Capital Losses on the JSE:
Implications for Long-Term Equity Investors

By

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I. Introduction and Methodology

Investors invest predominantly in equities in pursuit of capital gains, but the equity market has never been and will never be a platform for continuous, positive returns. Negative returns and hence, capital losses, are an integral part of equity investing. Therefore, equity investors have to live with the fear of losing money, especially those periods which stretch over considerable time intervals with substantial losses at stake.

Normally, in such instances investors often consider the capital losses to be permanent, as if markets will never recover or that there will not be sufficient time available for equity markets to rebound. Furthermore, there is a disproportionate relationship between how investors perceive capital losses and gains, i.e. capital losses are causing much more pain than the joy of capital gains. Hence, many investors opt to withdraw from the equity market during the "darkest hours."

To be sure, this knee-jerk behaviour are the worst possible investment strategy; all that materialise from this is that investors made their losses permanent, and they have become despaired with equity investments as a

major source of real wealth creation in the long run. Sadly, this group of investors will in all likelihood miss the next bull market.

Therefore, it is imperative that equity investors, especially the novice, should be armoured with the knowledge of how equity markets behave. Prior knowledge will lead to better decision-making in times of uncertainty and to effectively control emotions of fear and disappointment when the going gets tough.

Therefore, I endeavour to shed some perspectives on the notion of capital losses on the stock market – how to deal with it and what to expect from it. This study investigates the history of major capital losses on the JSE since 1960; the extent thereof, time to recovery and implications of these "bad patches" on the long-term outcome of equity investments.

In the analysis I used a database[1] covering the performance of the JSE ALSI index from January 1960 to March 2006, dividends excluded. Note that I am using the market index (per definition a well-diversified investment) as a proxy for an indication of the losses that investors on the aggregate experienced. Individually, investors could have experienced quite a different outcome (probably much worse!), especially if they were heavily invested in certain sectors of the market.

2. Capital Losses Defined: The Concept of Maximum Drawdown

The concept of "maximum drawdown" is the most well-known methodology of describing the extent of capital losses over a certain time interval. A brief technical explanation follows below.

The maximum cumulative loss from a market peak to the following trough within a certain time period is known as the maximum drawdown (MDD).

[1] Information provided by I-Net

Essentially, it is a measure of how sustained an investor's losses can be. Money managers prefer the MDD as the risk measure of choice since large drawdowns usually lead to fund redemptions; therefore a reasonably low MDD is critical to the success of any investment fund.

Maximum loss (gain) is the minimum (maximum) cumulated return from the beginning of a certain time period, while the maximum drawdown is the minimum cumulated return from any point over a certain time period and falls within the difference between the maximum loss and maximum gain over that time period. The maximum loss and gain are the extreme values within a time series, while the MDD concept captures the path-dependant or continuous series of cumulated losses within a certain time interval.[2]

For a practical understanding of the above terminology a series of 36 consecutive monthly returns are shown in table 1 (page 4). Both the maximum and minimum cumulative monthly returns are calculated from the monthly returns. The "drawdown" column is computed by subtracting the "cumulative return" from the "maximum cumulative return" column.

The maximum drawdown period starts in period 4; the last time-interval where drawdown was equal to zero before the continuous drawdown starts until it reaches a maximum in period 14. This point represents the end of the trough cycle. Thereafter recovery takes place until the cumulative losses are fully recovered in period 19; the first time-interval where drawdown is zero again after the maximum drawdown has been reached.

Thus, in total the maximum drawdown period extended over 15 months (month 4 until month 19) with a maximum drawdown of 22.9% reached in month 14 (trough).

[2] Quoted from Andreas Steiner at http://www.andreassteiner.net

Table 1: Maximum drawdown explained

#	Return(m)	Cum Return	Max Cum Return	Min Cum Return	Drawdown
1	4.1%	4.1%	4.1%	4.1%	0.0%
2	7.3%	11.4%	11.4%	4.1%	0.0%
3	-3.4%	8.0%	11.4%	4.1%	3.4%
4	5.6%	13.6%	13.6%	4.1%	0.0%
5	-6.9%	6.7%	13.6%	4.1%	6.9%
6	5.1%	11.8%	13.6%	4.1%	1.8%
7	-3.5%	8.3%	13.6%	4.1%	5.2%
8	2.4%	10.8%	13.6%	4.1%	2.8%
9	-5.0%	5.7%	13.6%	4.1%	7.9%
10	-8.3%	-2.6%	13.6%	-2.6%	16.2%
11	-2.8%	-5.4%	13.6%	-5.4%	19.0%
12	-2.5%	-7.9%	13.6%	-7.9%	21.5%
13	4.6%	-3.3%	13.6%	-7.9%	16.9%
14	-6.0%	-9.3%	13.6%	-9.3%	22.9%
15	9.7%	0.3%	13.6%	-9.3%	13.2%
16	2.6%	3.0%	13.6%	-9.3%	10.6%
17	5.4%	8.4%	13.6%	-9.3%	5.2%
18	2.7%	11.1%	13.6%	-9.3%	2.5%
19	6.1%	17.2%	17.2%	-9.3%	0.0%
20	5.6%	22.8%	22.8%	-9.3%	0.0%
21	-4.1%	18.8%	22.8%	-9.3%	4.1%
22	-1.6%	17.2%	22.8%	-9.3%	5.6%
23	6.9%	24.2%	24.2%	-9.3%	0.0%
24	0.5%	24.6%	24.6%	-9.3%	0.0%
25	-2.9%	21.7%	24.6%	-9.3%	2.9%
26	4.8%	26.5%	26.5%	-9.3%	0.0%
27	-0.2%	26.3%	26.5%	-9.3%	0.2%
28	-1.3%	25.0%	26.5%	-9.3%	1.5%
29	-2.7%	22.3%	26.5%	-9.3%	4.2%
30	8.0%	30.3%	30.3%	-9.3%	0.0%
31	-2.1%	28.3%	30.3%	-9.3%	2.1%
32	-6.1%	22.2%	30.3%	-9.3%	8.2%
33	-8.1%	14.0%	30.3%	-9.3%	16.3%
34	1.9%	15.9%	30.3%	-9.3%	14.5%
35	-6.0%	9.9%	30.3%	-9.3%	20.5%
36	5.8%	15.7%	30.3%	-9.3%	14.7%
Minimum/Maximum			30.3%	-9.3%	-22.9%

3. Identifying the Maximum Drawdown

Figure 1 displays the cumulative returns (log scale) of the All Share Index (ALSI) on the Johannesburg Securities Exchange (JSE) since 1960. By using the methodology explained above, the maximum drawdown period, starting in April 1969 and ending nearly five years later (January 1974), was identified.[3]

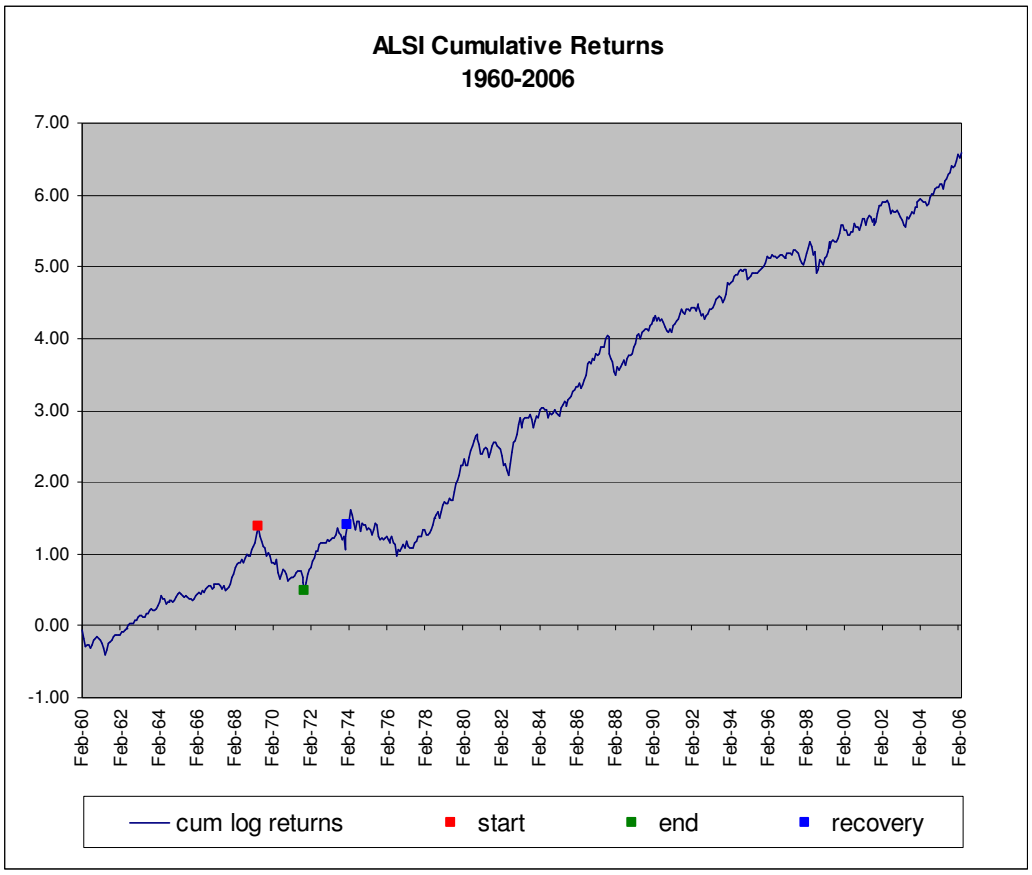


Figure 1: The maximum drawdown: 1960-2006

[3] I used a Excel template with built-in drawdown calculation functionalities, developed by Andreas Steiner at http://www.andreassteiner.net

Table 2 highlights the extent of the maximum drawdown experienced; the market fell from a ridiculous high PE multiple of 25.6 to a low 8.9 two-and-a-half years later with a cumulative loss of nearly 90% over this period![4] From this bottom it took more than two years to recover the cumulative losses.

Table 2: Identifying the maximum drawdown period

	Date	Month	PE Rating
Start Maximum Drawdown Period	**1969/04/30**	**111**	**25.6**
End Maximum Drawdown Period	**1971/10/31**	**141**	**8.9**
Recovery After Maximum Drawdown Period	**1974/01/31**	**168**	**12.7**

Max Drawdown	**89.6%**
Turnaround Period (from trough to recovery)	**27 months**
Total Recovery Period (from peak to recovery)	**57 months**

[4] The cumulative loss of 90% is not equal to the percentage loss an investor would have experienced over this period. In fact, an investor would have lost around 60% of the principal amount if invested at the peak and divested at the trough. See also section 5 for a more detailed explanation.

4. Major Drawdowns

A comprehensive view of the major drawdown periods that investors could experience over the last forty six years are displayed in table 3 and figure 2 (page 8).

Table 3: The duration of major drawdown events: 1960-2006

Length of Drawdown Periods	Number of Events
> 6 months	17
> 12 months	9
> 18 months	6
> 24 months	4
>36 months	2

The good news is that prolonged negative markets are relatively scarce; in the past four-and-a-half decades only nine drawdown events exceeded 12 months, four events continued longer than two years, and only two surpassed three years and more.

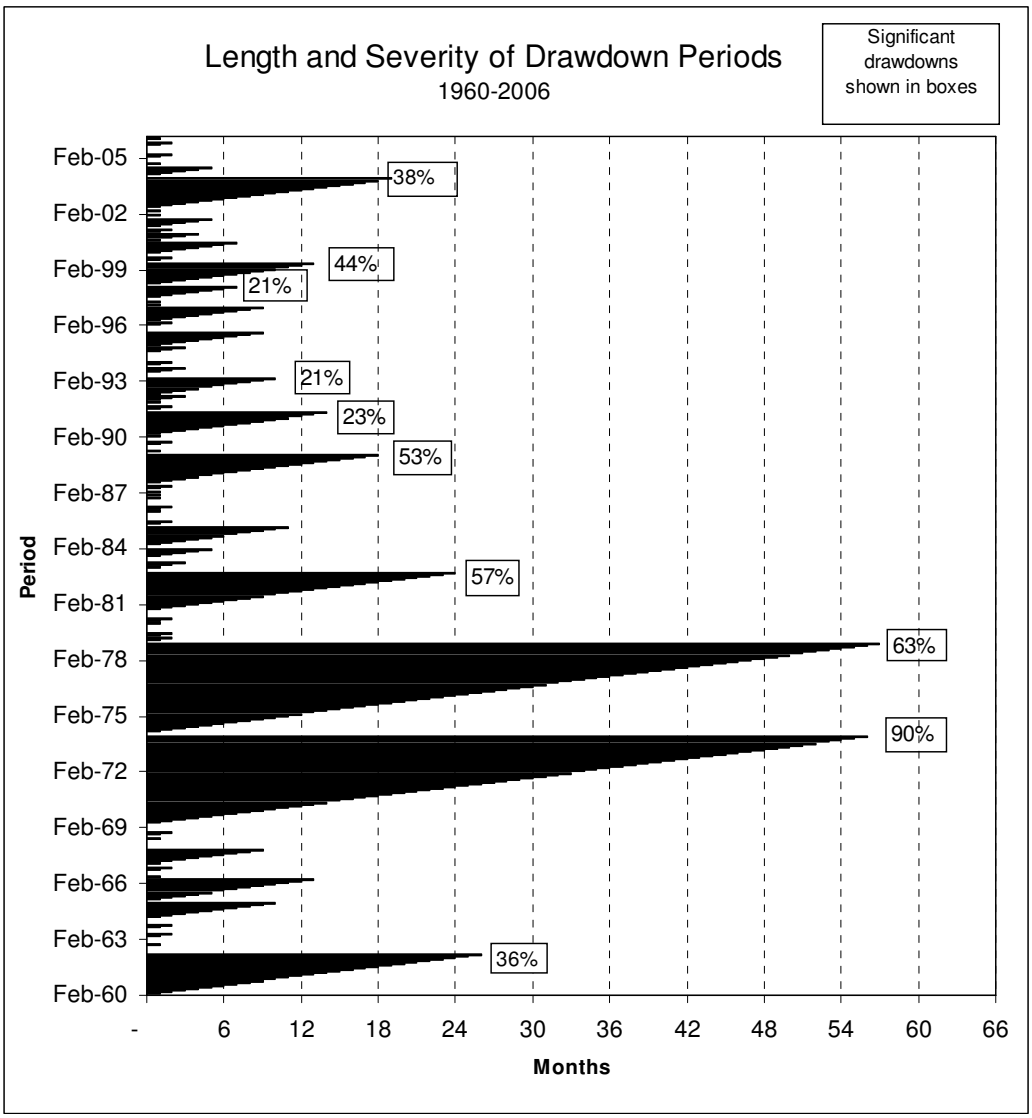


Figure 2: The duration and extent of major drawdowns on the JSE ALSI

From above: Two major drawdown events took place in the seventies. Since then we have not seen similar events; either in duration or the extent of losses. The most recent drawdown period started in May 2002 and ended in January 2004 with a cumulative loss of 38% over that period.

Table 4 shows the duration of each sub-event (retracting and recovery) together with the movement in the PE multiple of the market for the ten biggest drawdown periods since 1960.

Table 4: Major drawdowns and related PE multiples

Drawdown*	PE at top	Retracting period (m)	PE at bottom	Recovery period (m)	PE at recovery	Total Drawdown Period (m)
20.5%	13.88	5	11.62	6	14.70	11
20.5%	17.23	5	12.64	3	17.23	8
22.9%	10.86	10	8.77	5	12.04	15
35.8%	11.11	14	6.57	13	9.52	27
38.0%	13.57	11	8.83	9	14.05	20
43.5%	19.42	4	11.33	10	14.98	14
52.9%	14.70	6	8.00	13	10.41	19
57.0%	9.09	20	4.09	5	6.49	25
63.2%	14.92	29	4.97	29	6.80	58
89.6%	25.64	30	8.92	27	12.65	57

* The major drawdown events are graphically displayed in Appendix 1.

A few observations can be made:

First, there is a strong linear relationship between the level of drawdown (cumulative losses) and the decline in the PE multiple, as shown in figure 3.

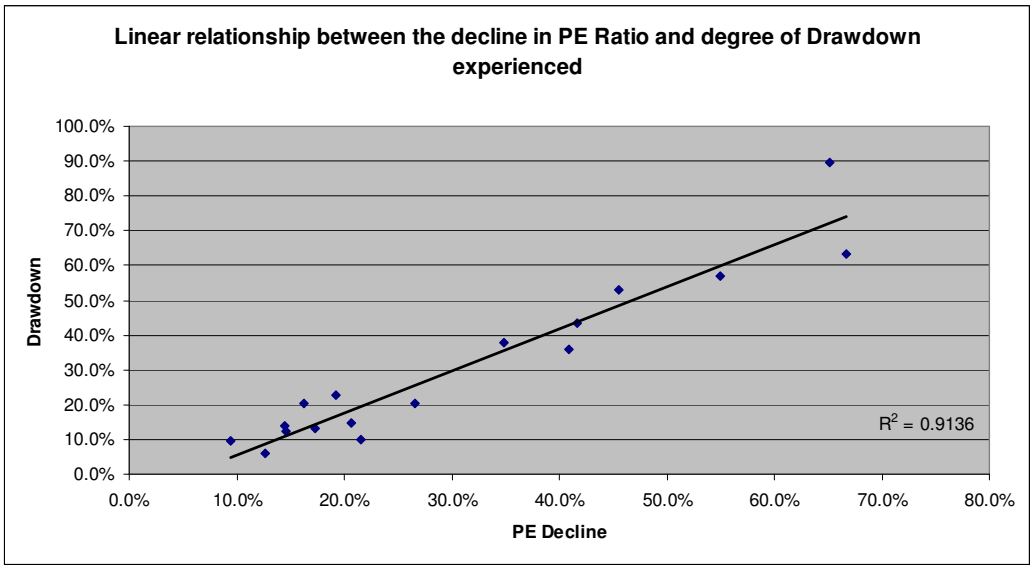


Figure 3: The relationship between drawdown and decline of PE ratio

Second, a weak correlation exists between the level of drawdown and the initial PE multiple at the start of the drawdown period, as illustrated in figure 4.

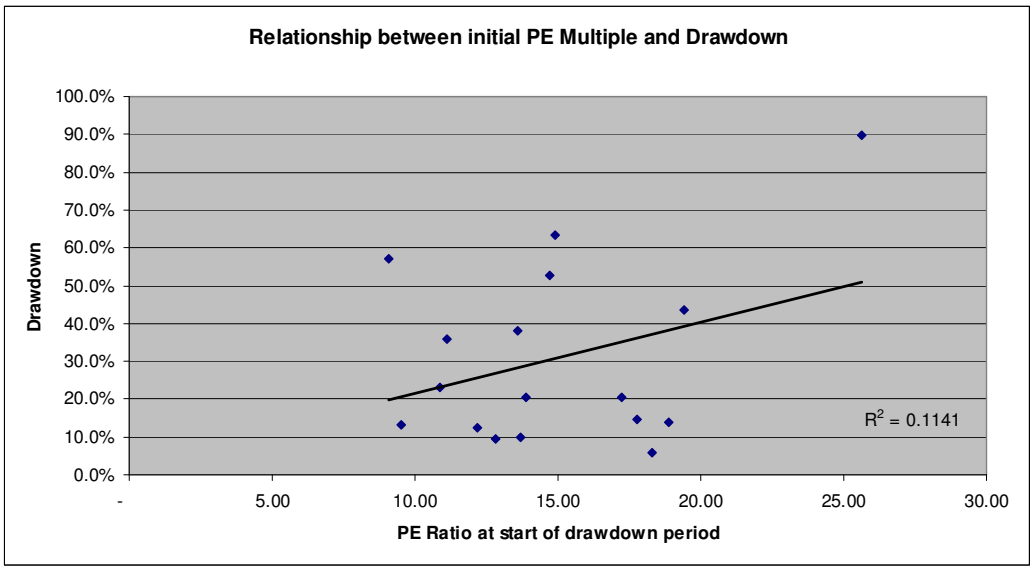


Figure 4: The relationship between drawdown and initial PE multiple

Thus, the general notion that the higher the PE multiple, the more likely a severe drawdown will occur is not undoubtedly true. In the past we have seen some major drawdowns to occur even at relative benign PE multiples. Therefore, no logical conclusion, based on historic fact, can be made that if the market rating seems expensive on a historical basis, a major drawdown is likely to follow.

Importantly, it is all about the context in which the PE multiple at a specific time period should be assessed. For example, a PE rating of 15 now versus a similar rating say twenty years ago is strictly speaking not comparable. Every man and his dog will agree we live now in a totally different socio-political and economic society. Furthermore, inflation and interest rate expectations now and then are two worlds apart. Thus, a similar rating indicates either a relative cheap market now or an overly-optimistic assessment then.

5. Measuring Investors' Losses

The drawdown, as calculated above, is not exactly equal to the actual percentage losses that an investor would have experienced. When calculating the drawdown the percentage losses are added cumulatively from a zero-basis at the start of any drawdown period, whereas the investor lose the same percentages, but from an amount invested. The net result is lower losses than indicated by the "drawdown" concept, especially over extended periods.

For example, if the cumulative loss (drawdown) is 10% and this month's market loss is 5%, the cumulative drawdown will become 15%. The market investor that initially invested R100 and whose investment value is R90 at the beginning of this month, will also experience a 5% negative return this month, but the negative return is calculated on the R90, which is equal to R4.50. The end value is thus R85.50; a total cumulative loss of 14.5%. Similarly, the recovery of losses will be at a slightly slower pace than implied by the "drawdown" concept.

Table 5 shows the position of a hypothetical investor that invested R100 at the top of each major drawdown period; what is the maximum loss that this investor experienced and how long did it take to recover these losses?

Table 5: Maximum losses and duration of recovery events on the JSE ALSI: 1960-2006

Drawdown	Max Loss to Investor*	Peak-Trough (m)	Trough-Recovery (m)	Peak-Recovery (m)
35.8%	32.2%	14	15	29
38.0%	32.9%	11	17	28
43.5%	39.4%	4	15	19
52.9%	43.9%	6	18	24
57.0%	46.7%	20	6	26
63.2%	51.4%	28	33	61
89.6%	62.4%	30	31	61

* The major losses are graphically displayed in Appendix 2.

6. A Historical Perspective on Long-Term Equity Investing

How relevant is the occurrence of capital losses, which invariably is part and parcel of equity investing, for the longer term investor? For example, if an investor invested in a period in which the markets experienced a prolonged period of retraction, as shown above, how did that impact his or her actual investment outcome at the end of the investment term? More specifically, the rationale for equity investing stems from the ability to achieve real growth (above inflation) over time, thus did these long-term investors experience real growth? Furthermore, are these investors materially worse off than another group of investors which was perhaps fortunate enough to largely avoid these big drawdown periods?[5]

I considered four different long-term investment holding periods, namely a five-year, ten-year, twenty-year and a thirty-year investment horizon. For each period I randomly selected 100 different investment dates (month-end data points). For example, in the five-year holding period an investor could invest any time between 1960 to March 2001. Similarly, for the thirty-year period investors could invest any time from 1960 to March 1976.

Equity returns (capital growth plus dividends) were compared with the prevailing inflation rate (CPI) for each period. The results of this random sampling for the different holding periods are shown in figures 5-8 and tables 6-9.

[5] Note that I am only investigating the situation where equity growth and dividends are capitalized, in other words no regular withdrawals are made from the investment plan. In a follow-up study the effect of long-term bear markets on the suitability of equities as a major income generating asset will be assessed.

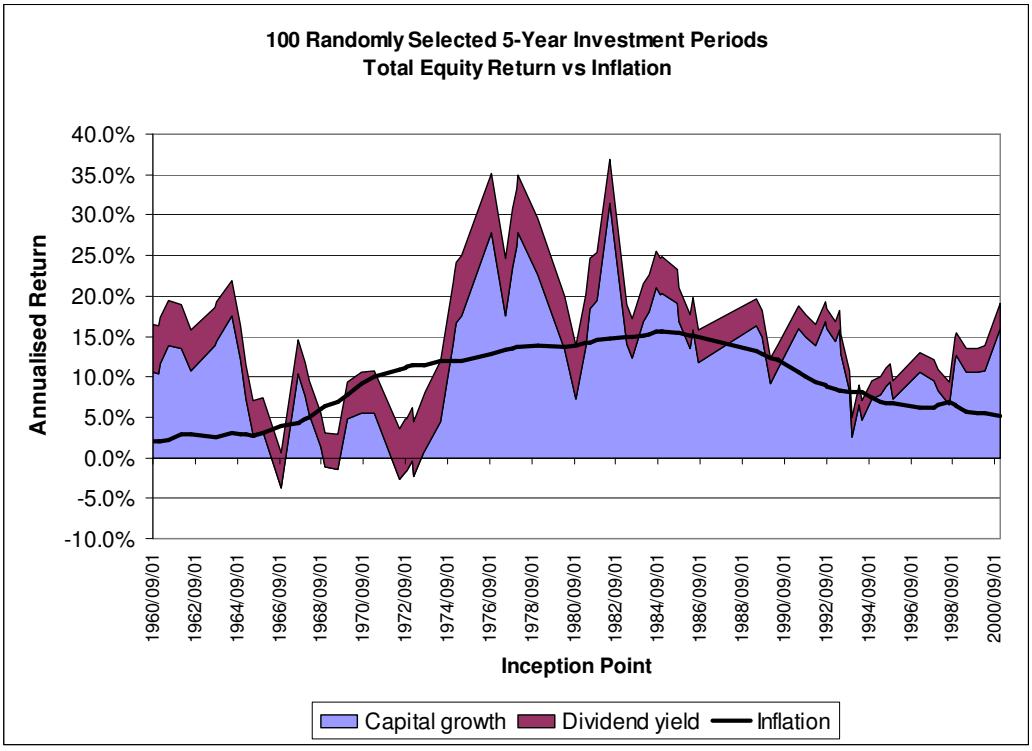


Figure 5: Random sampling: Five-year holding periods

Table 6: Outcome of random sampling: five-year holding periods

Results	Max	Min	Average	Std Dev
Annualised Return	36.9%	0.6%	15.7%	7.6%
Above Inflation (annualised)	22.3%	-7.5%	6.5%	6.7%

- No negative growth periods
- 14% of investments performed below the prevailing inflation rate
- Relative wide dispersion between best and worst performance

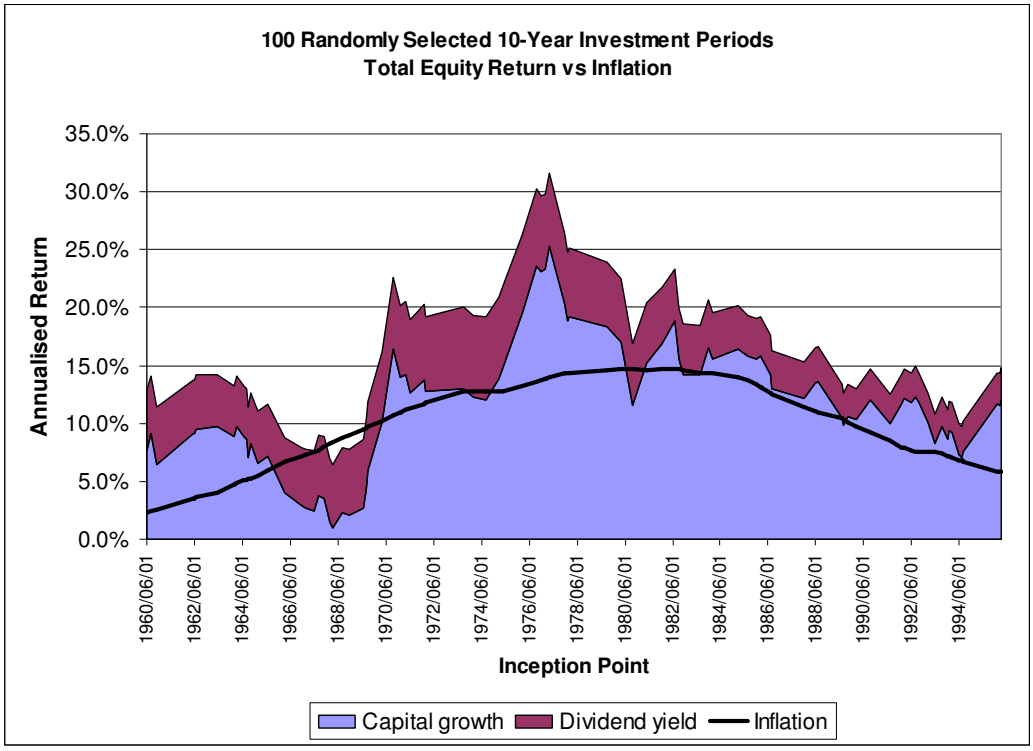


Figure 6: Random sampling: Ten-year holding periods

Table 7: Outcome of random sampling: ten-year holding periods

Results	Max	Min	Average	Std Dev
Annualised Return	31.6%	6.4%	16.3%	5.9%
Above Inflation (annualised)	17.6%	-2.0%	6.6%	4.1%

- No negative growth periods
- 5% of investments performed below the prevailing inflation rate
- Relative wide dispersion between best and worst performance

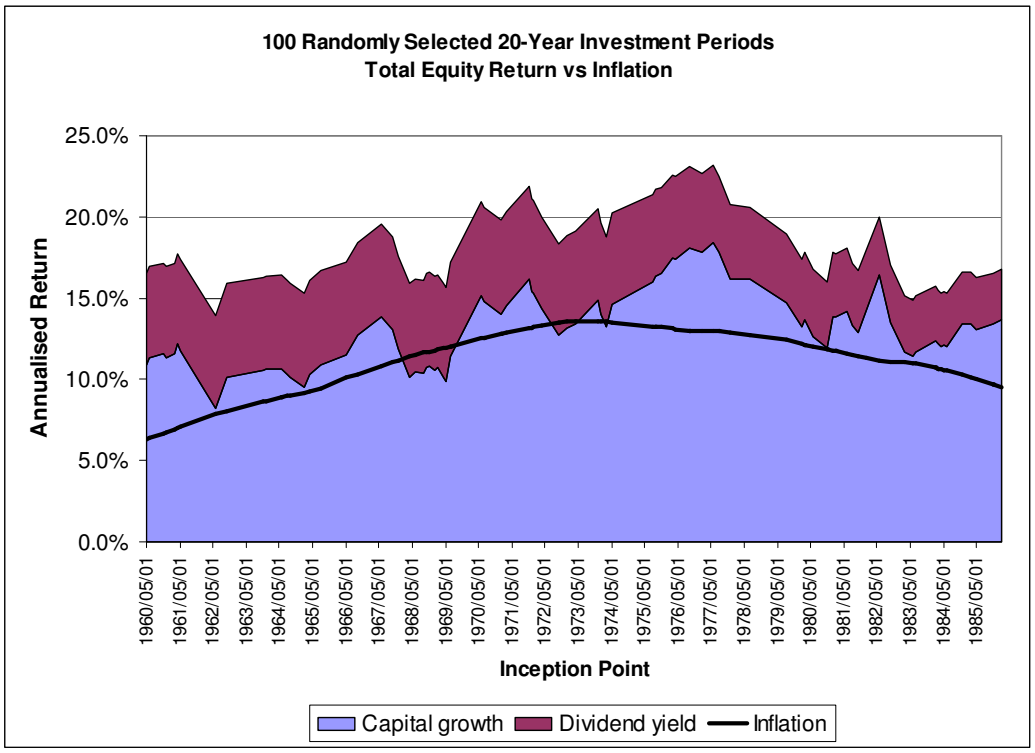


Figure 7: Random sampling: Twenty-year holding periods

Table 8: Outcome of random sampling: twenty-year holding periods

Results	Max	Min	Average	Std Dev
Annualised Return	23.2%	13.9%	18.1%	2.4%
Above Inflation (annualised)	10.8%	3.7%	6.8%	1.9%

- No negative growth periods
- No investment performed below the prevailing inflation rate
- Smaller dispersion between best and worst performance

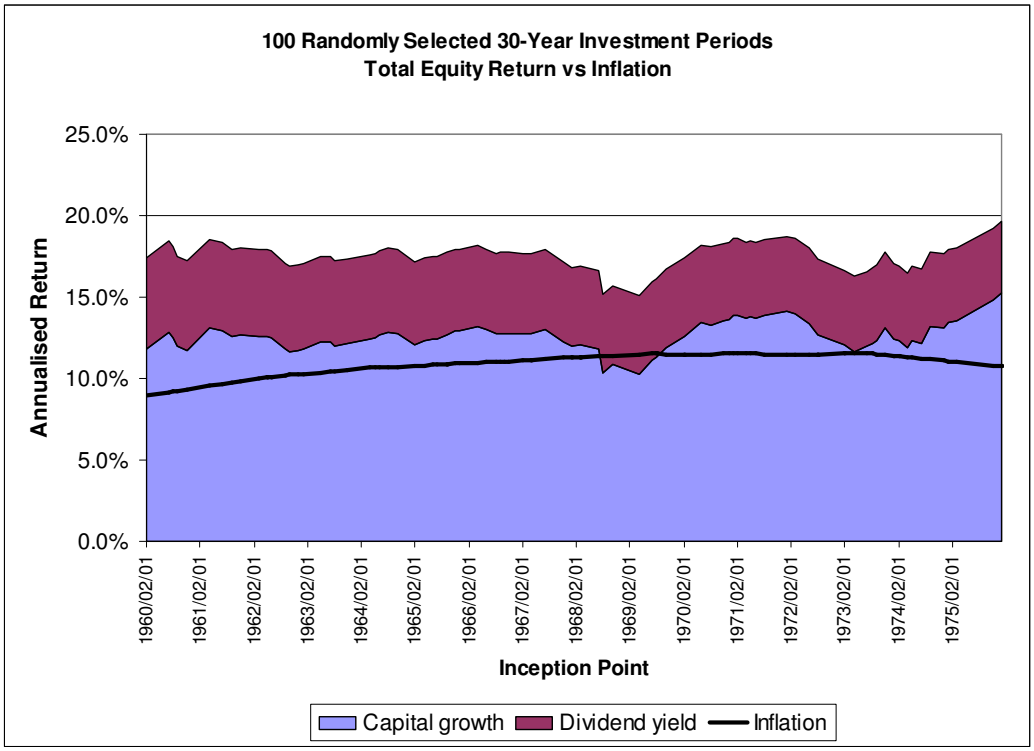


Figure 8: Random sampling: Thirty-year holding periods

Table 9 Outcome of random sampling: thirty-year holding periods

Results	Max	Min	Average	Std Dev
Annualised Return	19.6%	15.1%	17.5%	0.8%
Above Inflation (annualised)	9.2%	3.6%	6.6%	1.2%

- No negative growth periods
- No investment performed below the prevailing inflation rate
- Relative small dispersion between best and worst performance

7. Summary and Conclusions

1) Over the long term equity investments are able to deliver comprehensive inflation-beating returns despite being subject to periods of sharp market corrections.

   For example, only a small incidence of below-inflation growth periods was identified over the five-year and ten-year investment periods, but none over the twenty-year or more investment horizons.

2) Major stock market corrections have had surprisingly little influence on the outcome of your equity investment over the very long term (twenty to thirty years).

   For example, note the relative small difference between the best and worst investment return over these periods. Importantly, in all instances equity investments fulfil its primary objective: to beat inflation comprehensively.

   Therefore, if the investor has a long-term investment perspective, no real need exists to sell the investment during bear markets; simply because the investor is very unlikely to correctly time the re-entry into the equity market. Besides, very often recovery takes place much faster than most investors will anticipate.

3) Negative growth periods have always been and will always be an intrinsic part of equity investments. The single most important aspect for investors to master is not to become despaired with the lack of performance, but rather to perceive such periods it as an opportunity to accumulate quality assets.

For example, in this analysis it was shown the best returns were achieved when investments were made during cheap and depressed market conditions, such as the mid-seventies. Conversely, the worst returns were achieved when equity markets were expensive, like the end of the 1960's.

However, a word of caution: it is not always before-the-fact certain whether markets are cheap or expensive; obviously, after-the-fact you have 100% knowledge. Undoubtedly, some element of "luck" plays a role in whether you will achieve superior returns or not. Probably, the best way of ensuring some luck coming your way is to invest on a regular basis.

4) However, the most important message from all this is that even if the investor enters the market "blindly" (no opinion or idea whether the market is expensive or cheap), the chances are very good that he or she will achieve real growth in the long run.

However, three very important prerequisites need to be in place to validate the above claim. First, set a sound, long-term strategy and stay with that strategy. Too often investors are becoming despaired with the "lack of performance" over say a three-year period. But always keep perspective: three years is virtually nothing in an investment context of thirty years and more!

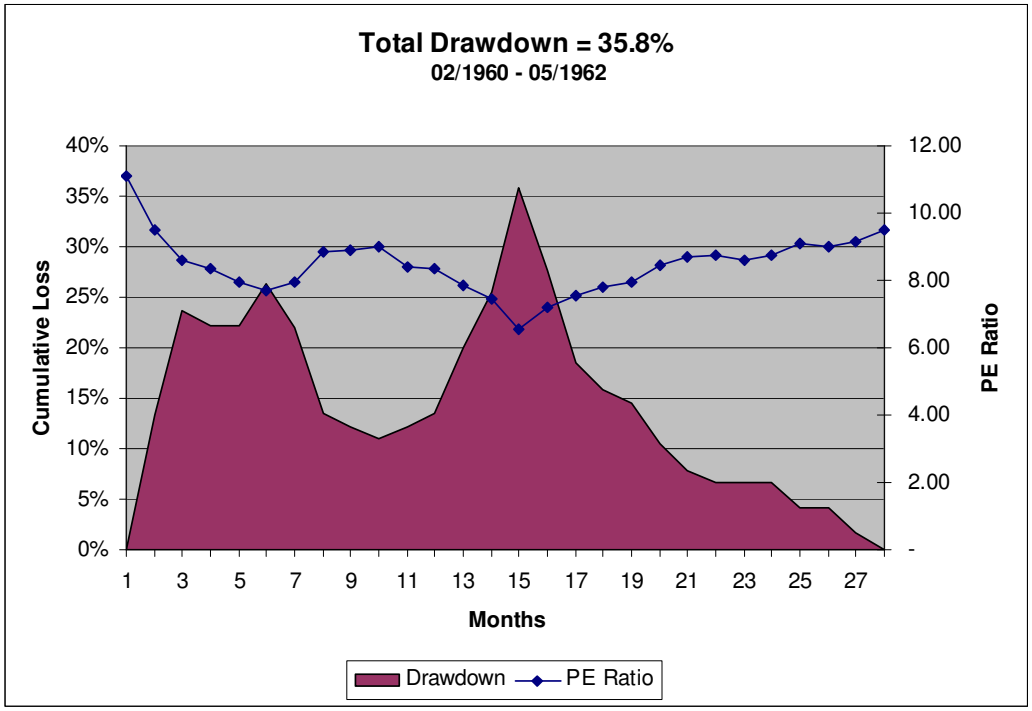
Second, maintain a balanced and well-diversified portfolio. Numerous examples exist in history where investors flocked to certain sectors of the market on the back of spectacular past performances and in anticipation of more to come. Alas, invariably these "parties" came to an abrupt end. For example, in the recent years investors in small cap and IT stock not only suffered major "paper" losses, they have lost vast amount of monies permanently.

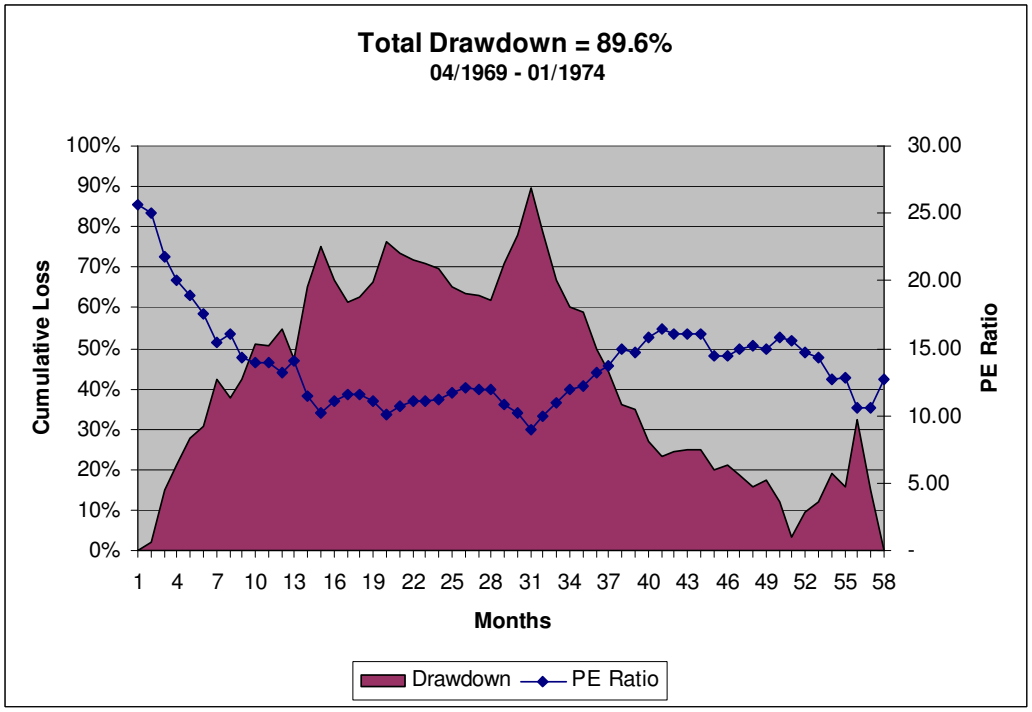
Third, we are exposed to sensational, mass-media reporting. Unwillingly, our ideas, emotions and perceptions are formed by this daily and even on-the-hour type of reporting. For long-term investors this spells danger. What might look reasonable today may look silly tomorrow. Many examples exist where certain strategies at a certain time were widely professed just to turn out the worst possible strategy a few years later.

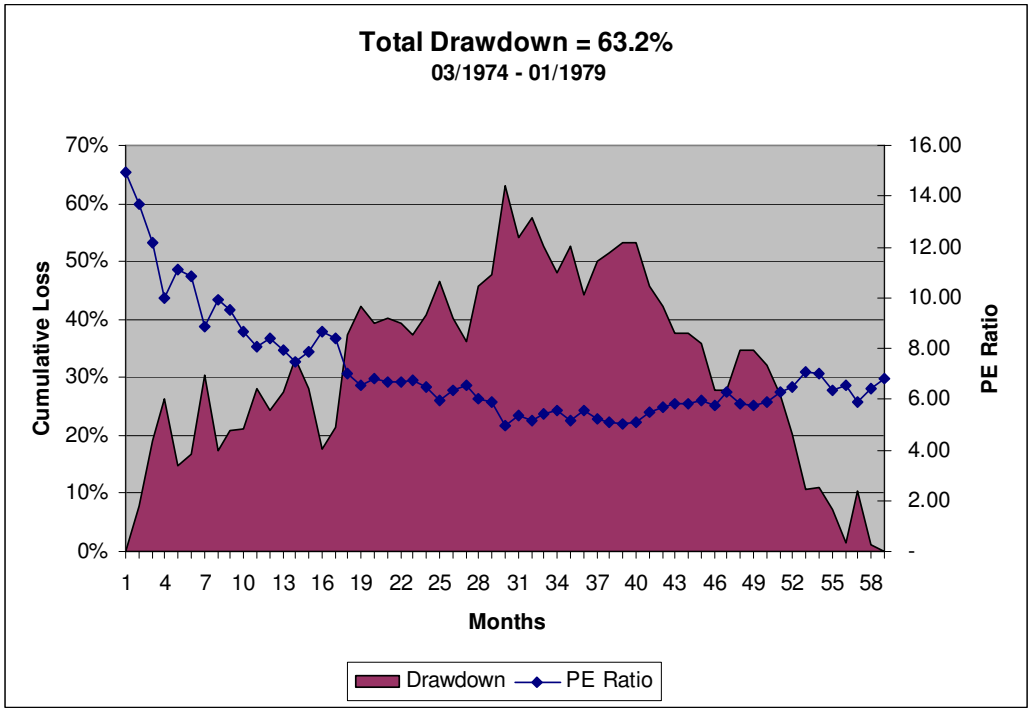
Quite simply, investors should not get deterred by so-called “crises” on the political and economic fronts; the stock market has survived many major crises before, and still delivered more than reasonable returns to long-term investors. The golden rule is to *invest and forget*, thereby avoiding *investment by emotion*.

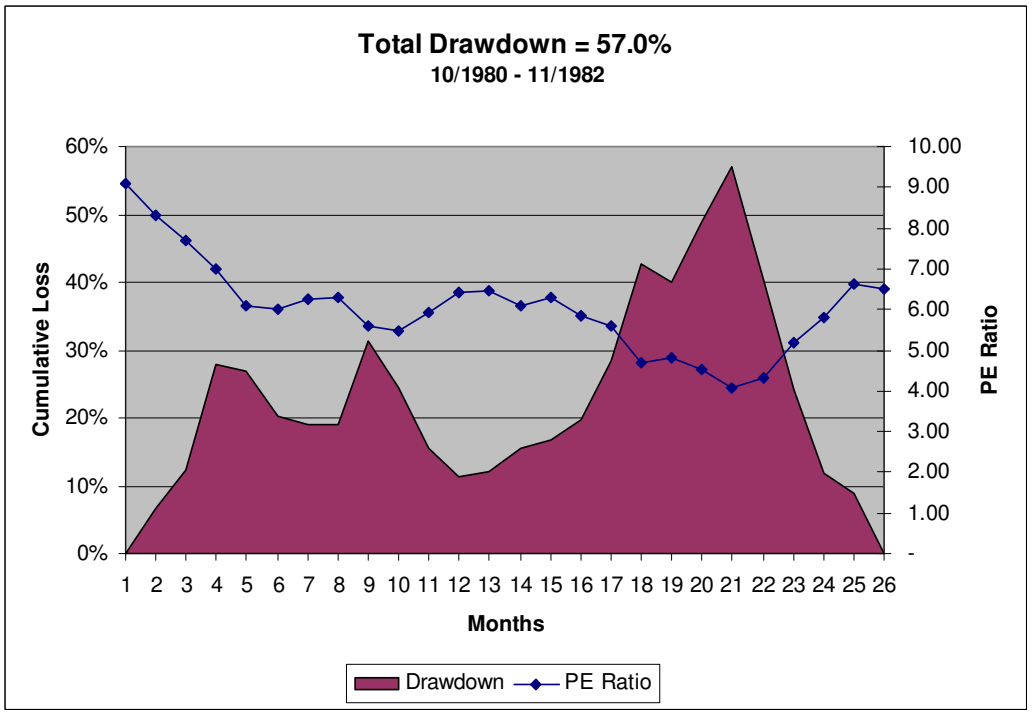
A final word: equity investing has proven to be a real wealth creator, despite some major drawdowns in the past. Importantly, equity investing is not only for the affluent or informed market. Today many people can sensibly invest therein, especially since the advent of low-cost, well-diversified market index funds.

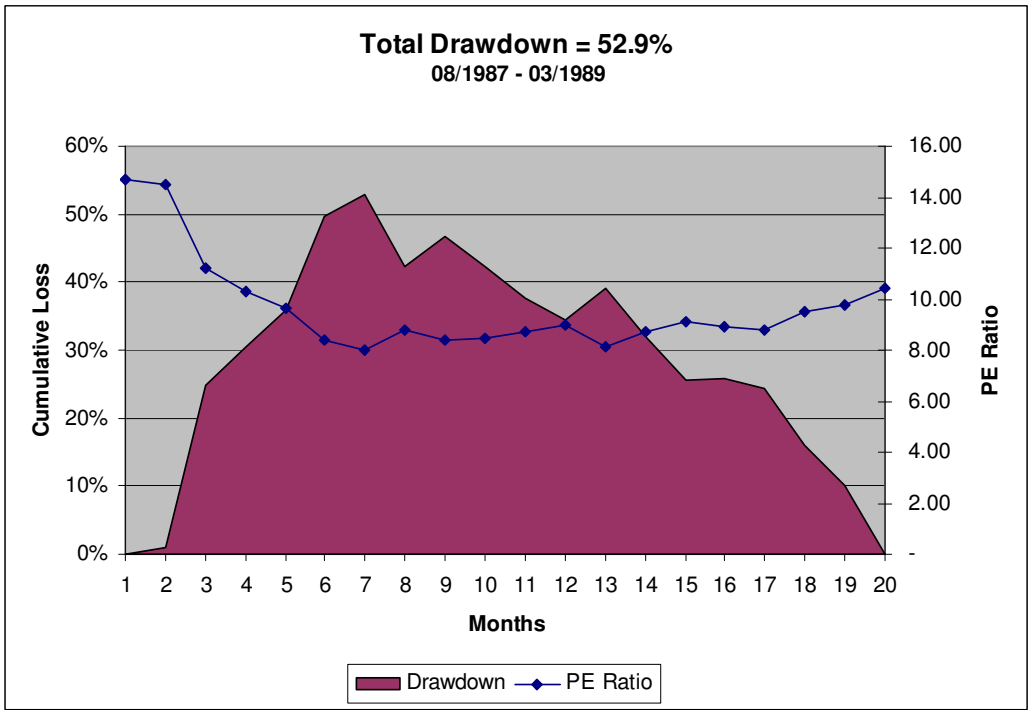
APPENDIX 1: Major Drawdown Periods

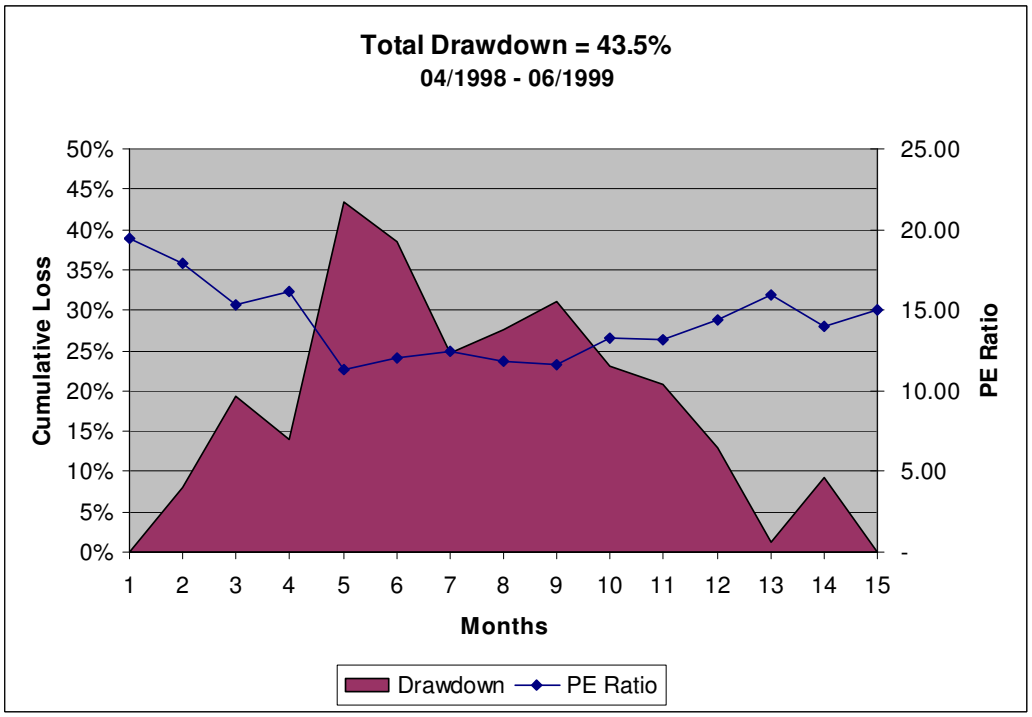


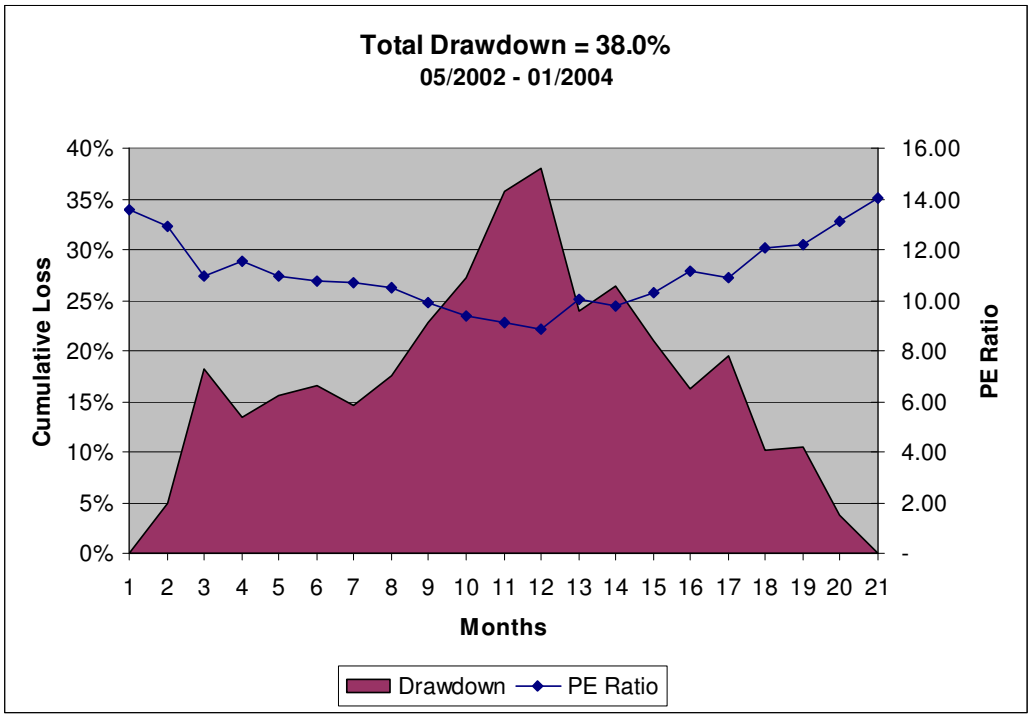



Total Drawdown = 63.2%
03/1974 - 01/1979
Cumulative Loss
70%
60%
50%
40%
30%
20%
10%
0%
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
-
PE Ratio
1 4 7 10 13 16 19 22 25 28 31 34 37 40 43 46 49 52 55 58
Months
Drawdown
PE Ratio

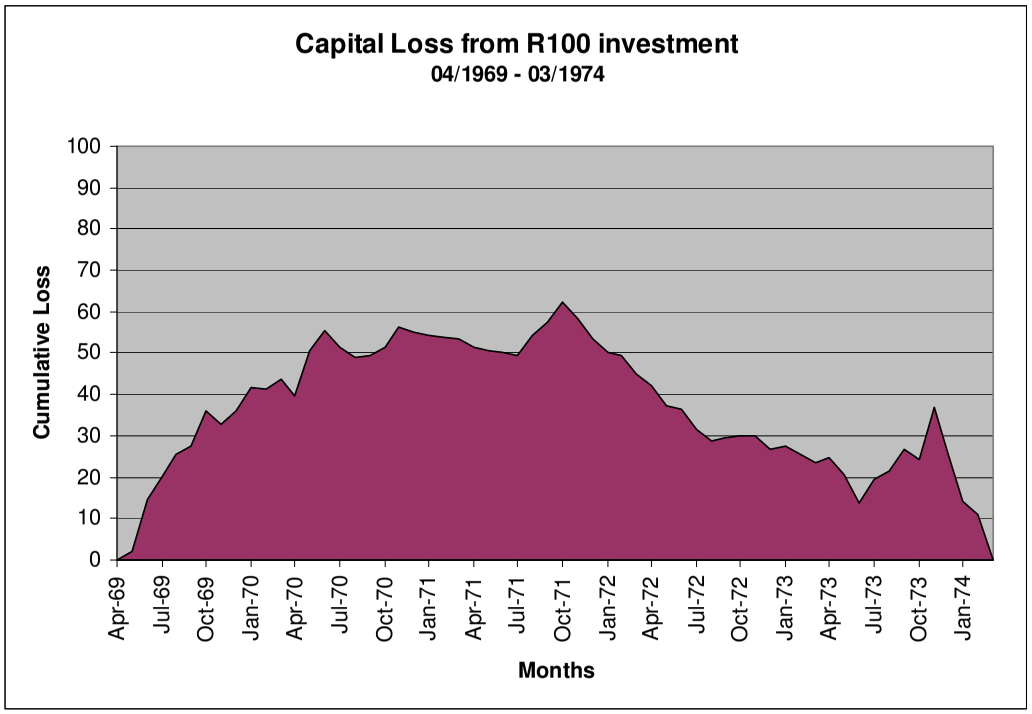

Total Drawdown = 57.0%
10/1980 - 11/1982
Cumulative Loss
60%
50%
40%
30%
20%
10%
0%
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
-
PE Ratio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
Months
Drawdown
PE Ratio

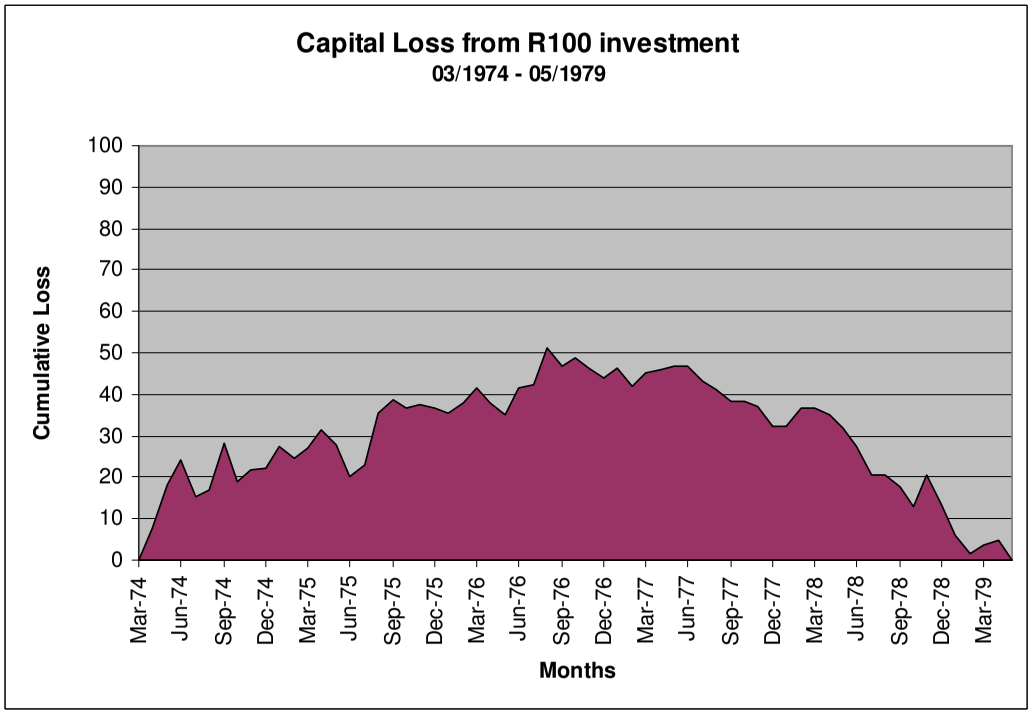

Total Drawdown = 52.9%
08/1987 - 03/1989
Cumulative Loss
60%
50%
40%
30%
20%
10%
0%
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
-
PE Ratio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Months
Drawdown
PE Ratio

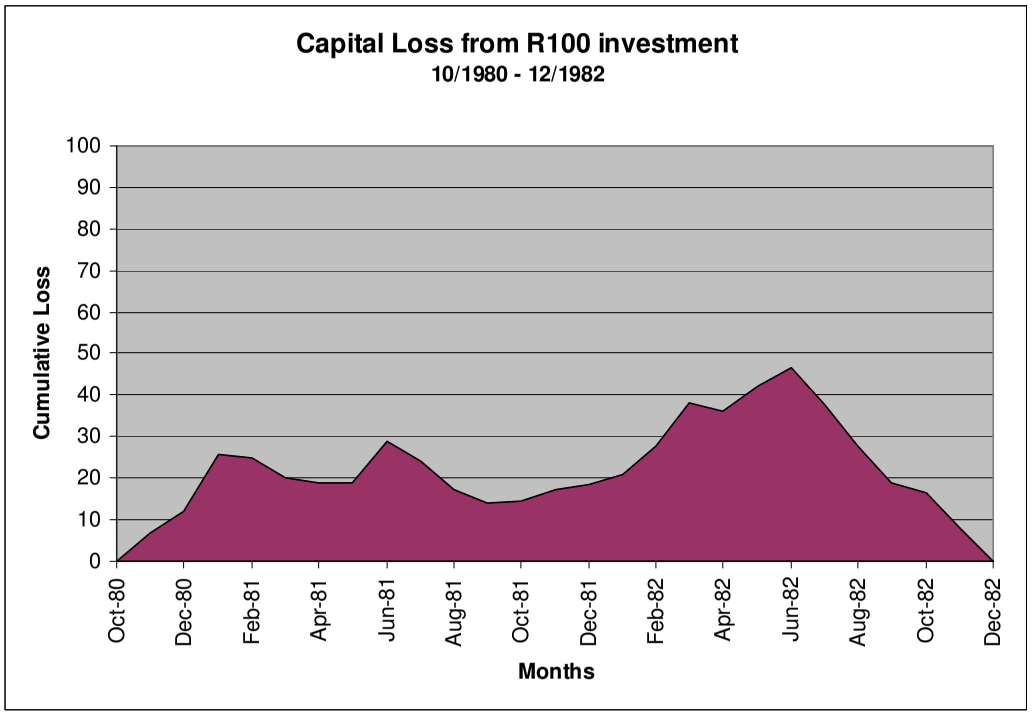

Total Drawdown = 43.5%
04/1998 - 06/1999
Cumulative Loss
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
25.00
20.00
15.00
10.00
5.00
-
PE Ratio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15
Months
Drawdown
PE Ratio

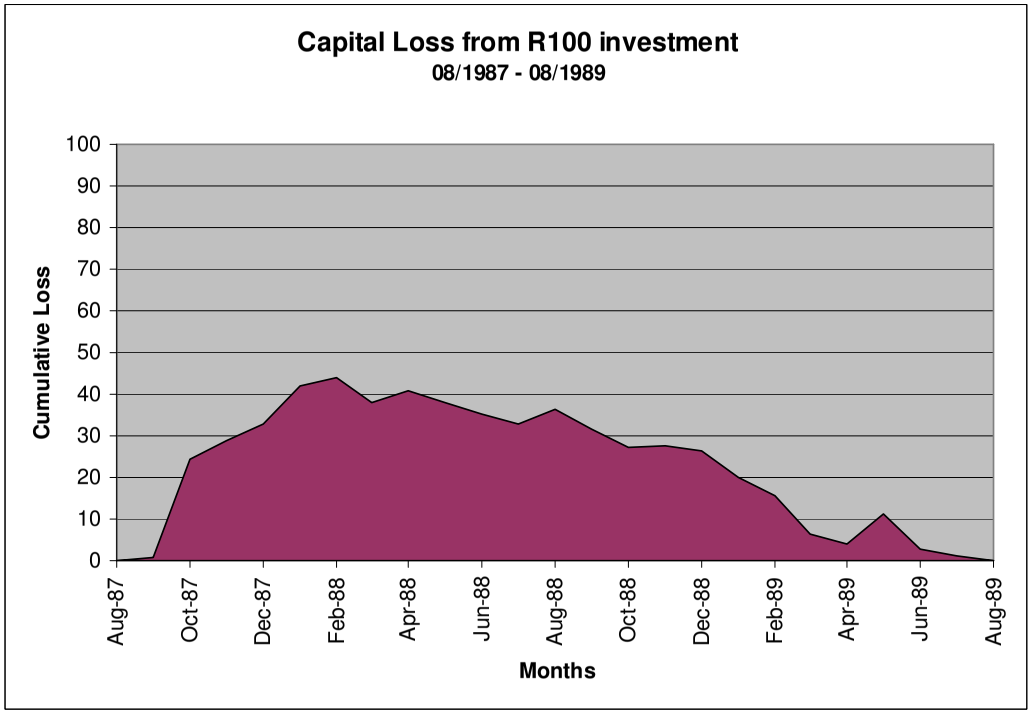

Total Drawdown = 38.0%
05/2002 - 01/2004
Cumulative Loss
40%
35%
30%
25%
20%
15%
10%
5%
0%
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
-
PE Ratio
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Months
Drawdown
PE Ratio

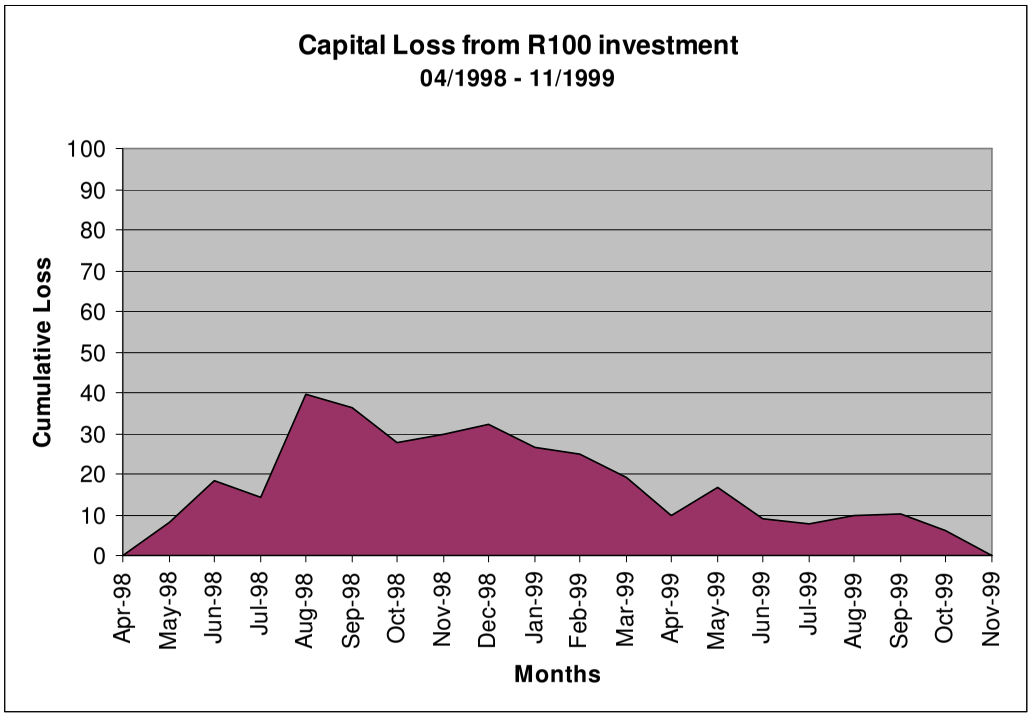
APPENDIX 2: Major Losses on the JSE ALSI: 1960-2006

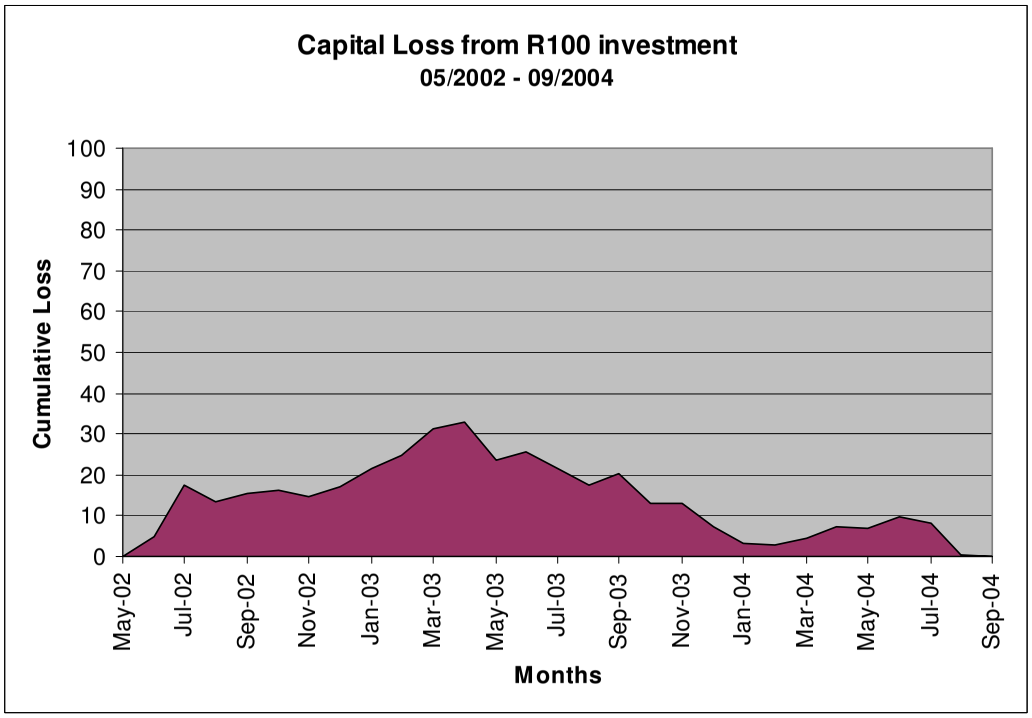





Capital Loss from R100 investment
10/1980 - 12/1982
Cumulative Loss
100
90
80
70
60
50
40
30
20
10
0
Oct-80
Dec-80
Feb-81
Apr-81
Jun-81
Aug-81
Oct-81
Dec-81
Feb-82
Apr-82
Jun-82
Aug-82
Oct-82
Dec-82
Months


Capital Loss from R100 investment
08/1987 - 08/1989
Cumulative Loss
100
90
80
70
60
50
40
30
20
10
0
Aug-87
Oct-87
Dec-87
Feb-88
Apr-88
Jun-88
Aug-88
Oct-88
Dec-88
Feb-89
Apr-89
Jun-89
Aug-89
Months


Capital Loss from R100 investment
04/1998 - 11/1999
Cumulative Loss
100
90
80
70
60
50
40
30
20
10
0
Apr-98
May-98
Jun-98
Jul-98
Aug-98
Sep-98
Oct-98
Nov-98
Dec-98
Jan-99
Feb-99
Mar-99
Apr-99
May-99
Jun-99
Jul-99
Aug-99
Sep-99
Oct-99
Nov-99
Months


Capital Loss from R100 investment
05/2002 - 09/2004
Cumulative Loss
100
90
80
70
60
50
40
30
20
10
0
May-02
Jul-02
Sep-02
Nov-02
Jan-03
Mar-03
May-03
Jul-03
Sep-03
Nov-03
Jan-04
Mar-04
May-04
Jul-04
Sep-04
Months