The JSE Return Characteristics: 1960-2005

By Daniel R Wessels

August 2005

Available at: www.indexinvestor.co.za

1. Introduction

The purpose of this analysis is to highlight the relative contribution and attributes of the three major sectors of the JSE stock market, namely resources, financials and industrials to the overall performance of the stock market over time.

This analysis will put some common misconceptions about stock market returns and specifically specific sectors to rest. For example, it is shown that the resources sector, commonly regarded as volatile, has not only outperformed the other sectors, but also with less volatility. Furthermore, it can be argued that has it not been for the relative importance of the resources sector in the South African stock market, the average investor would have been far worse off. Resources did not only outperform with less volatility, but it has shown a relative low correlation with the performances of the other sectors of the market, thus acting as an effective diversifier in the investment portfolio.

Obviously, the above argument would have been only valid if investors followed a more-or-less market portfolio approach, any other "managed" equity portfolio with much less resources exposure would have been sub-optimal to say the least!

2. Cumulative Returns

Figure 1 displays the cumulative return of the JSE All Share index (ALSI) from 1960 until June 2005. During this period one major bear market (1969-1978) has been experienced (large circle) with some mini-bear markets within the major bull market from 1980's until present.

If you invested R100 back in 1960 on the stock market (OK, I know it was "pounds then, but that is beside the point!), your investment would have grown to R144,195 (dividends included), an annualised return of near 21%.

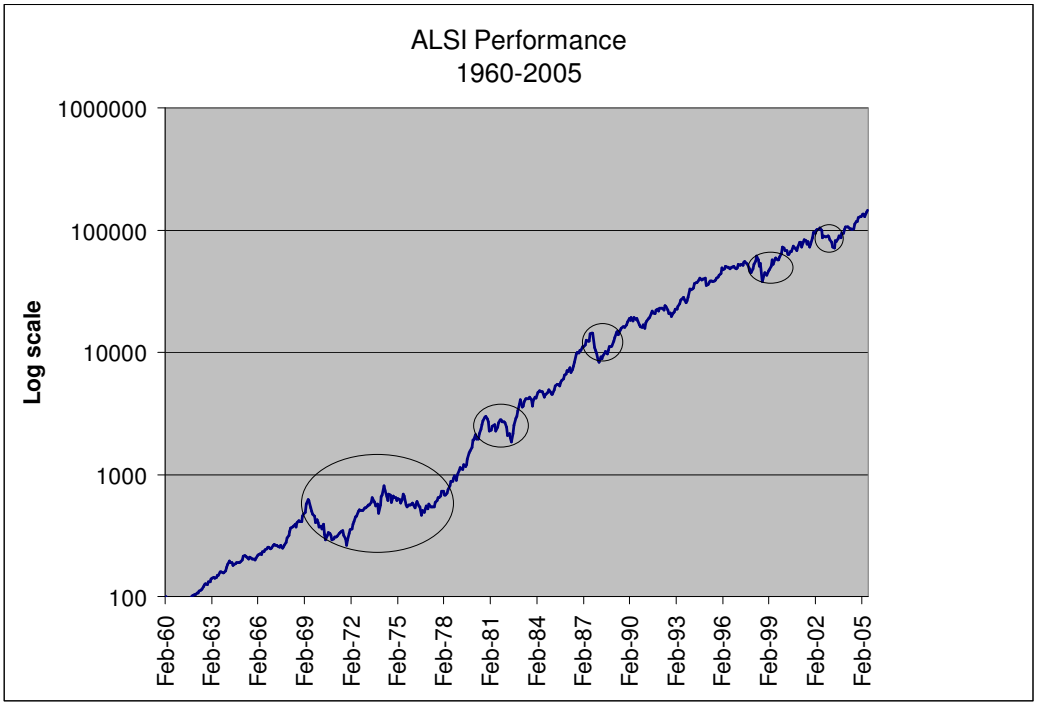

Figure 1: Cumulative return of the ALSI 1960-2005

Figure 2 shows the performances of the three major sectors of the stock market over the same period. Our R100 would have been worth now R182,000, R130,000 and R120,000 in the resources, financials and industrials respectively. From figure 2 it is evident that no one sector was the best performing sector all the time and each sector had its "time in the sun", yet the resources sector was the most dominant for the longest periods.

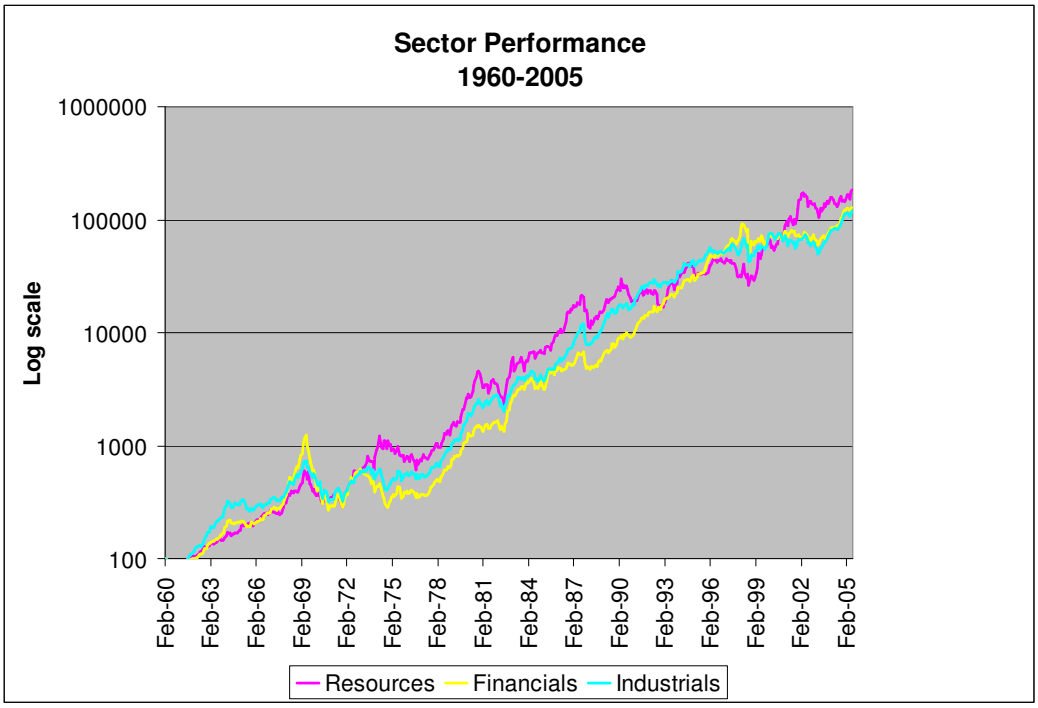

Figure 2: Cumulative performances of the major stock market sectors

Figures 3 and 4 take a closer look at the various sector performances. Notably in figure 3 it can be seen that the resources sector has experienced many mini-bear markets, but always rebounded fairly soon afterwards, almost in a predictable pattern. Perhaps a more fashionable phrase to use would be to say that resources exhibits a strong reversion-to-the mean tendency, but more on that later.

But now go to figure 4 and see that the combined financials and industrials historically have acted very differently – relative long periods of bear and bull markets! This pattern could be more or less described as trending, basically the opposite of reversion-to-the-mean, but note it is not pure trending, some mean reversion is still evident over time.

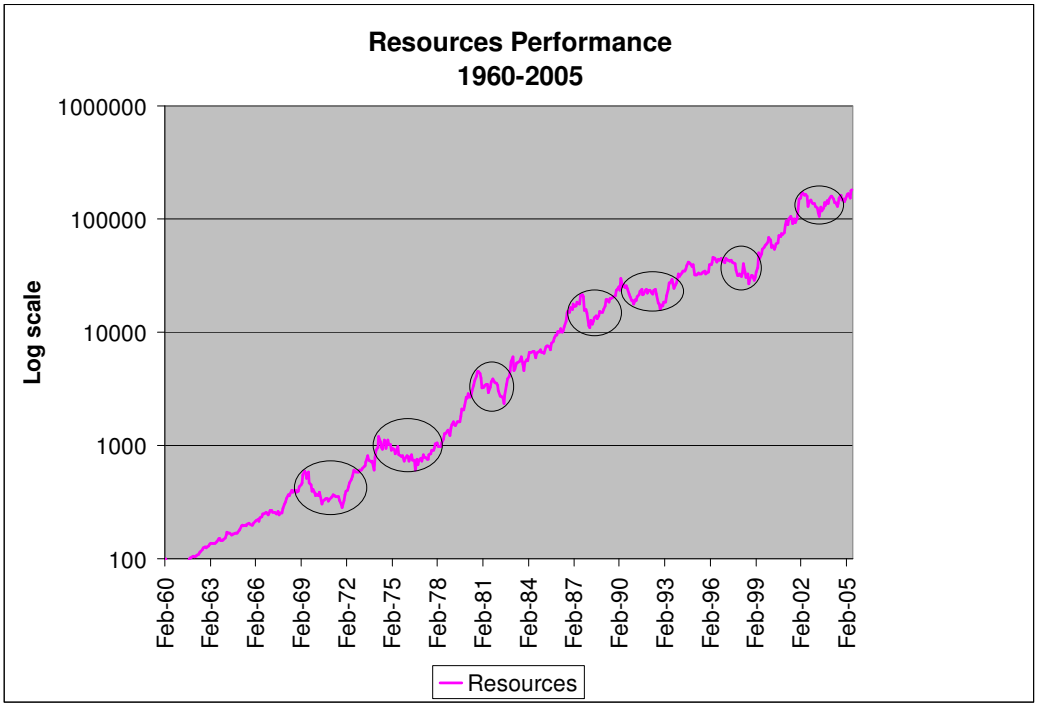

Figure 3: Cumulative performance of the resources sector

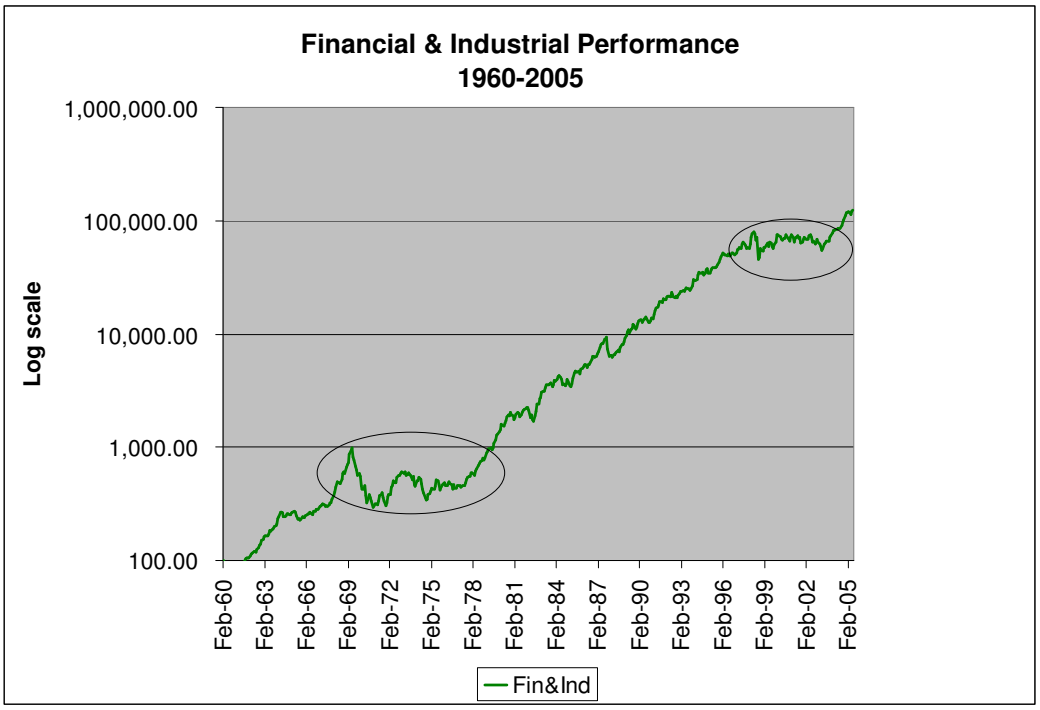

Figure 4: Cumulative performance of financials and industrials

By now you may ask what is the relevance of this information, well first of all it may be useful as a sort of a "timing tool" in managing your assets. Thus, do you expect the trend to continue or perhaps reversion-to-the-mean.

Secondly, and perhaps the most important aspect is that any asset class which exhibit strong reversion-to-the mean trends will have much lower volatility over the longer term than what its short-term volatility might indicate. For example, you cannot use yearly data about the volatility of an asset class and use that same data to make some extrapolations about the expected volatility over a three-year or five-year investment period. For a practical proof hereof refer to section 3 where the different market sectors are analysed over different investment periods.

But just for a bit of fun, since this website is about index investing *per se*, let us compare two strategies over this time period – one is the market (index) portfolio and the other is a managed equity portfolio. Let us be generous in saying that the manager follows a 20% exposure to resources, and 40% allocated each to financials and industrials. Obviously, there are a couple of flaws in this exercise, but lets say this is a

skilful manager and his/her selection and timing capabilities are above-average, but over 45 years his/her skill and luck equals the cost of managing this portfolio (you will be lucky if you find that performance over such a period!), thus he/she give you the market return, the only difference is the sector weightings.

Figure 5 depicts this scenario. For the first decade and more (fifteen years) the manager outperforms the index comprehensively, but thereafter the index takes control and stays in control, except for a brief period during the crazy bull market years of 1996-1998. At the end the difference is a mere R8,000 in favour of the index strategy (R144,000 versus R136,000), but again visit my (unrealistic?) assumptions.

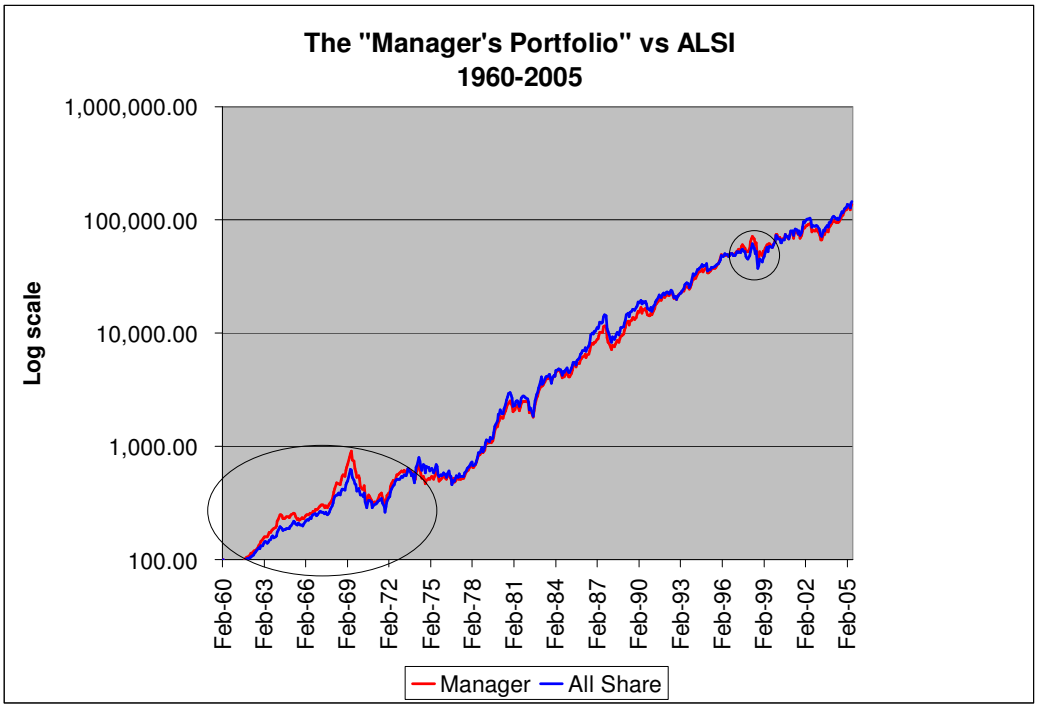

Figure 5: The Manager versus the Market: 1960-2005

But back to the serious business, in the next section the return characteristics of each sector over different time frames are summarised.

3. Return Characteristics

Table 1 summarises the performances and risk metrics of the market sectors.

Table 1: Return and risk measures over different periods

Monthly Return	ALSI	Resources	Financial	Industrial
Average	1.55%	1.71%	1.54%	1.49%
Median	1.86%	1.45%	1.46%	1.80%
Std Deviation	6.28%	8.10%	6.44%	5.84%
Min	-29.30%	-24.79%	-39.96%	-29.05%
Max	18.09%	33.10%	24.43%	15.46%
Negative Periods	37.68%	39.71%	37.68%	35.66%

Annual Return	ALSI	Resources	Financial	Industrial
Average	20.83%	22.87%	21.88%	20.42%
Median	18.85%	20.01%	23.18%	18.45%
Std Deviation	27.19%	33.77%	32.06%	26.88%
Min	-47.66%	-44.93%	-70.81%	-48.06%
Max	125.83%	137.42%	142.73%	100.61%
Negative Periods	21.95%	27.02%	23.64%	24.39%

Three-year Return	ALSI	Resources	Financial	Industrial
Average	18.51%	19.74%	18.52%	17.68%
Median	18.30%	18.90%	17.55%	17.34%
Std Deviation	13.59%	16.29%	17.18%	14.94%
Min	-14.21%	-13.19%	-26.21%	-16.52%
Max	66.94%	73.05%	76.16%	57.73%
Negative Periods	8.06%	11.59%	14.34%	12.77%

Five-year Return	ALSI	Resources	Financial	Industrial
Average	18.18%	19.20%	18.07%	17.00%
Median	17.10%	17.62%	19.25%	17.20%
Std Deviation	9.27%	9.94%	13.17%	11.12%
Min	0.54%	-3.30%	-20.16%	-6.85%
Max	46.40%	50.17%	42.51%	39.88%
Negative Periods	0.00%	1.03%	9.07%	4.12%

Ten-year Return	ALSI	Resources	Financial	Industrial
Average	18.25%	18.46%	18.02%	17.27%
Median	16.47%	17.42%	19.97%	17.64%
Std Deviation	6.77%	6.69%	8.47%	8.04%
Min	5.90%	6.73%	-3.97%	2.59%
Max	37.37%	38.26%	33.92%	34.83%
Negative Periods	0.00%	0.00%	2.12%	0.00%

The most important findings from table 1 can be listed as follows:

- Resources has delivered the highest average returns measured over any period,
- Resources has exhibit high volatilities when measured over a monthly and yearly basis, but when measured over longer investment periods it shows considerably lower volatilities than financials and industrials (refer to the reversion-to-the-mean argument earlier),
- Resources has shown much less negative return periods measured over longer holding periods than the other sectors,
- Resources has shown in most cases higher maximum return numbers, and better minimum returns than the other two sectors,
- The overall volatility of the ALSI is lower than those of its individual components (more on that shortly),
- Throughout the forty five years there has never been a negative ALSI return for any five-year or longer investment term!
- In general reversion-to-the-mean trends are visible in stock market returns, which explain the much lower volatilities of returns when measured over longer-term periods as opposed to the much higher volatilities recorded over short-term periods.

Some statistical measures are displayed in tables 2 and 3. Table 2 shows the return correlations of the three sectors with the ALSI as well as their correlations with each other. From that it is clear that both financials and industrials have a relative low return correlation with resources, which will reduce the overall volatility of ALSI returns.

Table 2: Correlations with ALSI and cross-correlations

	ALSI	Resources	Financial	Industrial
ALSI	1.000			
Resources	0.889	1.000		
Financial	0.731	0.464	1.000	
Industrial	0.852	0.581	0.780	1.000

Table 3: Statistical metrics

Kurtosis	ALSI	Resources	Financial	Industrial
Monthly return	1.43	1.04	4.07	1.72
Yearly return	0.63	0.24	1.79	-0.34
Three-year return	1.23	0.55	0.14	-0.07
Five-year return	0.08	-0.04	-0.41	-0.94
Ten-year return	-0.14	0.25	-0.55	-1.19
Skewness	ALSI	Resources	Financial	Industrial
Monthly return	-0.48	0.11	-0.50	-0.70
Yearly return	0.53	0.57	0.51	0.18
Three-year return	0.57	0.61	-0.06	0.32
Five-year return	0.71	0.53	-0.45	0.10
Ten-year return	0.53	0.67	-0.50	-0.06

Kurtosis refers to the relative peakedness or flatness of a distribution compared with the normal distribution. Positive kurtosis indicates a relatively peaked distribution. Negative kurtosis indicates a relatively flat distribution which seems to be relevant to longer term holding periods.

Skewness characterizes the degree of asymmetry of a distribution around its mean. Positive skewness indicates a distribution with an asymmetric tail extending toward more positive values. Negative skewness indicates a distribution with an asymmetric tail extending toward more negative values. It seems that especially the financial sector exhibits negative skewness, which implies the occurrence of large negative returns from time to time.

4. The "Ups" and "Downs" of the Stock Market

The following figures (6-8) illustrate the reversing tendency of returns for the three main sectors of the stock market over various holding periods.

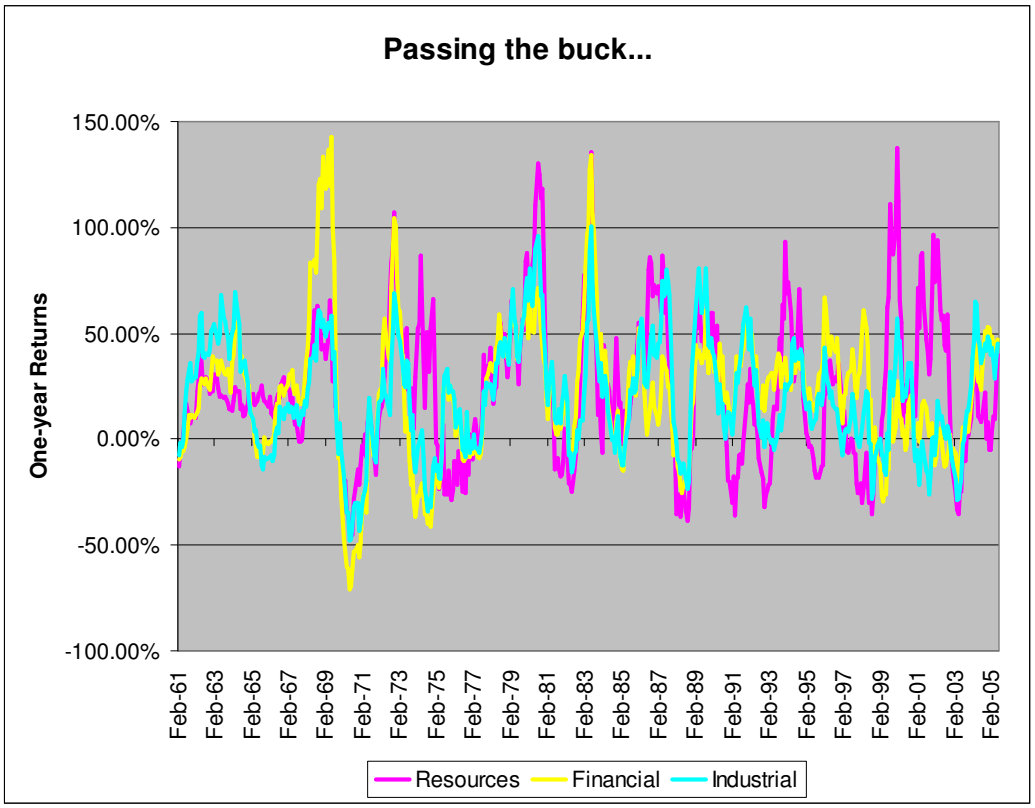

Figure 6: One-year returns for the stock market sectors

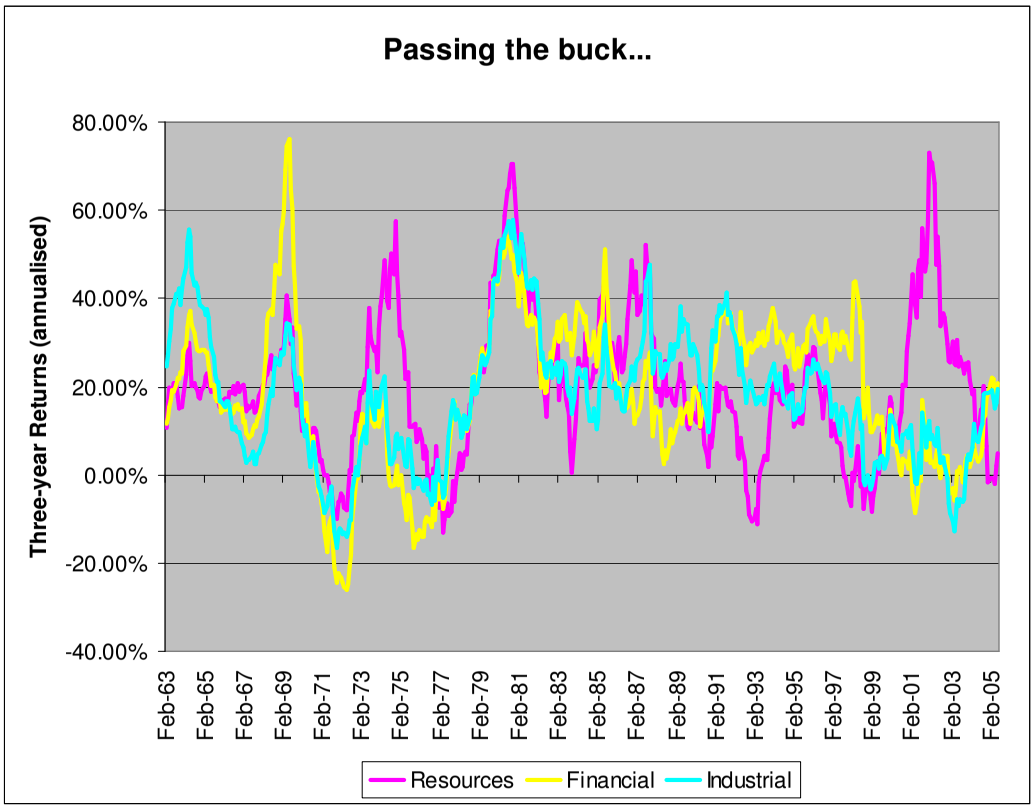

Figure 7: Three-year returns for the stock market sectors

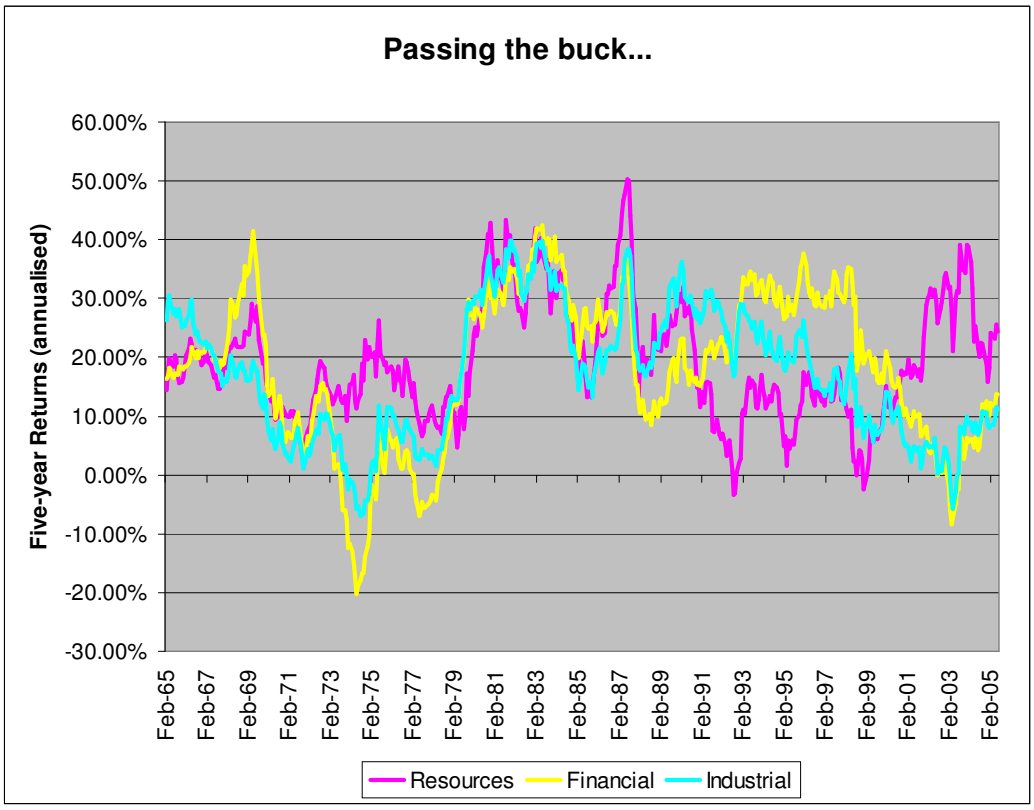

Figure 8: Five-year returns for the stock market sectors

5. Conclusions

What can one learn from all the tables and graphs showed in this document?

First of all, investment returns from the equity market are seldom "moderate", huge upswings are followed by large downswings. In general, reversion-to-the-mean is evident, although not necessarily following a fixed pattern (except perhaps for the resources sector) and probably difficult to prove statistically significant.

Secondly, diversification is the name of the game – no one sector has been the dominant sector throughout, a top performing sector now is more than likely to be the worst performing sector a number of years later.

How do you buy that diversification? Simple, you buy into an actively managed fund which will have certain mandates and portfolio specifications. Problem solved? No, not necessarily, what has been historically the best performing sector, in nominal and risk-adjusted terms? None other than the resources sector and guess what managers' views on resources are – they are considering that as a "wild animal" and will consequently limit its role in their managed portfolios.

Why? Active managers have relative short-term views and we know that resources are volatile over the short term. So, they are not wrong in their assessment, but since prudent equity investors should have long-term horizons there is eventually a mismatch between what managers offer and what investors require. In fact, investors are "penalised" for not having enough resources exposure in their portfolio.

I am basing my views on forty five years of data (and counting). One could argue that the future will look totally different than the past, but since I have last check you will still need "things" (commodities) to build and develop any economy and these are provided by resources companies, not banks, IT companies, service industries, etcetera.

So if active managers are too “conservative” in their outlook what can you buy? An even simpler solution is simply to buy an index fund. There you will find significant exposure to resources (35-40% of our stock market), and by following a long-term strategy your overall risk over time will be reduced, but not necessarily your returns.