FIRST GLOBAL FINANCE
India   Research

Valuation Thoughts

Valuing The Market

October 1996

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FIRST GLOBAL FINANCE

BSE Sensex (New) – Key Ratios

	FY91	FY92	FY93	FY94	FY95	FY96	FY97E	FY98E
P/E Ratio (x)						12.14	10.61	8.99
Growth adj. P/E Ratio (FY96-FY98, 20%)					10.41			
Price /Book Value (x)						2.20	1.88	1.78
Return on Networth (%)		15.82	14.74	16.24	20.71	20.39	19.50	20.35
Growth in PAT (%)		34.97	15.31	44.95	71.03	28.97	19.80	18.08
Growth in PBT (%)		38.22	7.63	37.60	61.89	33.59	22.08	17.72
Inc. PAT on Inc. Networth (ROINW)			13.87	27.21	39.13	20.79	15.99	17.47
Inc. PBT on Inc. Networth			10.46	32.12	45.69	30.56	23.42	22.92
Div Payout Ratio (%)	27.09	26.89	28.63	28.67	22.87	22.56		
Dividend Yield					1.46	1.86		

"That which doesn't kill, makes us stronger"

Frederick Nietzsche

BSE Sensex Valuation – what if...?

Sr. No.	Company	Weightage	Cumulative Weightage	Weightage of Overvalued Stocks**	Market Price * (Rs.)	Market Cap. (Rs. mn)	Worst case Market Price (Rs.)	Worst case Market Cap. (Rs. mn)
1	SBI	8.03%	8.03%		230	121143	180	94664
2	MTNL	7.89%	15.92%		198	119070	175	105000
3	HLL	7.72%	23.65%	7.72%	799	116526	450	65628
4	TELCO	6.86%	30.51%		405	103535	300	76769
5	SAIL	6.26%	36.76%	6.26%	23	94380	14	57826
6	RELIANCE	5.79%	42.56%	5.79%	191	87384	150	68735
7	BAJAJ AUTO	5.05%	47.61%		958	76227	700	55716
8	ITC	5.02%	52.63%		309	75709	250	61353
9	IDBI	4.65%	57.28%	4.65%	105	70207	70	46760
10	HPCL	4.27%	61.55%		309	64436	250	52218
11	TISCO	4.15%	65.70%	4.15%	171	62575	100	36690
12	L&T	3.68%	69.38%	3.68%	223	55503	175	43566
13	HINDALCO	3.15%	72.53%	3.15%	638	47493	400	29790
14	BHEL	2.74%	75.27%		169	41340	125	30595
15	TATA CHEM	2.41%	77.68%		202	36415	175	31626
16	M&M	2.11%	79.79%	2.11%	304	31827	250	26148
17	COLGATE	2.10%	81.89%	2.10%	233	31659	120	16319
18	RANBAXY	1.92%	83.81%	1.92%	603	29030	350	16853
19	INDIAN HOTELS	1.91%	85.72%		637	28757	600	27072
20	IPCL	1.85%	87.57%		112	27892	90	22514
21	GRASIM	1.85%	89.42%		385	27850	370	26755
22	ICICI	1.76%	91.18%	1.76%	66	26590	45	18061
23	ACC	1.52%	92.70%	1.52%	1676	22967	1000	13700
24	BSES	1.52%	94.22%	1.52%	166	22875	100	13776
25	NESTLE	1.39%	95.61%	1.39%	218	20995	120	11570
26	GUJ. AMBUJA	1.37%	96.97%		280	20609	250	18375
27	TATA POWER	0.86%	97.83%	0.86%	119	12928	70	7630
28	GLAXO	0.78%	98.61%		197	11779	160	9564
29	ARVIND	0.75%	99.36%	0.75%	113	11294	70	6990
30	GE SHIPPING	0.64%	100.00%	0.64%	34	9652	30	8643
	Total			**49.97%**		**1508648**		**1100903**

*   *Price as on October 4, 1996*

**   *This represents the percentage weightage of significantly overvalued companies in the BSE Sensex.*

Worst case scenario

Sensex down from 3101 to 2263	
A fall of	**27%**
Market P/E (FY97 earnings)	**7.7x**
Discount to Fair Value	**8%**

What is a truly undervalued BSE Sensex level?

You might call it a good example of "blue-skies" thinking : this attempt to find a truly undervalued sensex level. After all, all of us ultimately have to be individual stock pickers. Further, this exercise has its limitations in that not all stocks will reach these undervalued levels all at the same time, thereby, rendering the whole exercise meaningless.

Call it what you may, in the absence of any other more useful work to do, we thought we would make this attempt to see where the sensex should be in order to be truly undervalued.

Valuing The Market (BSE-30)

This is an exercise that has been long overdue. What is the market's fundamentally undervalued state? Where is it right now in the valuation continuum? Overvalued? Fairly Valued?

There can be two approaches to this - value individual stocks in the sensex on a FCF basis - or apply a 2-stage P/E formula to a set of Return and growth scenarios for the market as a whole.

A few of the sensex companies are presently not within our research universe, leading to a problem in estimating numbers for them. However, it is still possible to value these companies separately and then combine their valuations with valuations of companies within coverage.

However, while valuations on an individual stock basis have perhaps greater importance for money managers, it would also be useful to do a macro analysis, which can be of use in deciding allocation strategy.

Why the choice of the BSE Sensex?

While the BSE sensex may not be completely representative of the investible universe, it has been chosen as, fortunately or unfortunately, it still represents the more liquid segment of the market. It is also an index with a reasonably long history which, for instance, the NSE 50 does not have. Broader indices may, arguably, show greater degree of undervaluation but stocks included therein are unlikely to lead a bull charge. The BSE sensex still remains a reasonable market indicator. Of course, using the BSE sensex also has ancillary benefits of making growth & return estimates with greater accuracy than would be possible for an index with a larger number of companies. All historical data given hereafter (barring the index movements) are for companies included in the new Sensex.

Determinants of Market P/E

The market (or rather the sensex) P/E has been determined using a 2- stage formula which breaks up the future into two periods with varying growth and return assumptions. Since we are already almost exactly half-way through FY97, the P/E calculated would be on the FY97 EPS.

$$P/E = \left(\frac{1 - gA/rA}{k - gA}\right) \times \left(1 - \left(\frac{1+gA}{1+k}\right)^{N-1}\right) + \left(\frac{1+gA}{1+k}\right)^{N-1} \times \left(\frac{1 - gB/rB}{k-gB}\right)$$

Where

k = Cost of equity (or the discount rate)

N = Number of years in the first period

gA = Expected earnings growth in the first period

gB = Expected earnings growth in the second period

rA = Return on incremental networth in the first period

rB = Return on incremental networth in the second period

In other words, we are assuming earnings for the market compound at gA pa from FY97 to FY (97+ N) . During this period, it has a return on incremental networth of rA. Thereafter, earnings compound at gB pa till infinity with a return on incremental networth of rB.

The formula has been derived from Discounted Value of cash flows attributable to equity holders where annual cash flow is estimated as –

> **Net Profit After Tax**
>
> **Less: Net Investment (Capex and working capital increase less depreciation) to be made out of equity ie adjusted for leverage**

Of course, this analysis assumes that all assets of the company are contributing to cash flows and earnings. If this is not the case ie the company has assets like real estate which is not in use (a la Bombay Dyeing) or investments in equity shares, adjustment has to be made for these. The calculated fair value for the stock will therefore be:

> ## *(Calculated P/E) x FY97 EPS + Per share value of Non-optg.Assets*

The caveat in using in this formula is that one has to careful of not double-counting ie the value of Non-optg assets should be added separately only if the cash flows from these are not captured in the EPS.

This was the easy part. The tougher call to make is on the values to be assumed/estimated for these variables.

Determinants of k, gA, gB, rA, rB

The discount rate (k)

There are several approaches that can be used to estimate k or the cost of equity. One is to look at actual market returns over long periods of time. Unfortunately, this approach works only in equity markets with long histories like the US. In India, a broad index and a reasonably liquid market have been around only during the last 15- 20 years (The BSE sensex has a base year of 1978-79). Since the inception of the index, the market return has been 20.8% pa, not including dividends. Including dividends, Sensex returns have been around 22%. However, in the history of markets, 18 years is not a long enough time to take these returns as a bench mark.

The other way to estimate cost of equity is to take a differential to the risk- free rate. International experience has shown that the differential between equity returns and the risk free rate ranges between 6% to 7.5% in developing markets. Given today's government borrowing rate of 13.5- 14%, the cost of equity in India comes to around 19.5-21.5%. Of course, the tax treatment of Treasury Bonds and equity is different. In India, interest income is taxed at 40% plus whereas capital gains which form bulk of the equity returns are taxed at lower rates. Adjusting for this fact, a discount rate of 20-20.5% seems appropriate.

Historical P/E ratios vs. Prime Interest Rates
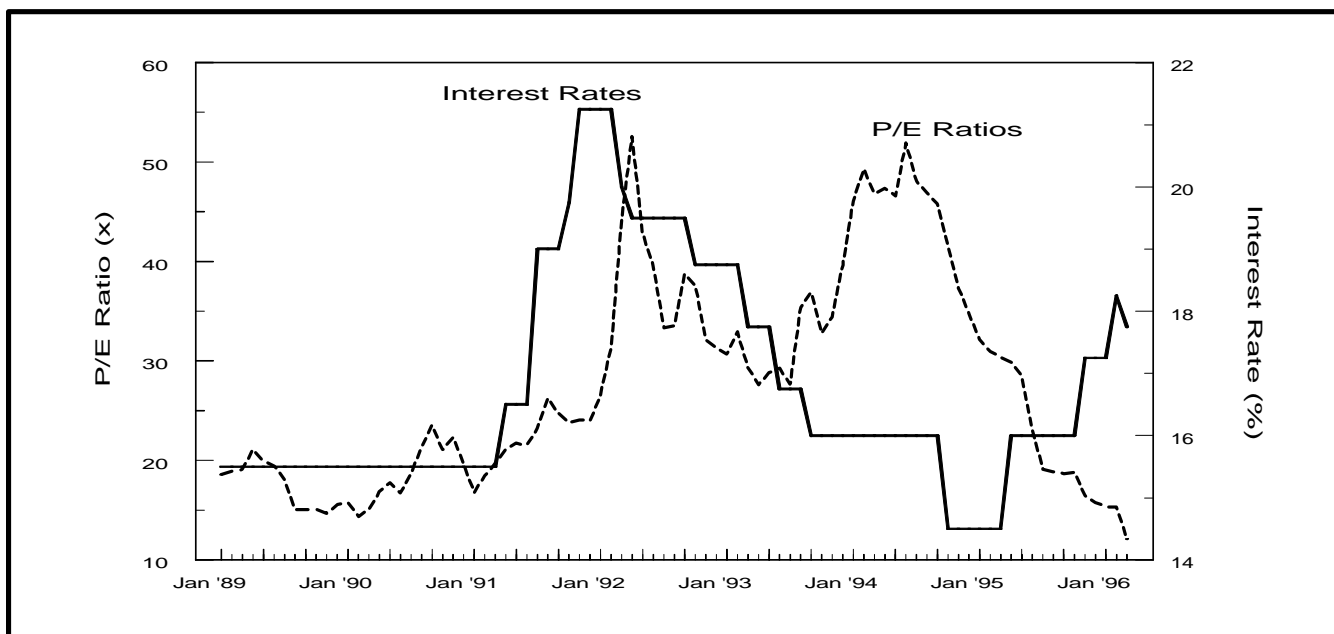
Looking at the above graph it becomes amply clear that the only period in which P/E Ratios and interest rates have moved in opposite directions (as they should) has been in the past one and a half years or so. Interest rates used are the Prime Lending Rate for working capital borrowings.

The conclusion, therefore, is that gradually market valuations are approaching levels of sanity, consistent with the general interest rates in the economy.

The Growth Rates (gA and gB)

EPS for the new Sensex companies has grown at a CAGR of 29% for the last 5 years. First Global estimates for earnings growth are 17% for FY97 and 18.2% for FY98. Given this background and the fact that several of the companies (especially the commodity cyclicals) in the Sensex are currently close to the bottom of their cycle and FY97 results have a one-time impact of MAT, an earnings CAGR of 18% for the next 15-20 years or so looks possible and this is the value that has been assumed for gA. Thereafter, ie in the so-called steady state, the earnings growth rate will be related to the nominal growth rate of the economy, or at least the industrial sector in the economy. An inflation rate of 6-8% and industrial growth rate of 7-8% will give a nominal growth of around 13-16%. This is the likely top-line growth. With compensating effect of operating leverage and some possible loss of market shares for what are dominant companies, in most cases a growth rate of 15% or so appears achievable and this has been assumed as gB.

## *BSE-30 : Historical & Forecast Growth Rates in PBT, PAT & EPS*
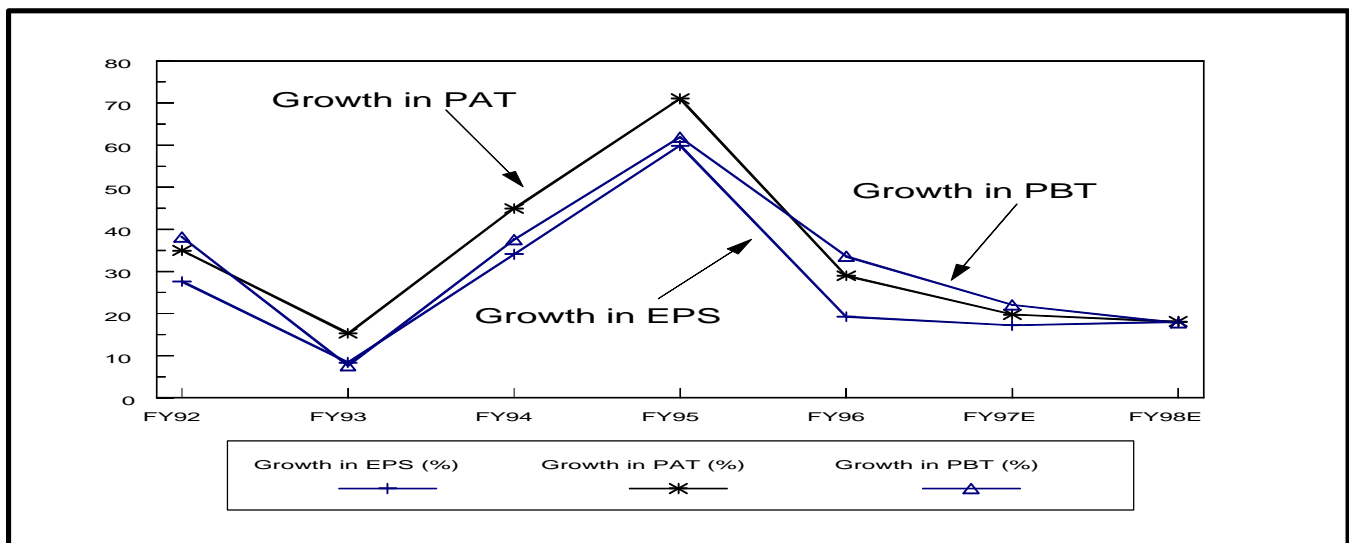

The Return Assumptions (rA and rB)

Return on Net Worth for the Sensex has ranged between 15 to 21% during the last 5 years. Of course, the Return on incremental Net Worth has shown greater variation, from 13.9% in FY93 to 27.2% in FY94. Wholesale equity dilutions during this period by many large companies resulted in deleveraging and consequently lower ROE. In FY97 also, the Return on Incremental Net Worth will be somewhat depressed due to one-time reasons like MAT as well as the depressed prices of many commodities. Overall, we think a Return on Incremental Net Worth of 23-25% appears sustainable on a long term basis (even though this may not be achieved during the next couple of years) and this is what has been assumed for the future. *Of course, this implies that these companies would continue to generate economic returns ie earn more than their cost of equity, even in the terminal period. Given the strong, sustainable advantages of many of the companies in the Sensex, this does not appear to be an unreasonable assumption.*

BSE-30 : RONW & Return on Incremental Net Worth
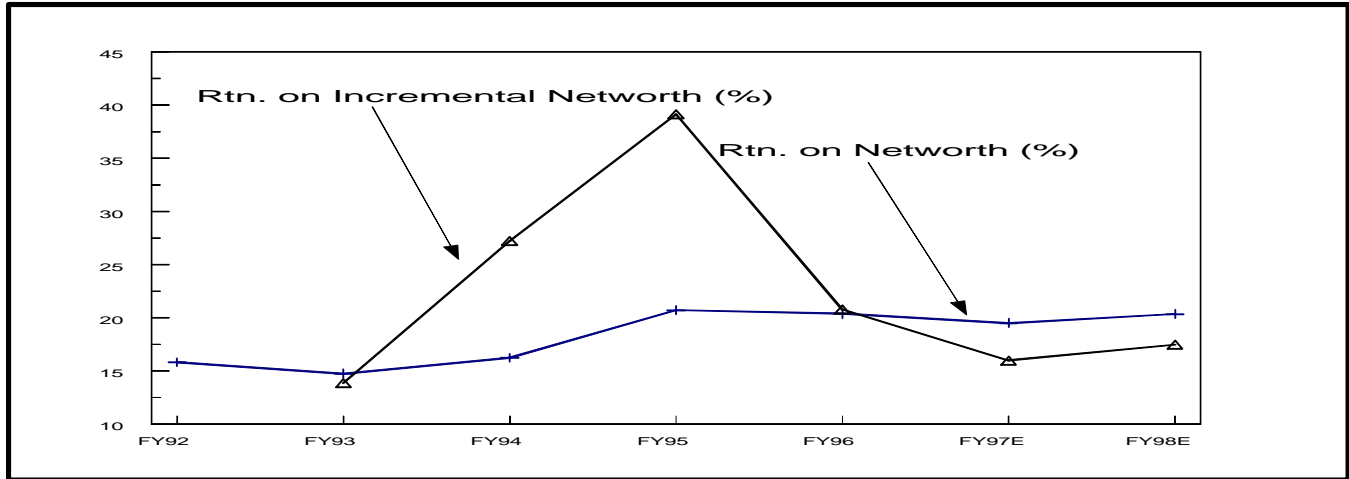
BSE-30 : Dividend Payout Ratio (%)
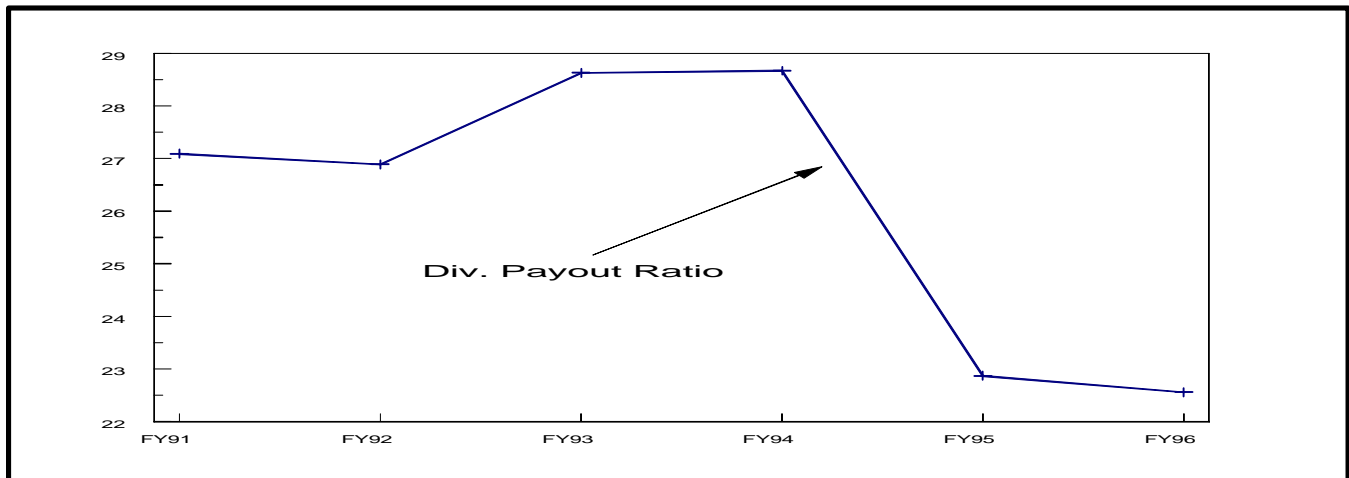
So, what is the Market's Fair Value P/E?

With our assumptions, we have :

k=   20.00%

N=   15

gA= 18.00%

gB= 15.00%

rA=   25.00%

rB=   23.00%

P/E = 8.4x

Therefore, under these assumptions, the theoretical fair value of the market is around 8.4x. Some upward revision may be required to capture the value of assets not contributing to cash flows, but the impact is not likely to be significant. As we are almost exactly half-way through FY97, the multiple is to be used on FY97 EPS. Of course, bear in mind that there is no exact market P/E. It could well be (+) or (-) 5% around this figure of 8.4x.

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Let us look us what the actuals look like. At the current index level of around 3100, we are at a 10.6x multiple to FY97 earnings. The Sensex therefore needs to come down to around 2450 levels to be considered fairly valued. This, however, would not imply a uniform downward drift for all stocks. Some Sensex constituents like Grasim and MTNL are already at pretty serious (30% plus) discounts to fair value and are unlikely to have significant downside from these levels. Then there are others (like TISCO and HLL) which are still severely overvalued.

The other judgement to be made is whether the downward movement will be arrested just when the market reaches 'fairly valued' levels or will go lower. Our view is that market weakness would continue till the market is somewhat undervalued as only then will there be enough steam generated for an extended bull run. *This is likely to be the case even if many smaller (non-Sensex) scrips are at discounts to fair value as it is extremely unlikely that these shares will lead a bull charge.*

This entire analysis assumes that you are more or less in agreement with us on the basic values assumed for the growth rates, return ratios and discount rate. However, these assumptions are inherently subjective and controversial at least within a reasonable range. Some objections could be:

— The derivation of the discount rate from the risk free rate assumes that the risk free rate itself remains constant which may be erroneous. For instance, if interest rates come down substantially the return expectations from equity will also reduce. However, given that the cost of equity for a number of major US companies is in the range of 11-14%, an overall 20% cost of equity for our market may not be unreasonable to assume.

— You can quibble about the growth rate and return assumptions as well. For instance, you may think that given the historical track record and India's prospects, earnings could compound at higher rates.

To account for the fact that your world view may not agree with ours, we are, as always, giving a series of matrices which will enable you to read off the market P/E given your personal set of assumptions.

However, in order to be conservative, we would rather be on the side of caution in terms of assumptions, because equity investments become attractive only when the risk: reward equation is substantially in the investor's favor.

How does the market work off overvaluation?

When we say that the market's fairly valued state is at a Sensex level of 2400-2500 or so, it doesn't really mean that the sensex should come down to this level all at once. What this means is that this is today's fairly valued sensex level, at a K of 20%. Therefore, another way the sensex can become fairly valued is by remaining here for the next year or so, in which case, it will effectively be at 2500 or so ie, 20% (k) cheaper. Mathematically, it can be explained as 3000 (sensex level one year from now)/ (1+.2 (k)) = 2500 today. In other words, the present value of a sensex level of 3000 one year from now is 2500 today.

This is the same way in which stocks can also work off their overvaluation - stagnating. Reality, however, will probably be somewhere in the middle - the market will drift down a little over the next year, allowing the fair value to rise a little through the year, in its quest to reach a fairly valued state...

Ranbaxy and HDFC are prime examples of this phenomenon...

Of course, the exact nature and quantum of a market correction are hard to predict as market swings can be often irrational in the short term, even while the market is in the process of moving to a fundamentally justifiable level. *As 'The Economist' mentioned in a recent article – "the discipline exercised by capital markets... is neither infallible nor is it applied smoothly and consistently. Discipline is often doled out irrationally, with waves of excessive optimism being followed by excessive pessimism. Three striking examples of this are the rise and fall of the dollar in the 1980s, the boom and bust in world bond markets in 1993 and 1994, and the recent Mexican peso crisis. In all three examples, dramatic swings in asset prices were linked to economic fundamentals, but the markets were slow to respond at first and then moved too suddenly."*

How the market corrects overvaluation
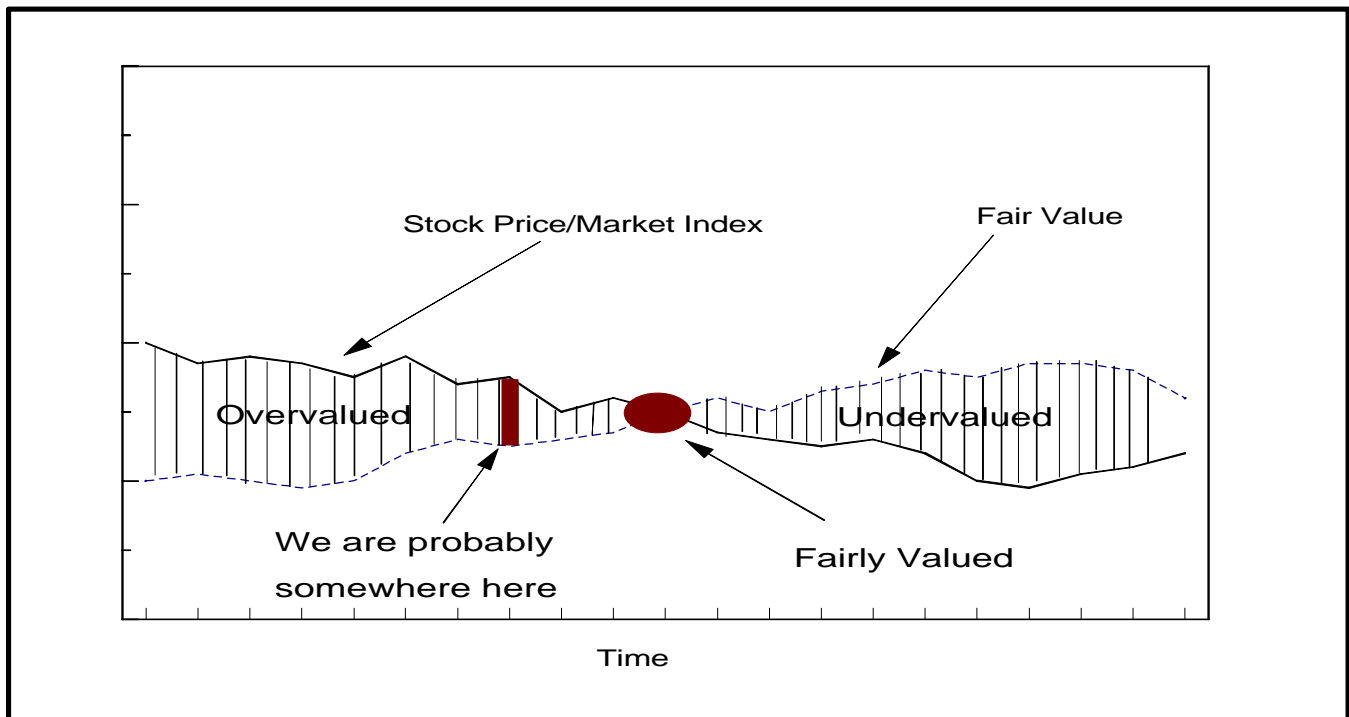
Breakeven P/E Matrix

		Earnings Growth Rate from FY97 to FY2012 (gA)							
		17.0%	17.5%	18.0%	18.5%	19.0%	19.5%	20.0%	20.5%
Cost of equity (k)	18.0%	13.89	14.39	NA	15.47	16.06	16.67	17.32	18.01
	18.5%	11.80	12.18	12.59	NA	13.46	13.93	14.42	14.94
	19.0%	10.24	10.54	10.85	11.17	NA	11.88	12.26	12.66
	19.5%	9.03	9.26	9.50	9.76	10.03	NA	10.60	10.91
	20.0%	8.06	8.24	8.43	8.63	8.84	9.06	NA	9.53
	20.5%	7.28	7.42	7.56	7.72	7.88	8.05	8.23	NA
	21.0%	6.62	6.73	6.85	6.96	7.09	7.22	7.35	7.50
	21.5%	6.07	6.16	6.24	6.33	6.42	6.52	6.63	6.73
	22.0%	5.60	5.66	5.73	5.79	5.86	5.93	6.01	6.09
	22.5%	5.20	5.24	5.28	5.33	5.38	5.43	5.48	5.54

Discount Rate (k) (cost of equity) = 19%

		Earnings Growth Rate after FY2012 (gB)										
		13.0%	13.5%	14.0%	14.5%	15.0%	15.5%	16.0%	16.5%	17.0%	17.5%	18.0%
Rate of Return on incr. Net Worth after FY 2012 (rB)	18.0%	7.23	7.16	7.07	6.96	6.82	6.65	6.41	6.08	5.59	4.77	3.12
	18.5%	7.52	7.49	7.44	7.39	7.32	7.24	7.12	6.96	6.72	6.32	5.52
	19.0%	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80	7.80
	19.5%	8.06	8.09	8.13	8.18	8.25	8.33	8.44	8.59	8.82	9.20	9.96
	20.0%	8.30	8.37	8.45	8.55	8.67	8.83	9.04	9.34	9.78	10.52	12.01
	20.5%	8.54	8.64	8.75	8.90	9.08	9.31	9.62	10.06	10.71	11.79	13.96
	21.0%	8.76	8.89	9.04	9.23	9.47	9.77	10.17	10.74	11.58	12.99	15.81
	21.5%	8.98	9.13	9.32	9.55	9.84	10.21	10.70	11.39	12.42	14.14	17.59
	22.0%	9.18	9.36	9.58	9.85	10.19	10.62	11.20	12.01	13.22	15.24	19.28
	22.5%	9.37	9.58	9.83	10.14	10.52	11.02	11.68	12.60	13.98	16.28	20.89
	23.0%	9.56	9.79	10.07	10.42	10.85	11.40	12.13	13.16	14.71	17.29	22.44
	23.5%	9.74	9.99	10.30	10.68	11.16	11.76	12.57	13.71	15.41	18.24	23.92
	24.0%	9.91	10.19	10.52	10.94	11.45	12.11	12.99	14.23	16.08	19.16	25.33
	24.5%	10.07	10.37	10.74	11.18	11.73	12.45	13.40	14.73	16.72	20.05	26.69
	25.0%	10.23	10.55	10.94	11.41	12.01	12.77	13.78	15.20	17.34	20.89	28.00

Discount Rate (k) (cost of equity) = 20%

		Earnings Growth Rate after FY2012 (gB)										
		13.0%	13.5%	14.0%	14.5%	15.0%	15.5%	16.0%	16.5%	17.0%	17.5%	18.0%
Rate of Return on incr. Net Worth after FY 2012 (rB)	18.0%	6.07	5.98	5.86	5.73	5.57	5.37	5.13	4.82	4.40	3.81	2.94
	18.5%	6.29	6.22	6.14	6.04	5.93	5.78	5.61	5.38	5.07	4.64	4.00
	19.0%	6.50	6.46	6.40	6.34	6.26	6.17	6.06	5.91	5.71	5.43	5.02
	19.5%	6.70	6.68	6.65	6.62	6.58	6.54	6.48	6.41	6.31	6.18	5.98
	20.0%	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89	6.89
	20.5%	7.07	7.09	7.11	7.14	7.18	7.22	7.27	7.34	7.43	7.56	7.75
	21.0%	7.24	7.28	7.33	7.38	7.45	7.54	7.64	7.77	7.95	8.20	8.58
	21.5%	7.40	7.46	7.53	7.61	7.71	7.84	7.99	8.19	8.45	8.82	9.37
	22.0%	7.55	7.63	7.73	7.83	7.96	8.12	8.32	8.58	8.92	9.40	10.12
	22.5%	7.70	7.80	7.91	8.04	8.20	8.40	8.64	8.96	9.38	9.96	10.84
	23.0%	7.84	7.96	8.09	8.25	8.43	8.66	8.95	9.32	9.81	10.50	11.53
	23.5%	7.98	8.11	8.26	8.44	8.65	8.91	9.24	9.66	10.22	11.01	12.18
	24.0%	8.11	8.25	8.42	8.62	8.86	9.16	9.52	9.99	10.62	11.50	12.81
	24.5%	8.23	8.39	8.58	8.80	9.06	9.39	9.79	10.31	11.00	11.97	13.42
	25.0%	8.35	8.53	8.73	8.97	9.26	9.61	10.05	10.61	11.37	12.42	14.00

Discount Rate (k) (cost of equity) = 21%

		Earnings Growth Rate after FY2012 (gB)										
		13.0%	13.5%	14.0%	14.5%	15.0%	15.5%	16.0%	16.5%	17.0%	17.5%	18.0%
Rate of Return on incr. Net Worth after FY 2012 (rB)	18.0%	5.21	5.11	5.00	4.87	4.72	4.54	4.33	4.07	3.74	3.32	2.77
	18.5%	5.38	5.30	5.21	5.11	4.98	4.84	4.67	4.46	4.19	3.85	3.40
	19.0%	5.54	5.48	5.41	5.33	5.23	5.12	4.99	4.82	4.62	4.35	4.00
	19.5%	5.70	5.65	5.60	5.54	5.47	5.39	5.29	5.17	5.02	4.83	4.57
	20.0%	5.84	5.82	5.78	5.74	5.70	5.64	5.58	5.50	5.40	5.28	5.11
	20.5%	5.98	5.97	5.95	5.93	5.91	5.89	5.86	5.82	5.77	5.71	5.63
	21.0%	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12	6.12
	21.5%	6.24	6.26	6.27	6.29	6.31	6.34	6.37	6.40	6.45	6.51	6.58
	22.0%	6.36	6.39	6.42	6.46	6.50	6.55	6.60	6.68	6.76	6.88	7.03
	22.5%	6.48	6.52	6.56	6.61	6.68	6.75	6.83	6.94	7.07	7.23	7.46
	23.0%	6.59	6.64	6.70	6.77	6.85	6.94	7.05	7.19	7.35	7.57	7.86
	23.5%	6.70	6.76	6.83	6.91	7.01	7.12	7.26	7.42	7.63	7.90	8.26
	24.0%	6.80	6.87	6.95	7.05	7.16	7.30	7.46	7.65	7.90	8.21	8.63
	24.5%	6.89	6.98	7.07	7.18	7.31	7.47	7.65	7.87	8.15	8.51	8.99
	25.0%	6.99	7.08	7.19	7.31	7.46	7.63	7.83	8.08	8.40	8.80	9.33

Discount Rate (k) (cost of equity) = 22%

		Earnings Growth Rate after FY2012 (gB)										
		13.0%	13.5%	14.0%	14.5%	15.0%	15.5%	16.0%	16.5%	17.0%	17.5%	18.0%
Rate of Return on incr. Net Worth after FY 2012 (rB)	**18.0%**	4.55	4.45	4.35	4.24	4.10	3.95	3.77	3.56	3.31	3.00	2.61
	18.5%	4.68	4.60	4.52	4.42	4.31	4.17	4.02	3.84	3.63	3.36	3.03
	19.0%	4.81	4.75	4.67	4.59	4.50	4.39	4.26	4.11	3.93	3.71	3.44
	19.5%	4.93	4.88	4.82	4.75	4.68	4.59	4.49	4.36	4.22	4.04	3.82
	20.0%	5.05	5.01	4.96	4.91	4.85	4.78	4.70	4.61	4.49	4.35	4.18
	20.5%	5.16	5.13	5.10	5.06	5.01	4.96	4.90	4.84	4.75	4.65	4.52
	21.0%	5.26	5.25	5.22	5.20	5.17	5.14	5.10	5.05	5.00	4.93	4.85
	21.5%	5.37	5.36	5.34	5.33	5.32	5.30	5.28	5.26	5.24	5.20	5.16
	22.0%	5.46	5.46	5.46	5.46	5.46	5.46	5.46	5.46	5.46	5.46	5.46
	22.5%	5.55	5.56	5.57	5.58	5.60	5.61	5.63	5.65	5.68	5.71	5.75
	23.0%	5.64	5.66	5.68	5.70	5.73	5.76	5.79	5.83	5.88	5.94	6.02
	23.5%	5.72	5.75	5.78	5.81	5.85	5.89	5.95	6.01	6.08	6.17	6.28
	24.0%	5.80	5.84	5.88	5.92	5.97	6.03	6.09	6.17	6.27	6.38	6.53
	24.5%	5.88	5.92	5.97	6.02	6.08	6.15	6.24	6.33	6.45	6.59	6.77
	25.0%	5.95	6.00	6.06	6.12	6.19	6.28	6.37	6.49	6.62	6.79	7.00