the difference in price earnings ratios (20) times the earnings of Company B ($10) or $200. Since the acquiring company is probably now required to use purchase accounting and write off the goodwill against earnings, the example shows an increase in value of $185. Note that the reported earnings per share of Company A increase from $0.20 to $0.25 as a result of this one transaction. The company may conclude many mergers during the year. It is not unknown for firms to consummate as many as one merger per week when in the heat of such a feeding frenzy! This is really just another form of reverse dilution and will eventually end the same way.

TABLE 3
GROWTH THROUGH MERGER

	Company A	Company B	Merged Companies, Assuming Purchase Accounting	
Tangible Assets	200.00	100.00	300.00	
Goodwill			20.00	
Total Assets	200.00	100.00	320.00	
Liabilities	100.00	50.00	150.00	
Equity	100.00	50.00	170.00	
Writeoff of Goodwill			0.50	40.00 Years
Net Income	20.00	10.00	29.50	
Shares	100.00	100.00	120.00	Assume 20 shares issued for B
Earnings per Share	0.20	0.10	0.25	PRICE PAID is $120 (20*$6)
Price Earnings	30.00	10.00	30.00	
Price per Share	6.00	1.00	7.38	
Market Value	600.00	100.00	885.00	
Increase in Value			185.00	

ANALYSIS OF AMERICA ONLINE

America Online (AOL) is a leading provider of online information services for personal computers. The growth of AOL over the period 1992 to 1998 is summarized in TABLE 4. Note that AOL achieved growth in book value per share of 54% per year and of earnings per share of 55% per year. However the sustainable growth calculation shows that AOL would have grown at 5.7% per year through retention of earnings alone! Almost 90% 0f AOL's growth originates from either sale of shares or through merger! This was possible because of the high price earnings ratio that prevailed over the period. Note that common shares increased from 350.77 to 878.56 million during this time.

TABLE 4
AMERICA ONLINE - ANALYSIS OF GROWTH

	1992	1993	1994	1995	1996	1997	1998	AR*	GA*
Book Value per Share	0.05	0.06	0.21	0.36	0.69	0.16	0.68	.54	
Earnings per Share	0.01	0.01	0.01	0.03	0.04	(0.09)	0.4	.55	
Dividends	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
(Earnings - Dividends)/Book Value	0.20	0.17	0.05	0.08	0.06	(0.56)	0.21		
Sustainable Growth	0.25	0.20	0.05	0.09	0.06	(0.36)	0.26		.057
Price-Earnings Ratio	32.20	48.70	79.80	60.70	175.00	NMF	357.00	*	
Common Shares	350.77	377.09	463.71	600.88	741.01	801.51	878.56		

AR* Annual Growth Rate
GA* Geometric Average
* Prices for 1996 and 1997 were estimated from Bloomberg.com stock price chart.
Source: Value Line Investment Survey, March 5, 1999

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