# Generating Excess Returns through Global Industry Rotation

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**March 2006**

## Abstract

Numerous studies have shown that international diversification across global equity markets can lead to improved performance on a risk adjusted basis when compared to investing in domestic equity markets. Early studies provided empirical evidence that country and industry effects were important factors in explaining total returns. These studies generally concluded country factors dominate industry factors. Recent studies however provide evidence this view is changing in that industry effects are at least as important as country effects. With the increasing importance of industry effects it makes sense to investigate what investment strategies could lead to improved investment performance in relation to global equity markets. We examine a number of commonly used investment strategies in relation to industry rotation. Our results indicate that each of the strategies can earn significant positive excess returns. Yet these strategies appear to act quite differently. Each of the strategies breaks down at some point in time, but by combining the strategies into a portfolio of strategies we are able to generate more consistent performance with improved levels of significance.

## Introduction

Numerous studies have shown that international diversification across global equity markets can lead to improved performance on a risk adjusted basis when compared to investing in domestic equity markets. Early studies by Lessard (1974) and Solnik (1974) provided empirical evidence that country and industry effects were important factors in explaining total returns. They concluded country factors dominate industry factors.

Following on from this early research, Grinold, Rudd and Stefek (1989) provide additional evidence that country effects still dominate industry effects. These results are also supported by Heston and Rouwenhorst (1994, 1995), Beckers, Connor and Curds (1996) and Griffin and Karolyi (1998). Roll (1992) on the other hand finds that that industry factors explain about 40% of the variation of returns. Overall, the evidence from 1970-1999 supports the notion that country factors dominate industry factors.

Recent studies however provide evidence this view is changing. Studies by Baca, Garbe and Weiss (2000) and Cavaglia, Brightman and Aked (2000) provide evidence of the increasing importance of industry effects. For example, Cavaglia, Brightman and Aked (2000) show that industry effects have grown substantially from 1995-1999 and that diversification across industries provides greater risk reduction when compared to diversification across countries. In a recent study Phylaktis and Xia (2003) examined country and industry effects of the Dow Jones Global country and industry indexes of 51 industry groups and 34 country indices. Using weekly data from January 1992 to December 2001 they find that country effects still dominate industry effects but from 1999 there has been an upward shift in the industry effect. The shift in industry effects is predominately noticed in Europe and North America whilst country effects still dominate Asia Pacific and Latin America.

Scowcroft and Sefton (2005) provide more recent evidence in supporting the increased importance of industry/sector effects. Their study focuses on examining momentum effects of ten MSCI global sectors from 1992-2003. Ranking sectors by prior six months

return but not including the last month, and going long the top two sectors and shorting the bottom two sectors, they find that returns to global sectors explain on average 58% of total return variation, country factors explain on average 34% of total return variation and stock specific factors explain on average 8% total return variation. Their research provides the most recent evidence that industry effects are now more important than country effects and that momentum which will be discussed in greater detail later in the paper is largely an industry effect.

It appears that industry effects are at least as important as country effects and this raises the question what effect does this have on global equity investment strategies. Prior to 1999 it made more sense for a global portfolio manager to take active country bets as opposed to active industry bets. Richards (1997) and Chan, Hameed and Tong (2000) have shown country momentum strategies can lead to significant profits. With the increasing importance of industry effects it makes sense to investigate what investment strategies could lead to improved investment performance in relation to global equity markets.

In the following discussion we examine the profitability of commonly used investment strategies in relation to industry rotation. The strategies examined are:

- Momentum
- Value
- Combination of Value and Momentum
- Growth.

Each of these strategies can generate positive excess returns and are well documented in the literature. Momentum has been extensively researched with regards to stock specific, country and industry strategies. Value investing has a long history of academic research. Fama and French (1992) suggest that excess returns of value investing represent a distress premium. Both value and momentum strategies can earn positive excess returns, and there are diversification benefits in employing a combination strategy as the correlation between value and momentum is generally negative. In relation to growth strategies, there is a theoretical basis that growth in long term earnings clearly plays an

important role in determining the required rate of return of a stock. From the discounted dividend model (DDM) the required rate of return is the dividend yield plus the long term growth rate of dividends (or earnings given we know the payout ratio). There are of course many other strategies documented in the literature. It is not the intention here to produce an exhaustive list but rather to focus on some of the simpler strategies that are commonly researched and implemented.

Our results indicate that each of the above mentioned strategies can earn significant positive excess returns. Yet these strategies appear to act quite differently. Each of the strategies breaks down at some point in time, but by combining the strategies into a portfolio of strategies we are able to generate more consistent performance.

The format of the paper follows. Section one provides descriptive statistics of global industry data used in this study. Section two examines the performance of industry momentum strategies. Sections three, four and five examine the performance of the value, combination of value and momentum and growth strategies respectively. Section six examines the performance of an aggregate strategy and section seven examines the effect of inversion in the US yield curve. Section eight presents the conclusions of the paper.

## 1. Descriptive Statistics

Global industry data representing thirty six industries was obtained from Datastream. These data are constructed by Datastream. For each of the industries the following series were obtained: total return index, price index, dividend yield and earnings yield for the period 1/1973 to 12/2005 on a monthly basis.[1] Total returns and prices were calculated in terms of US dollars. Additionally, the Tbill rate and yield on 10 year government bonds for the US were also downloaded.

Insert Table 1

[1]As industry book to price ratios were not available from Datastream, we were not able to use these as an alternative measure of value.

Table 1 presents summary statistics of the annual average return , annual standard deviation, minimum and maximum monthly return for each industry over each decade since 1973 and for the whole sample period from 1973-2005. We have done this to highlight the variability of the performance of industries at different times. Continuously compounded monthly returns were calculated from the Datastream total return index. Over the entire sample period the average annual return for all sectors was 10.8% pa. From 1/1973-12/1979, 1/1980-12/1989, 1/1990-12/1999 and 1/2000-12/2005 the average annual return for all sectors was 4.6% pa, 19.5% pa, 10.2% pa and 4.6% pa respectively. It is interesting to note that the eighties produced the highest return by far and that for the seventies and the current decade produced returns of 4.6% pa.

Insert Table 2

To highlight the variability of performance of industries Table 2 presents the top four and bottom four industries ranked by annual return for each decade. Over the entire period the best performing industries were: Water, Tobacco, Aerospace/Defense and Oil and Gas. The worst performing industries were: Forestry & Paper, Media and Photography, Steel and other Metals and Information Technology. For the seventies, not surprisingly, Oil and Gas and Gas Distribution performed well, whilst consumer related industries performed poorly. For the eighties Specialty Finance, Water, Tobacco and Banks performed well, whilst Software, Aerospace/Defense, Mining and Information Technology were the worst performing industries. This situation was reversed in the nineties where Software and Information Technology were the best performing industries whilst Steel, Construction, Transport and Engineering and Machinery were the worst performing industries. For the current decade this situation reversed again where, Tobacco, Mining, Oil and Gas and Water were the best performing industries, whilst Information Technology, Software, Telecom Services and Media and Photography were the worst performing industries. It is quite evident that there is sufficient variability in returns across industries and sample periods to warrant an investigation into whether one

can develop an industry rotation strategy which outperforms the passive strategy of holding industry benchmark weights.

Table 3 presents some characteristics of the industries. Panel A displays the earnings yield, annual return, implied growth and trend growth of each industry for the whole period.[2] For each industry an earnings index was created by multiplying the earnings yield by the price index. The implied annual growth rate of each industry was calculated as the natural logarithm (earning end 2005/earnings start 1973)/33. If one plots the earnings index of an industry it is apparent that earnings oscillate about a trend line. The trend growth of an industry is the slope of regressing the earnings index against time. Trend growth can be above/below the implied growth rate. This relation is a function of where earnings are in relation to the economic cycle. Currently the implied growth rate is above trend growth owing to the recent recovery in the US economy over the last two to three years. Panel B of Table 3 presents industries ranked by their earnings yields. Industries that have high earnings yields are Water, Tobacco, Oil and Gas, Aerospace/Defense and Autos and industries that have low earnings yields, are Investment companies, Information Technology, Software, Transport and Pharmaceuticals.[3] The column tagged Qnt represents the average return of each quintile ranked by earnings yield. It is apparent that overweighting the top quintile and shorting the bottom quintile would have produced an excess return of about 2.6% pa. The performance of the other quintiles produced similar returns which were in the range of 10.7% to 10.0%.[4] Panel C displays similar results to Panel B but in this case industries are ranked by implied growth. In this case the results are somewhat surprising in that the higher growth rate industries are Water, Tobacco, Health and Insurance. These would normally be regarded as more conservative industries with the possible exception of Health. Low growth rate industries present no surprises with Forestry/Paper, Telecom services, Electricity and Autos experiencing the lowest growth rates. Ranking industries by implied growth rates illustrates that the quintile with the highest growth rate has an

[2] For the sake of brevity we have not included the dividend yields in Table 3.
[3] We found the earnings yield/performance of Water to be quite variable and were somewhat surprised by the performance of this industry.
[4] Ranking by dividend yield produced similar results.

average return of 13.3%, whilst the lowest growth rate quintile experienced an average return of 9.2%. Returns for the other quintiles were in the range of 10.2% to 10.8%. These results suggest going long the high growth quintile and shorting the low growth quintile would have produced an excess return of 4.1% pa.

Insert Table 3

From a macroeconomic perspective the US economy plays an important role with regards to the global economy. Harvey (1988) has noted the shape of the US yield can have significant effect on global equity markets. Harvey (1988) and Estrella and Hardouvelis, (1991) have found that the spread between the yield on 5/10 year US government bonds and the US Treasury bills has significant forecasting ability in predicting future movements in US GDP. Maximum forecasting ability is about twelve months in the future. They have also noted that when the US yield curve inverts this is usually associated with a recession in twelve months time. Furthermore, Harvey (1988) noted that when the US yield curve inverts this can have a dramatic effect on global equity markets. We examine this issue by noting the performance of industries when the US yield curve inverts and when the US yield curve is normal.

Table 4 depicts the performance of industries when the US yield curve is inverted and when the US yield curve is normal. When the US yield curve is normal the top five performing industries are Tobacco, Water, Aerospace/Defence, Information Technology and Food & Drug Retailers and the bottom five industries are Forestry/Paper, Mining, Steel & other metals, Diversified Industries and Chemicals. The average return of the top five industries was 15.2 pa% whilst the average return of the bottom five industries was 10.3 pa%. This represents a difference of 4.9% pa, which indicates that when the yield curve is normal there is potential to profit from overweighting the top five industries and under weighting the bottom five industries. On the other hand when the yield curve is inverted the top five performing industries are Mining, Water, Tobacco, Oil and Gas and Forestry/Paper, and the bottom five performing industries are Information Technology, Media & Photography, Household Goods, Autos and Software. The average return of the

top five industries was 14.0% pa, whilst the average return of the bottom five industries was -17.2% pa. This represents a difference of 31.2% pa. The potential to profit here is quite substantial and seeing that in early 2006 the US yield curve has just inverted this may be an opportune time to rebalance industry exposures.

Insert Table 4

**2. Momentum**

There is an extensive body of literature that has documented the profitably of momentum based strategies. These studies have centred on stock specific, industry and country momentum. In the US context, studies by Jegadeesh and Titman (1993, 2001) have shown that buying top decile stocks ranked by intermediate prior returns (three to twelve months) and shorting the bottom decile of stocks can produce excess returns of the order of 12% pa. These results are also supported by Chan, Jegadeesh and Lakonishok (1996) and Lee and Swaminathan (2000). Rouwenhorst (1998) examined similar momentum strategies for European stocks and found significant momentum profits across twelve European markets. Country momentum was examined by Richards (1997) and Chan, Hameed and Tong (2000) who showed that the same type of strategy is profitable for global country indices.

There is a growing body of literature that suggests that momentum effects are essentially driven by industry effects not stock specific effects. Moskowitz and Grinblatt (1999) found that industry momentum subsumes industry neutral momentum for the US. These results were also supported by O'Neal (2000) who found strong momentum effects for US Sector funds. Grundy and Martin (2001) on the other hand provide contrary evidence to the findings of Moskowitz and Grinblatt (1999) suggesting that industry effects are not the primary cause of momentum, but rather stock specific return components. Swinkels (2002) and Scowcroft and Sefton (2005) have provided additional evidence to support industry momentum in the global context.

We employ a similar approach by ranking industries on prior returns. Rather than focus on one prior return measure we examine a number prior return measures. Industries are ranked by, one month, three month, six month, nine month, twelve month, fifteen months, twenty four months and forty eight months prior returns. The holding period in our analysis is for one month. For example, industries ranked by prior twelve months return are placed into deciles at t-1 and then held for the following month.[5] The process is then repeated for each successive month. Table 5 reports the results of a long/short strategy which goes long the top decile and simultaneously goes short the bottom decile.[6] Over the whole period the highest excess return was obtained from ranking the previous twelve month returns. This is consistent with a number of other studies for US and European stocks. As a general observation it is apparent that the nineties was a very good decade for momentum strategies. This decade producing significant t values for all decades except for the forty eight month ranking.[7] The results from table 5 also indicate that momentum performed very strongly from 1980-1999. In contrast, the worst performing decades were from 1973-1979 and 2000-2005 with excess returns not significantly different from zero (excepting for the twelve month ranking for 1973-1979).[8]

Insert Tables 5

**3. Value**

Research has shown value strategies can earn positive returns over the long term. For example, Fama and French (1992) have shown that book value to market value has predictive ability in forecasting future stocks returns in the US. In a similar vain, Lakonishok, Shleifer and Vishny (1994) found that cash flow to price had power to forecast stock returns in the US. These results have been supported in the global context

[5] Extensions to this approach often employed in the literature is ranking on k months prior returns and holding these positions for one, three, six, nine and twelve months.
[6] Results for decile performance are available from the authors on request. Generally speaking, top deciles produced the greatest return, whilst bottom deciles produced the lowest return.
[7] Throughout the paper we consider a strategy to be significant if the t value is greater than 1.65 (5% level).
[8] As noted earlier the returns to Water were somewhat erratic. We repeated the analysis without water but obtained similar results and hence are not reported.

by Fama and French (1998) who examined returns to value strategies for stocks included in the MSCI developed markets index.

Value investing typically involves selecting stocks that have high earnings yield or high dividend yields or high book to price ratios. In the following analysis we examine the performance of ranking industries by earnings yield and normalized earnings yield. The results for ranking industries by dividend yield are similar to those from earnings yield and are not reported.[9] Panel B from Table 3 reports the performance of industries sorted by earnings yield. It is apparent that if one adopts a strategy of overweighting high earnings yield industries then one will usually over weight industries such as Water, Tobacco, Oil and Gas, Electricity, Aerospace/Defense, Auto and Parts, Mining and underweight, Investment companies, Information Technology Hardware, Software and Computer Services, Transport, Pharmaceuticals. As can be seen from Table 6 this type of strategy can lead to prolonged periods of underperformance. For example, from 1974-2005 the long short strategy of going long the top decile and shorting the bottom decile produced an excess return of 6.5% pa. However during the nineties this strategy realized a loss of 4.9% pa. Much of the out performance of this strategy over the whole sample period was due to the reversal of fortune of the value strategy in the current decade where the average excess return was 24.9% pa. As noted earlier this was the period when momentum performed the worst.

Insert Table 6

To overcome the criticism of always overweighting/underweighting the same types of industries we examined a strategy of ranking industries by their normalized earnings yield (ZEYVAL). The logic here is that when ZEYVAL is positive relative to its historic past then the industry is attractive and when ZEYVAL is negative then earnings yields are low relative to historic past and are considered to be unattractive. Under this scenario growth type industries such as Information Technology and Software could be included in the long portfolios. The results of decile ranking are displayed in Table 7. It is apparent

[9] These results are available from the authors on request.

the returns from this approach are erratic and do not out perform the earnings yield approach.

Insert Table 7

**4. Value and momentum combination Strategy**

In the previous discussion relating to value and momentum strategies it is clear that both strategies can earn positive excess returns. Yet these strategies appear to act quite differently. In the nineties momentum performed exceptionally well, where as value under performed. From 2000 onwards value performed well where as momentum profits are not significantly different from zero. Asness (1997) has examined the interaction of value and momentum for US stocks. In his analysis, value was measured as book value to market value and the dividend yield. Momentum was measured as the prior twelve months momentum but not including the most recent month. His results indicated that both value and momentum strategies generated positive excess returns, but value seems to work best with poor momentum stocks and momentum seems to work best with expensive stocks. We examine these issues in the following discussion in relation to global industries.

Since the correlation between long/short value and momentum strategies is -0.17 [refer Table 11], there may be diversification benefits of trying to combine value and momentum strategies. To address this issue we examine a combination strategy which attempts to refine the momentum and value approaches by segregating the ranking of each strategy into quartiles. For the period 1974-2005 we partition the rankings into: value from Q1 (expensive) to Q4 (cheap), and momentum from Q1 (loser portfolio) and Q4 (winner portfolios). Table 8 reports the performance of sorting value and momentum into quartiles. It appears the greatest return of 19.5% pa was obtained from a combination of good value and good momentum (Q4valQ4mom). The combination of poor value and poor momentum (Q1valQ1mom) produced a return of 7.2% pa. This was not the worst performing combination but was only marginally better than the worst performing

combination. A long/short strategy of Q4valQ4mom - Q1valQ1mom produced an excess return of 12.3% pa with a T value of 3.8.

Insert Table 8

Other points of interest from Table 8 are that momentum seems to work well for the most expensive industries. By focusing on the most expensive industries and sorting these industries by momentum. A long/short strategy of going long the most expensive industries (Q1val) within the winner momentum portfolio (Q4mom) and shorting the most expensive industries with the weakest momentum (Q1val and Q1mom) yielded a significant excess return of 9.3% pa. Significant results were also obtained when holding the other value quartiles constant and combining this with winner/loser momentum portfolios. From a momentum perspective there appears to be little benefit in sorting winner momentum portfolios by value. The long/short strategy produced an insignificant positive return of 3.1% pa. Consistent with the findings of Asness (1997) momentum seems to work better for expensive industries and value seems to be work better by focusing on poor momentum industries.

As noted earlier in relation to the momentum results, the nineties was an incredibly successful decade for momentum strategies, and it is possible that the good performance during this decade may overshadow the performance in other decades. We examine this issue by comparing the performance of long/short strategies for each decade. Table 9 presents results of ranking industries into quartiles by value and momentum, but in this case focusing on the performance of long/short strategies by decade. The performance of expensive industries sorted by momentum can be quite varied across decades. For example, the strategy of Q4momQ1val-Q1momQ1val produced insignificant excess returns from1973-1979 and 2000-2005, marginally significant excess return of 7.9% pa (t=1.68) for 1980-1989. During the nineties the excess return was a staggering 21% pa (t=3.89). Overall we can conclude that momentum seems to work best for expensive industries, but these results are driven mainly by the performance of momentum strategies in the nineties.

Insert Table 9

The results are somewhat muddied for the value statement that value works best with loser momentum portfolios. Over the whole sample period this statement is supported however on a decade by decade basis the results are less strong. What does seem to work consistently across differing sample periods is combining good value with good momentum and shorting poor value and poor momentum. These results are reported in the long/short combination column of table 12.

The long only strategy of investing in industries with good value and good momentum out performs the passive benchmark strategy of investing in the MSCI developed market index. From 1973- 2005 the total return of the MSCI index was 10.6% pa with standard deviation of 14.5% pa, whilst the return of choosing industries that had a ranking greater than 0.5 for value and momentum generated a return of 16.0% pa with a standard deviation of 13.7% pa.[10]

**5. Growth**

From a theoretical basis growth in long term earnings clearly plays an important role in determining the required rate of return of a stock. From the discounted dividend model (DDM) the required rate of return is the dividend yield plus the long term growth rate of dividends (or earnings given we know the payout ratio). Figure 1 displays a scatter plot of implied growth against the return for each industry over the full sample period together with a fitted regression. The adjusted R square is 46%, with a constant term of 5.2% (t=5.0) and a slope coefficient of 0.64 (t=5.6). The results suggest that industries with higher growth rates achieve higher returns.

Insert Figure 1

[10] We chose a ranking of 0.5 because the volatility of the long only strategy was less than the volatility of the MSCI index. Choosing a ranking of 0.75 for good value and good momentum generated a return of 19.5% pa with a standard deviation of 15.8% pa.

The results from Table 3 suggest that ranking industries by implied growth rates offered potentially more profit than ranking by earnings yield. We adopt a similar approach in this section where we rank industries by implied growth rates. We measure implied growth by two different approaches. The first approach calculates the ex post implied growth up to time t from the earnings index. We also calculate a rolling five year growth rate as these numbers are often cited in the financial press. The second approach is to calculate the ex ante implied growth rate from the DDM. This is a forward looking estimate of future growth rates and may be a better indication of future growth. We examine two cases, ranking industries by implied growth rates and overweighting high growth industries and underweighting low implied growth rate industries. Secondly, rather than just overweight industries with the highest growth rates we look for industries that have increasing growth potential by normalizing the current implied growth rate with respect to historic average over the previous 36 month.

Figure 2 depicts the ex ante implied growth rate calculated from DDM of the Aerospace/Defense industry. The average implied growth rate from 1973-2005 was 8.3% pa, and it is quite evident the implied growth can vary substantially. The implied growth rate of Aerospace/Defense as of December 2005 is 10.1% pa from the DDM, and closely matches the ex post implied growth of 9.1% pa estimated from earnings in Table 3.

Panel A of table 10 presents results of ranking industries by implied growth rates from actual earnings. It is apparent there is no value in sorting industries by this measure as all long/short results for differing sample are not significantly different zero. Also presented in panel A is the case where industries are ranked by their previous five year growth rates. Results in this case are also not significantly different from zero.

Insert Tables 10

Panel B of table 10 reports results similar to panel A, but in this case industry growth rates are determined from the discounted dividend model. From 1973-1999 the long/short

strategy is not significantly different from zero. However from 2000-2005 low growth substantially out performed high growth by 25%. Contrary to expectations that high growth rates lead to higher returns we in fact obtain the reverse. Examining the strategy by decade provides mixed results. Low growth (Dec 1) outperforms high growth (Dec10) from 1973-1979 and 2000-2005, whilst the results are not significantly different from zero for 1980-1989 and 1990-1999. These results indicate that overweighting industries with high implied growth rates does not appear to lead to out performance.

Also reported in Panel B of table 10 are results of going long industries that have increasing normalised earnings growth and shorting those industries that have decreasing normalised earnings growth. Over the entire sample period the average excess return was 4.5% pa with a T value of 3.1. Each decade generated a significant positive excess return excepting for the current decade where the excess return was not significantly different from zero.

**6. Aggregate Strategy**

From the previous analysis it was apparent that most strategies broke down at some point in time. In relation to long/short strategies, value produced negative excess returns from 1990-1999. Momentum produced insignificant excess returns from 1973-1979 (except for twelve month momentum) and 2000-2005. The combination strategy of being long good value and good momentum and shorting poor value and poor momentum produced significant excess returns for all decades excepting from 1980-1989 (significant at the 7.5% level). Growth generated insignificant excess returns from 2000-2005. We now examine whether there is any benefit in aggregating the strategies to form a portfolio of strategies, as relying on anyone strategy can be problematic owing to inconsistent performance. The strategies which are included in the aggregate strategy are: momentum [twelve month momentum top decile (Dec10) and bottom decile (Dec1)]; value [earnings yield top decile (Dec10) and bottom decile (Dec1)]; combination [good value and momentum rank above 0.75 and poor value and poor momentum rank below 0.25],

growth [high growth (Dec10) and low growth (Dec1), based on normalised ex ante growth].

Table 11 presents the correlation matrix of the long only strategies and the long/short strategies. The correlations between the long only strategies are reasonably high and there appears little potential for diversification across the strategies. What is likely happening here is the correlations are picking up the market factor. We obtain a better sense of diversification by examining the correlations from the long/short strategies. In this case, it is quite evident there is much more diversification. As expected there is a negative correlation between value and momentum. There are also low correlations between growth and all other strategies which suggests that combining the strategies may lead to considerable diversification.

Insert Table 11

Panel A of table 12 presents the performance of the individual long only strategies and the equally weighted aggregation of these strategies.[11] The long only aggregate strategy provides some reduction in volatility but is able to capture most of the return. The aggregate long only strategy substantially outperforms the MSCI index. Over the entire sample period, the average excess return was about 6.9% pa with a lower standard deviation than the MSCI index. In each decade the aggregate strategy out performed the MSCI index by 8.3% pa (t=3.8), 6.8% pa (t=3.3), 3.2% pa (t=1.6) and 11.7% pa (t=3.4) for 1973-1979, 1980-1989, 1990-1999 and 2000-2005 respectively.

Insert Table 12

Panel B of table 12 reports the performance of the long/short strategies and the equally weighted aggregate strategy. The aggregate strategy typically has lower volatility than the majority of the individual strategies and higher t values. The aggregate strategy

[11] We have not tried to optimize the weights given to each strategy. Potentially returns could be improved by following this approach.

produced average excess returns of 11.0% pa (t=4.8), 7.5% pa (t=2.9), 8.1% pa (t=2.8) and 11.2% pa (t=2.0) for 1973-1979, 1980-1989, 1990-1999 and 2000-2005 respectively. Over the entire sample period the average excess return was 9.0% pa with a standard deviation of 9.3%.

## 7. US Yield Curve Effect

As noted earlier from the results of table 4 movements in the US yield curve can have a significant effect on industry returns. We explore this issue further by examining the performance of each of the strategies when the US yield curve is normal and when the US yield curve is inverted. Table 13 reports the performance of each strategy for differing sample periods when the US yield curve is normal and inverted. When the curve is normal, momentum produces the highest average excess return with results being significant at the 1% level for every decade except from 2000-2005. The next best performing strategy was the combination strategy which produced significant excess returns for every decade excepting 1980-1989. Overall the worst performing strategy was value. On the other hand when the US yield curve was inverted the worst performing strategy was momentum. Much of this poor performance was due to under performance from 2000-2005. From 1974-1999 the average excess return was not significantly different from zero. Not surprisingly the best two performers were value and the combination strategies. This seems to support the notion of a value premium which comes into play when expectations are of a contracting economy or potential recession.

The implication of these results suggest that when the US yield curve is normal, the weight given to the value should be reduced and the weight to momentum and combination should be increased. Alternatively when the US yield curve is inverted the weight of momentum and growth should be reduced and the weight to value and combination should be increased.

For example, when the US yield curve is normal a potential weighting scheme could be to reduce weights to value and growth from 25% to 15% each, and increase the weights of momentum to 40% and combination to 30%.[12] Similarly when the yield curve is inverted both momentum and growth do not perform well where as value and combination perform well. In case, weights for momentum and growth could be 0% and weights to value and combination could be 50% each. In each decade the t values increase on average by 11%, and over the whole period the t value increases from 5.5 to 6.2. Changing the weights to take into account movements in the US yield can lead to improved performance over the equally weighted aggregate strategy, however implementing this type of strategy assumes this phenomenon will continue in the future.

Insert Table 13

**8. Conclusion**

Recent evidence has established that industry effects are at least as important as country effects in explaining global returns. In fact Scowcroft and Sefton (2005) have shown that approximately 60% of total returns can be explained by industry effects. However these findings pertain mostly to the last ten or so years and earlier evidence indicated that country effects were dominant. Prior to 1999 it made more sense for a global portfolio manager to take active country bets as opposed to active industry bets. However, with the increasing importance of industry effects we examined a number of commonly used investment strategies in relation to industry rotation. The strategies examined were: momentum, value, combination of value and momentum and growth. It was found that each of the above mentioned strategies can earn significant positive excess returns. Yet these strategies appear to act quite differently. Each of the strategies broke down at some point in time. For example, momentum produced significant positive excess returns from 1980-1999 and insignificant excess returns from 1973-1979 and 2000-2005. Value produced significant positive excess returns from 1973-1979 and 2000-2005 and

[12] We have not endeavored to optimize the weights, but generally speaking reducing exposure to momentum when the US yield curve is inverted and reducing exposure to value when the US yield curve is normal leads to higher t values than the equally weighted strategy.

insignificant excess returns otherwise. The combination strategy produced significant positive excess returns for all decades excepting 1980-1989. Similarly growth produced significant positive excess returns for each decade excepting for 2000-2005.

It was found that by combining the strategies into a portfolio of strategies we are able to generate more consistent performance. An equally weighted aggregate long/short strategy produced significant positive excess returns for each decade.

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Table 1 - Performance of Global Industries

| Industry | 73-05 | | | | 73-79 | | | | 80-89 | | | | 90-99 | | | | 00-05 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Return | Stdev | Min | Max | Return | Stdev | Min | Max | Return | Stdev | Min | Max | Return | Stdev | Min | Max | Return | Stdev | Min | Max |
| AEROSPCE,DEFENCE | 13.1 | 20.1 | -5.4 | 4.0 | 19.6 | 23.9 | -5.4 | 6.9 | 11.8 | 21.2 | 4.0 | 21.1 | 13.1 | 16.1 | -4.0 | 5.5 | 7.8 | 19.9 | -9.0 | 4.0 |
| AUTO & PARTS | 8.7 | 17.6 | 1.0 | 3.1 | 4.7 | 19.0 | 1.0 | 4.5 | 16.8 | 17.1 | 0.6 | 2.5 | 6.4 | 16.8 | -3.3 | 10.3 | 3.8 | 18.3 | -6.8 | 3.1 |
| BANKS | 11.4 | 18.1 | 4.2 | 9.3 | 4.4 | 16.2 | 4.8 | 9.3 | 23.3 | 19.4 | 4.1 | 6.1 | 6.1 | 18.9 | -2.1 | 0.1 | 8.3 | 15.9 | -7.6 | 4.2 |
| BEVERAGES | 10.9 | 16.3 | 0.0 | 0.8 | -2.5 | 20.9 | 0.0 | 3.8 | 22.5 | 14.7 | 2.0 | 3.2 | 11.1 | 15.9 | -6.9 | -5.7 | 6.7 | 11.9 | -0.3 | 0.8 |
| CHEMICALS | 10.1 | 16.5 | 1.9 | 4.0 | 6.1 | 17.7 | 1.9 | 2.9 | 18.2 | 16.6 | 3.2 | 5.2 | 6.6 | 16.0 | -3.2 | 5.1 | 7.1 | 16.0 | -4.0 | 4.0 |
| CONS.&BLDG MAT. | 10.4 | 18.2 | 4.3 | 4.7 | 6.9 | 18.8 | 4.1 | 4.7 | 22.3 | 18.2 | 1.8 | 6.1 | -0.1 | 19.0 | -2.5 | 4.4 | 11.9 | 15.5 | -6.1 | 4.3 |
| DIVERSIFIED INDS | 9.3 | 16.8 | 5.3 | 6.6 | 5.0 | 18.4 | 4.3 | 6.6 | 16.7 | 16.5 | 3.6 | 8.3 | 10.3 | 15.1 | -1.8 | 10.1 | 0.2 | 17.7 | -1.6 | 5.3 |
| ELECTR. EQUIP. | 11.3 | 19.0 | 1.6 | 8.0 | 6.4 | 17.6 | 1.6 | 6.0 | 18.6 | 17.0 | 4.4 | 5.1 | 14.0 | 18.4 | -0.6 | 16.5 | 0.3 | 23.8 | -1.9 | 8.0 |
| ELECTRICITY | 10.8 | 14.1 | 0.8 | 2.3 | 5.7 | 15.1 | 0.7 | 2.3 | 20.1 | 15.8 | -1.6 | 2.4 | 5.6 | 12.3 | -6.6 | -2.0 | 10.0 | 12.0 | -1.0 | 0.8 |
| ENG.&MACHINERY | 8.9 | 18.4 | -0.7 | 6.0 | 6.6 | 15.6 | -0.7 | 4.8 | 17.4 | 17.7 | 2.8 | 3.4 | 2.4 | 21.1 | -3.8 | 5.8 | 8.2 | 17.7 | -4.2 | 6.0 |
| FOOD PRDR./PRCR. | 12.1 | 13.8 | 0.3 | 2.8 | 7.6 | 15.5 | 2.8 | 3.6 | 21.7 | 14.6 | 4.2 | 4.6 | 7.3 | 12.4 | -4.5 | -1.3 | 8.9 | 12.0 | -9.4 | 0.3 |
| FOOD&DRUG RETLRS | 12.8 | 16.0 | 0.1 | 1.6 | 7.9 | 21.7 | 0.1 | 4.0 | 22.4 | 14.8 | 1.3 | 3.6 | 15.2 | 12.7 | -3.6 | 0.8 | -2.0 | 14.4 | -8.9 | 1.6 |
| FORESTRY&PAPER | 8.0 | 20.3 | -2.8 | 6.4 | 8.1 | 23.2 | -2.8 | 4.6 | 14.8 | 21.3 | 4.0 | 8.3 | 4.5 | 17.2 | -6.3 | 8.4 | 2.5 | 19.8 | -9.3 | 6.4 |
| GAS DISTRIBUTION | 11.6 | 18.0 | -1.9 | -0.3 | 9.1 | 14.8 | -1.9 | 7.4 | 21.8 | 22.2 | 2.9 | 3.1 | 6.2 | 15.7 | -5.8 | 3.3 | 6.6 | 16.9 | -0.3 | 7.4 |
| HEALTH | 11.4 | 17.5 | -3.2 | 3.1 | -2.0 | 20.7 | -3.2 | 4.1 | 17.0 | 18.4 | -1.7 | 3.3 | 15.0 | 17.0 | -7.5 | -4.1 | 11.5 | 11.1 | 1.0 | 3.1 |
| H'HLD GDS&TEXTLS | 8.9 | 19.3 | 4.8 | 5.1 | 2.8 | 20.5 | 4.8 | 7.1 | 20.1 | 19.0 | -1.1 | 3.4 | 6.9 | 19.5 | -0.9 | 17.6 | 0.3 | 17.4 | -10.6 | 5.1 |
| INF.TECHN.HARDW. | 8.7 | 24.3 | -0.9 | 7.7 | 0.5 | 19.1 | -0.9 | 1.4 | 14.0 | 18.6 | -0.4 | 5.2 | 23.3 | 22.0 | 2.0 | 17.3 | -15.2 | 37.4 | -2.0 | 7.7 |
| INSURANCE | 11.7 | 16.6 | 4.6 | 5.2 | 7.9 | 16.0 | 2.5 | 5.2 | 20.5 | 16.9 | 1.0 | 1.8 | 10.0 | 15.9 | -5.0 | 4.8 | 4.4 | 17.9 | -7.8 | 4.6 |
| INVESTMENT COS. | 10.7 | 16.8 | 2.3 | 4.7 | 5.2 | 20.2 | 2.3 | 3.4 | 16.6 | 17.0 | 5.3 | 6.5 | 11.6 | 13.1 | -1.9 | 8.0 | 5.5 | 17.9 | -3.6 | 4.7 |
| LEIS.,ENT.&HOTEL | 10.9 | 20.6 | 6.3 | 6.5 | 1.5 | 27.6 | 5.0 | 6.5 | 22.7 | 18.8 | -0.1 | 9.4 | 10.6 | 16.1 | -4.9 | 8.6 | 2.2 | 20.4 | 2.3 | 6.3 |
| LIFE ASSURANCE | 12.8 | 18.3 | 1.9 | 5.1 | 6.2 | 20.6 | -0.6 | 1.9 | 21.5 | 17.8 | 5.8 | 11.2 | 14.0 | 15.4 | 5.5 | 6.8 | 3.7 | 20.2 | -12.8 | 5.1 |
| MEDIA&PHOTOGRA. | 8.3 | 17.8 | -1.5 | 1.5 | -4.6 | 20.7 | -1.5 | 2.8 | 19.9 | 16.8 | 3.9 | 4.0 | 15.0 | 14.0 | -4.6 | 16.0 | -7.4 | 19.9 | -0.2 | 1.5 |
| MINING | 11.2 | 26.0 | 6.0 | 6.0 | 12.4 | 24.2 | 6.0 | 18.9 | 11.8 | 30.4 | 4.9 | 11.4 | 5.2 | 23.7 | 4.0 | 11.8 | 18.7 | 24.1 | -10.4 | 6.0 |
| OIL & GAS | 12.9 | 17.6 | -4.2 | 2.7 | 12.4 | 16.8 | -4.2 | -1.4 | 14.3 | 20.4 | 8.2 | 10.9 | 11.0 | 15.4 | -2.5 | 1.7 | 14.5 | 17.3 | -5.6 | 2.7 |
| PER.CARE&HSHLD | 10.3 | 15.5 | -0.6 | 2.4 | -4.0 | 18.1 | -0.6 | 0.9 | 18.7 | 14.7 | -1.0 | 3.8 | 16.1 | 15.5 | -6.8 | 3.2 | 2.9 | 12.6 | -7.8 | 2.4 |
| PHARMACEUTICALS | 11.8 | 16.2 | -0.6 | 3.5 | 1.8 | 20.7 | 0.8 | 3.5 | 20.5 | 15.3 | -2.2 | 0.9 | 16.1 | 14.9 | -7.4 | -2.6 | 1.4 | 12.9 | -0.6 | 2.1 |
| REAL ESTATE | 9.7 | 21.7 | 2.9 | 16.1 | 3.3 | 27.3 | 5.3 | 16.1 | 18.5 | 22.3 | -1.4 | 11.2 | 3.9 | 20.4 | -4.5 | 4.1 | 12.0 | 13.8 | -3.4 | 2.9 |
| RETAIL, GENERAL | 9.8 | 18.3 | -2.8 | 4.5 | -4.1 | 20.7 | -2.8 | 0.7 | 20.9 | 18.1 | 1.1 | 4.6 | 13.8 | 16.1 | -4.4 | 8.8 | 0.7 | 18.6 | -15.5 | 4.5 |
| SFTWR&COMP.SERV. | 10.5 | 25.7 | -2.4 | 6.0 | -1.1 | 26.7 | -2.4 | -0.3 | 11.2 | 23.1 | 3.5 | 3.6 | 32.8 | 21.7 | -1.3 | 24.5 | -14.9 | 32.3 | -10.0 | 6.0 |
| SPC&OTH. FINANCE | 11.3 | 23.2 | 2.6 | 5.1 | 1.5 | 18.5 | 2.6 | 3.4 | 28.2 | 27.1 | 1.0 | 1.8 | 5.0 | 24.2 | -8.7 | 1.2 | 5.0 | 17.8 | -1.4 | 5.1 |
| STEEL&OTH.METALS | 8.6 | 23.0 | 1.5 | 6.7 | 4.8 | 20.9 | 1.5 | 11.3 | 21.2 | 24.4 | -2.7 | 19.8 | -3.6 | 22.4 | -4.5 | 7.6 | 12.5 | 23.6 | -6.0 | 6.7 |
| SUPPORT SERVICES | 9.2 | 17.6 | -5.3 | 4.8 | -2.0 | 19.8 | -5.3 | 3.4 | 20.5 | 18.3 | 3.8 | 5.9 | 12.9 | 14.8 | -5.9 | 4.1 | -3.0 | 17.1 | -7.2 | 4.8 |
| TELECOM SERVICES | 9.9 | 17.6 | -3.8 | -0.3 | 6.5 | 12.4 | -3.8 | -1.7 | 19.0 | 17.6 | -2.6 | 5.3 | 16.1 | 16.8 | -7.9 | 11.7 | -12.1 | 22.2 | -5.3 | -0.3 |
| TOBACCO | 16.1 | 20.5 | -2.0 | 3.8 | 5.7 | 20.2 | 1.4 | 3.8 | 26.4 | 19.9 | 1.5 | 2.4 | 9.3 | 20.2 | -8.2 | -6.1 | 22.3 | 21.8 | -6.3 | -2.0 |
| TRANSPORT | 9.6 | 16.6 | 4.1 | 5.1 | 6.0 | 14.5 | 2.9 | 5.1 | 22.3 | 17.6 | 1.1 | 2.9 | 0.3 | 18.3 | -6.5 | 0.8 | 8.0 | 13.0 | -6.8 | 4.1 |
| WATER | 16.3 | 20.6 | 0.4 | 3.1 | 7.6 | 21.6 | -0.4 | 0.4 | 27.0 | 23.8 | 4.4 | 24.9 | 13.1 | 18.8 | -8.4 | 7.2 | 13.6 | 15.4 | -5.6 | 3.1 |

**Table 2 - Top and Bottom Performing Global Industries for Differing Sample Periods**

| | Industry | 73-05 Av Return | Industry | 73-79 Av Return | Industry | 80-89 Av Return | Industry | 90-99 Av Return | Industry | 00-05 Av Return |
|---|---|---|---|---|---|---|---|---|---|---|
| Top 4 | Water | 16.3 | Aerospace/Defense | 19.6 | SPC&Oth. Finance | 28.2 | Software | 32.8 | Tobacco | 22.3 |
| | Tobacco | 16.1 | Oil & Gas | 12.4 | Water | 27 | Inf. Techn.Hardw. | 23.3 | Mining | 18.7 |
| | Aerospace/Defense | 13.1 | Mining | 12.4 | Tobacco | 26.4 | Telecom Serv. | 16.1 | Oil & Gas | 14.5 |
| | Oil & Gas | 12.9 | Gas Distribution | 9.1 | Banks | 23.3 | Pharmaceuticals | 16.1 | Water | 13.6 |
| Bottom 4 | Forestry& Paper | 8 | Media & Photography | -4.6 | Software | 11.2 | Steel&Oth. Metals | -3.6 | Inf. Techn.Hardw. | -15.2 |
| | Media & Photography | 8.3 | Retail,General | -4.1 | Aerospace/Defense | 11.8 | Cons&Bldg Mat. | -0.1 | Software | -14.9 |
| | Steel&Oth. Metals | 8.6 | Per. Care&Hshld | -4 | Mining | 11.8 | Transport | 0.3 | Telecom Serv. | -12.1 |
| | Inf. Techn.Hardw. | 8.7 | Beverages | -2.5 | Inf. Techn.Hardw. | 14 | Eng&Machinery | 2.4 | Media & Photography | -7.4 |

**Table 3 - Industry Characteristics in Relation to Earnings Yield and Implied Growth**

| Panel A | | | | | Panel B | | | | Panel C | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Industry | EY | Return | Imp Gwt | Trnd Gwt | Industry | EY | Return | Qnt | Industry | Return | Imp Gwt | Qnt |
| AEROSPCE,DEFENCE | 8.2 | 13.1 | 9.1 | 7.1 | WATER | 14.50 | 16.3 | | WATER | 16.3 | 13.5 | |
| AUTO & PARTS | 8.0 | 8.7 | 5.7 | 5.1 | TOBACCO | 9.1 | 16.1 | | TOBACCO | 16.1 | 12.0 | |
| BANKS | 7.2 | 11.4 | 9.7 | 9.3 | OIL & GAS | 8.8 | 12.9 | | HEALTH | 11.4 | 11.6 | |
| BEVERAGES | 5.6 | 10.9 | 9.7 | 10.0 | ELECTRICITY | 8.4 | 10.8 | | INSURANCE | 11.7 | 11.4 | |
| CHEMICALS | 6.7 | 10.1 | 7.9 | 5.7 | AEROSPCE,DEFENCE | 8.2 | 13.1 | | LIFE ASSURANCE | 12.8 | 11.1 | |
| CONS.&BLDG MAT. | 6.5 | 10.4 | 8.2 | 7.8 | AUTO & PARTS | 8.0 | 8.7 | | FOOD&DRUG RETLRS | 12.8 | 10.9 | |
| DIVERSIFIED INDS | 7.2 | 9.3 | 7.0 | 6.5 | MINING | 7.8 | 11.2 | 12.7 | PHARMACEUTICALS | 11.8 | 10.8 | 13.3 |
| ELECTR. EQUIP. | 5.6 | 11.3 | 8.5 | 7.9 | LIFE ASSURANCE | 7.3 | 12.8 | | LEIS.,ENT.&HOTEL | 10.9 | 10.4 | |
| ELECTRICITY | 8.4 | 10.8 | 5.3 | 4.1 | TELECOM SERVICES | 7.3 | 9.9 | | SFTWR&COMP.SERV. | 10.5 | 10.3 | |
| ENG.&MACHINERY | 5.5 | 8.9 | 6.6 | 5.5 | BANKS | 7.2 | 11.4 | | INVESTMENT COS. | 10.7 | 10.3 | |
| FOOD PRDR./PRCR. | 7.1 | 12.1 | 8.7 | 8.3 | DIVERSIFIED INDS | 7.2 | 9.3 | | SPC&OTH. FINANCE | 11.3 | 9.9 | |
| FOOD&DRUG RETLRS | 6.0 | 12.8 | 10.9 | 11.0 | GAS DISTRIBUTION | 7.1 | 11.6 | | BEVERAGES | 10.9 | 9.7 | |
| FORESTRY&PAPER | 6.8 | 8.0 | 4.2 | 3.3 | FOOD PRDR./PRCR. | 7.1 | 12.1 | | BANKS | 11.4 | 9.7 | |
| GAS DISTRIBUTION | 7.1 | 11.6 | 8.4 | 6.7 | FORESTRY&PAPER | 6.8 | 8.0 | 10.7 | RETAIL, GENERAL | 9.8 | 9.7 | 10.8 |
| HEALTH | 5.2 | 11.4 | 11.6 | 10.1 | CHEMICALS | 6.7 | 10.1 | | TRANSPORT | 9.6 | 9.6 | |
| H'HLD GDS&TEXTLS | 5.0 | 8.9 | 7.5 | 7.3 | CONS.&BLDG MAT. | 6.5 | 10.4 | | STEEL&OTH.METALS | 8.6 | 9.4 | |
| INF.TECHN.HARDW. | 4.7 | 8.7 | 8.2 | 7.0 | INSURANCE | 6.3 | 11.7 | | PER.CARE&HSHLD | 10.3 | 9.4 | |
| INSURANCE | 6.3 | 11.7 | 11.4 | 11.1 | FOOD&DRUG RETLRS | 6.0 | 12.8 | | AEROSPCE,DEFENCE | 13.1 | 9.1 | |
| INVESTMENT COS. | 3.8 | 10.7 | 10.3 | 11.6 | PER.CARE&HSHLD | 5.8 | 10.3 | | OIL & GAS | 12.9 | 8.9 | |
| LEIS.,ENT.&HOTEL | 5.0 | 10.9 | 10.4 | 9.9 | SPC&OTH. FINANCE | 5.8 | 11.3 | | FOOD PRDR./PRCR. | 12.1 | 8.7 | |
| LIFE ASSURANCE | 7.3 | 12.8 | 11.1 | 9.5 | STEEL&OTH.METALS | 5.8 | 8.6 | 10.7 | SUPPORT SERVICES | 9.2 | 8.7 | 10.8 |
| MEDIA&PHOTOGRA. | 5.4 | 8.3 | 6.6 | 6.5 | BEVERAGES | 5.6 | 10.9 | | REAL ESTATE | 9.7 | 8.7 | |
| MINING | 7.8 | 11.2 | 7.5 | 3.8 | ELECTR. EQUIP. | 5.6 | 11.3 | | ELECTR. EQUIP. | 11.3 | 8.5 | |
| OIL & GAS | 8.8 | 12.9 | 8.9 | 5.4 | SUPPORT SERVICES | 5.6 | 9.2 | | GAS DISTRIBUTION | 11.6 | 8.4 | |
| PER.CARE&HSHLD | 5.8 | 10.3 | 9.4 | 8.3 | ENG.&MACHINERY | 5.5 | 8.9 | | INF.TECHN.HARDW. | 8.7 | 8.2 | |
| PHARMACEUTICALS | 4.9 | 11.8 | 10.8 | 11.3 | RETAIL, GENERAL | 5.5 | 9.8 | | CONS.&BLDG MAT. | 10.4 | 8.2 | |
| REAL ESTATE | 5.1 | 9.7 | 8.7 | 9.1 | MEDIA&PHOTOGRA. | 5.4 | 8.3 | | CHEMICALS | 10.1 | 7.9 | |
| RETAIL, GENERAL | 5.5 | 9.8 | 9.7 | 8.9 | HEALTH | 5.2 | 11.4 | | MINING | 11.2 | 7.5 | |
| SFTWR&COMP.SERV. | 4.8 | 10.5 | 10.3 | 10.1 | REAL ESTATE | 5.1 | 9.7 | 10.0 | H'HLD GDS&TEXTLS | 8.9 | 7.5 | 10.2 |
| SPC&OTH. FINANCE | 5.8 | 11.3 | 9.9 | 10.8 | H'HLD GDS&TEXTLS | 5.0 | 8.9 | | DIVERSIFIED INDS | 9.3 | 7.0 | |
| STEEL&OTH.METALS | 5.8 | 8.6 | 9.4 | 5.7 | LEIS.,ENT.&HOTEL | 5.0 | 10.9 | | MEDIA&PHOTOGRA. | 8.3 | 6.6 | |
| SUPPORT SERVICES | 5.6 | 9.2 | 8.7 | 8.5 | PHARMACEUTICALS | 4.9 | 11.8 | | ENG.&MACHINERY | 8.9 | 6.6 | |
| TELECOM SERVICES | 7.3 | 9.9 | 5.0 | 3.2 | TRANSPORT | 4.9 | 9.6 | | AUTO & PARTS | 8.7 | 5.7 | |
| TOBACCO | 9.1 | 16.1 | 12.0 | 12.0 | SFTWR&COMP.SERV. | 4.8 | 10.5 | | ELECTRICITY | 10.8 | 5.3 | |
| TRANSPORT | 4.9 | 9.6 | 9.6 | 8.1 | INF.TECHN.HARDW. | 4.7 | 8.7 | | TELECOM SERVICES | 9.9 | 5.0 | |
| WATER | 14.5 | 16.3 | 13.5 | 10.9 | INVESTMENT COS. | 3.8 | 10.7 | 10.1 | FORESTRY&PAPER | 8.0 | 4.2 | 9.2 |

**Table 4 - Global Industry Performance Relative to US Yield Curve**

| Normal Yield Curve Industry | Return | Stdev | Inverted Yield Curve Industry | Return | Stdev |
|---|---|---|---|---|---|
| TOBACCO | 16.3 | 20.4 | MINING | 20.4 | 26.6 |
| WATER | 16.0 | 20.5 | WATER | 18.5 | 21.4 |
| AEROSPCE,DEFENCE | 15.0 | 19.1 | TOBACCO | 14.4 | 21.5 |
| ELECTR. EQUIP. | 14.7 | 18.6 | OIL & GAS | 9.9 | 20.3 |
| SPC&OTH. FINANCE | 14.1 | 23.6 | FORESTRY&PAPER | 6.6 | 22.2 |
| FOOD&DRUG RETLRS | 14.3 | 15.2 | GAS DISTRIBUTION | 2.8 | 18.5 |
| LIFE ASSURANCE | 14.3 | 18.0 | LIFE ASSURANCE | 2.3 | 20.1 |
| LEIS.,ENT.&HOTEL | 14.2 | 19.4 | INSURANCE | 2.2 | 17.2 |
| INF.TECHN.HARDW. | 14.2 | 23.3 | FOOD&DRUG RETLRS | 2.1 | 20.6 |
| SFTWR&COMP.SERV. | 14.1 | 24.8 | AEROSPCE,DEFENCE | 1.6 | 26.4 |
| INVESTMENT COS. | 13.8 | 16.1 | FOOD PRDR./PRCR. | 1.3 | 17.1 |
| FOOD PRDR./PRCR. | 13.6 | 13.2 | PHARMACEUTICALS | 1.2 | 19.8 |
| OIL & GAS | 13.5 | 17.2 | HEALTH | -0.1 | 22.0 |
| BEVERAGES | 13.5 | 15.8 | CHEMICALS | -0.5 | 17.9 |
| BANKS | 13.4 | 18.1 | TRANSPORT | -3.5 | 15.2 |
| ELECTRICITY | 13.3 | 13.8 | DIVERSIFIED INDS | -3.8 | 17.0 |
| PHARMACEUTICALS | 13.2 | 15.6 | PER.CARE&HSHLD | -4.1 | 19.4 |
| HEALTH | 13.2 | 16.7 | BANKS | -4.3 | 17.2 |
| GAS DISTRIBUTION | 13.0 | 17.9 | CONS.&BLDG MAT. | -5.8 | 19.7 |
| INSURANCE | 13.0 | 16.6 | BEVERAGES | -6.2 | 18.9 |
| RETAIL, GENERAL | 12.9 | 17.9 | ELECTRICITY | -6.2 | 15.4 |
| CONS.&BLDG MAT. | 12.6 | 17.9 | TELECOM SERVICES | -6.7 | 18.4 |
| TELECOM SERVICES | 12.4 | 17.4 | STEEL&OTH.METALS | -7.1 | 22.1 |
| PER.CARE&HSHLD | 12.4 | 14.9 | SUPPORT SERVICES | -9.0 | 21.3 |
| REAL ESTATE | 12.3 | 20.9 | ENG.&MACHINERY | -9.9 | 16.6 |
| H'HLD GDS&TEXTLS | 12.1 | 19.0 | RETAIL, GENERAL | -10.1 | 20.4 |
| SUPPORT SERVICES | 12.1 | 16.9 | SPC&OTH. FINANCE | -10.4 | 19.4 |
| AUTO & PARTS | 12.1 | 17.2 | INVESTMENT COS. | -10.9 | 20.7 |
| MEDIA&PHOTOGRA. | 11.9 | 17.4 | REAL ESTATE | -12.0 | 24.7 |
| ENG.&MACHINERY | 11.7 | 18.6 | ELECTR. EQUIP. | -12.0 | 20.3 |
| CHEMICALS | 11.6 | 16.3 | SFTWR&COMP.SERV. | -13.5 | 31.0 |
| TRANSPORT | 11.3 | 16.7 | LEIS.,ENT.&HOTEL | -13.5 | 26.7 |
| DIVERSIFIED INDS | 11.0 | 16.7 | AUTO & PARTS | -14.1 | 19.8 |
| STEEL&OTH.METALS | 10.9 | 23.2 | H'HLD GDS&TEXTLS | -14.5 | 20.2 |
| MINING | 9.6 | 26.0 | MEDIA&PHOTOGRA. | -15.7 | 19.0 |
| FORESTRY&PAPER | 8.4 | 20.0 | INF.TECHN.HARDW. | -28.3 | 29.0 |

**Table 5 Performance Long/Short Industry Momentum D10 - D1**

| | | 1 mth | 3 mth | 6 mth | 9 mth | 12 mth | 15 mth | 24 mth | 48 mth |
|---|---|---|---|---|---|---|---|---|---|
| 74-79 | Av Ret | 7.89 | 3.47 | -3.41 | 5.17 | 10.37 | 2.38 | 0.43 | 0.60 |
| | Std | 12.52 | 13.43 | 14.51 | 13.36 | 11.79 | 14.39 | 13.85 | 12.63 |
| | T val | 1.54 | 0.63 | -0.58 | 0.95 | 2.15* | 0.41 | 0.08 | 0.12 |
| 80-89 | Av Ret | 9.21 | 1.40 | 6.17 | 10.48 | 11.95 | 8.23 | 3.00 | -2.26 |
| | Std | 12.96 | 15.35 | 16.26 | 16.03 | 17.36 | 16.44 | 15.88 | 17.26 |
| | T val | 2.27* | 0.29 | 1.22 | 2.09* | 2.20* | 1.60 | 0.60 | -0.42 |
| 90-99 | Av Ret | 7.74 | 16.08 | 10.86 | 16.46 | 21.86 | 18.27 | 14.47 | 6.46 |
| | Std | 15.58 | 16.90 | 16.23 | 16.33 | 18.20 | 17.78 | 17.82 | 17.17 |
| | T val | 1.59 | 3.05** | 2.14* | 3.22** | 3.84* | 3.29** | 2.60** | 1.20 |
| 00-05 | Av Ret | -3.89 | 0.54 | 3.59 | 3.03 | 3.74 | 1.37 | -4.02 | -3.16 |
| | Std | 19.98 | 21.08 | 23.52 | 23.73 | 23.73 | 23.35 | 22.52 | 20.52 |
| | T val | -0.48 | 0.06 | 0.37 | 0.31 | 0.39 | 0.14 | -0.44 | -0.38 |
| 74-05 | Av Ret | 6.07 | 6.23 | 5.36 | 9.98 | 13.23 | 9.00 | 4.81 | 0.84 |
| | Std | 15.24 | 16.77 | 17.52 | 17.37 | 18.15 | 18.02 | 17.61 | 17.11 |
| | T val | 2.27* | 2.12* | 1.74* | 3.27** | 4.16** | 2.85** | 1.56 | 0.28 |
| 74/99 | Av Ret | 8.34 | 7.53 | 5.76 | 11.56 | 15.40 | 10.74 | 6.82 | 1.76 |
| | Std | 13.89 | 15.64 | 15.89 | 15.58 | 16.61 | 16.58 | 16.28 | 16.26 |
| | T val | 3.12** | 2.50** | 1.89* | 3.86** | 4.82** | 3.37** | 2.18* | 0.56 |

*** significant at 5%**
**** significant at 1%**

**Table 6 - Performance Earnings Yield EYVAL**

| | | DEC1 | DEC2 | DEC3 | DEC4 | DEC5 | DEC6 | DEC7 | DEC8 | DEC9 | DEC10 | L/S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74-79 | Av Ret | 6.82 | 9.89 | 1.97 | 4.39 | 10.30 | 11.16 | 12.32 | 9.22 | 17.47 | 17.50 | 10.69 |
| | Std | 16.44 | 17.44 | 19.38 | 18.71 | 16.68 | 17.49 | 16.77 | 15.66 | 15.19 | 14.93 | 10.37 |
| | T value | | | | | | | | | | | 2.53** |
| 80-89 | Av Ret | 20.23 | 23.97 | 22.77 | 20.97 | 20.65 | 18.51 | 18.76 | 22.60 | 21.81 | 24.54 | 4.32 |
| | Std | 17.96 | 19.34 | 14.97 | 16.23 | 17.21 | 15.97 | 14.73 | 14.84 | 13.84 | 14.33 | 13.23 |
| | T value | | | | | | | | | | | 1.04 |
| 90-99 | Av Ret | 15.88 | 11.31 | 14.34 | 14.27 | 11.85 | 7.06 | 13.68 | 8.30 | 9.14 | 10.99 | -4.89 |
| | Std | 18.93 | 15.63 | 14.84 | 14.42 | 14.29 | 14.62 | 14.62 | 14.18 | 14.01 | 12.18 | 16.31 |
| | T value | | | | | | | | | | | -0.96 |
| 00-05 | Av Ret | -6.31 | 0.16 | -1.42 | 10.62 | 8.03 | 7.62 | 7.08 | 11.58 | 9.09 | 18.59 | 24.91 |
| | Std | 21.35 | 15.34 | 13.48 | 14.14 | 13.49 | 14.87 | 16.11 | 13.68 | 15.18 | 15.21 | 18.85 |
| | T value | | | | | | | | | | | 3.1** |
| 74-05 | Av Ret | 11.42 | 12.94 | 11.73 | 13.83 | 13.61 | 11.52 | 13.79 | 13.56 | 14.66 | 17.87 | 6.45 |
| | Std | 18.81 | 17.27 | 15.78 | 15.85 | 15.59 | 15.67 | 15.34 | 14.64 | 14.44 | 14.01 | 15.22 |
| | T value | | | | | | | | | | | 2.42** |
| 74/99 | Av Ret | 15.46 | 15.85 | 14.73 | 14.57 | 14.88 | 12.41 | 15.32 | 14.01 | 15.93 | 17.71 | 1.51 |
| | Std | 18.01 | 17.59 | 16.16 | 16.23 | 16.02 | 15.85 | 15.16 | 14.87 | 14.27 | 13.75 | 19.97 |
| | T value | | | | | | | | | | | 0.39 |

significant at 1%

**Table 7 - Performance Normalised Earnings Yield ZEYVAL**

| | | DEC1 | DEC2 | DEC3 | DEC4 | DEC5 | DEC6 | DEC7 | DEC8 | DEC9 | DEC10 | L/S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 74-79 | Av Ret | 10.78 | 5.97 | 14.09 | 9.62 | 8.79 | 11.97 | 5.56 | 10.15 | 11.97 | 14.09 | 3.32 |
| | Std | 16.91 | 16.28 | 16.56 | 15.68 | 17.73 | 16.85 | 16.33 | 16.18 | 19.94 | 17.61 | 13.18 |
| | T value | | | | | | | | | | | 0.62 |
| 80-89 | Av Ret | 21.18 | 21.54 | 18.81 | 22.10 | 22.77 | 20.69 | 22.53 | 24.25 | 22.58 | 18.78 | -2.40 |
| | Std | 15.81 | 15.99 | 16.84 | 14.88 | 15.36 | 17.25 | 14.49 | 15.91 | 15.61 | 15.37 | 12.21 |
| | T value | | | | | | | | | | | -0.63 |
| 90-99 | Av Ret | 14.06 | 17.67 | 12.21 | 14.39 | 12.73 | 12.31 | 15.79 | 7.89 | 6.90 | 4.24 | -9.82 |
| | Std | 14.21 | 14.09 | 13.25 | 14.46 | 14.20 | 13.65 | 15.51 | 16.13 | 16.25 | 16.18 | 11.74 |
| | T value | | | | | | | | | | | -2.68** |
| 00-05 | Av Ret | 6.95 | 3.87 | 6.72 | 4.15 | 6.03 | 4.86 | 7.09 | 7.00 | 7.07 | 11.03 | 4.08 |
| | Std | 15.68 | 15.65 | 15.93 | 14.24 | 15.46 | 15.65 | 16.29 | 13.60 | 14.93 | 15.70 | 12.20 |
| | T value | | | | | | | | | | | 0.78 |
| 74-05 | Av Ret | 14.36 | 14.13 | 13.61 | 14.01 | 13.89 | 13.49 | 14.37 | 13.28 | 12.80 | 11.90 | -2.45 |
| | Std | 15.53 | 15.49 | 15.56 | 14.85 | 15.55 | 15.84 | 15.57 | 15.72 | 16.64 | 16.15 | 12.31 |
| | T value | | | | | | | | | | | -1.13 |
| 74/99 | Av Ret | 16.04 | 16.46 | 15.18 | 16.25 | 15.68 | 15.45 | 16.02 | 14.70 | 14.10 | 12.10 | -6.63 |
| | Std | 15.48 | 15.40 | 15.46 | 14.93 | 15.56 | 15.86 | 15.39 | 16.15 | 17.01 | 16.27 | 12.39 |
| | T value | | | | | | | | | | | 2.78** |

** significant at 1%

**Table 8 - Performance of Sorting Value and Momentum into Quartiles 1974-2005**

| | | | VALUE | | | | |
|---|---|---|---|---|---|---|---|
| | | | Q1 Expensive | Q2 | Q3 | Q4 Cheap | Return Difference |
| MOMENTUM | Q1 (Loser quartile) | Average Return | 7.20 | 8.60 | 9.90 | 12.90 | 5.80 |
| | | Std | 18.80 | 16.90 | 17.30 | 15.70 | 15.70 |
| | | T value | | | | | 2.10** |
| | Q2 | Average Return | 6.80 | 11.90 | 11.10 | 13.40 | 6.60 |
| | | Std | 17.40 | 16.90 | 15.00 | 14.70 | 14.70 |
| | | T value | | | | | 2.57** |
| | Q3 | Average Return | 10.60 | 14.90 | 12.10 | 15.00 | 4.50 |
| | | Std | 16.20 | 15.20 | 14.40 | 15.10 | 12.50 |
| | | T value | | | | | 2.05* |
| | Q4 (winner quartile) | Average Return | 16.40 | 15.40 | 13.90 | 19.50 | 3.10 |
| | | Std | 16.80 | 16.10 | 15.60 | 16.90 | 17.40 |
| | | T value | | | | | 1.00 |
| | | Return Difference | 9.30 | 6.90 | 4.00 | 6.60 | 12.30 |
| | | Std | 17.40 | 15.30 | 15.60 | 16.20 | 15.50 |
| | | T value | 3.05** | 2.6** | 1.50 | 2.33** | 4.8** |

* significant at 5%

** significant at 1%

**Table 9 Long/Short Strategy of Combination Value and Momentum Sorted by Quartiles**

| | | Q1 VAL (Q4-Q1)MOM | Q2 VAL (Q4-Q1)MOM | Q3 VAL (Q4-Q1)MOM | Q4 VAL (Q4-Q1)MOM | Q1 MOM (Q4-Q1)VAL | Q2 MOM (Q4-Q1)VAL | Q3 MOM (Q4-Q1)VAL | Q4 MOM (Q4-Q1)VAL |
|---|---|---|---|---|---|---|---|---|---|
| 74-79 | Av Ret | -1.14 | 2.99 | -1.99 | 4.73 | 8.45 | 9.06 | 7.88 | 14.32 |
| | Std | 15.92 | 16.04 | 14.41 | 13.43 | 15.24 | 13.72 | 12.64 | 15.84 |
| | T value | -0.18 | 0.46 | -0.34 | 0.86 | 1.36 | 1.62 | 1.53 | 2.21** |
| 80-89 | Av Ret | 7.92 | 6.06 | 0.95 | 8.00 | 4.19 | -2.70 | 4.80 | 4.27 |
| | Std | 14.91 | 14.76 | 15.02 | 18.61 | 15.93 | 16.05 | 13.86 | 19.17 |
| | T value | 1.68* | 1.30 | 0.20 | 1.36 | 0.83 | -0.53 | 1.09 | 0.70 |
| 90-99 | Av Ret | 21.05 | 12.87 | 12.37 | 8.65 | 3.00 | 7.66 | -0.99 | -9.40 |
| | Std | 17.12 | 15.00 | 16.13 | 16.18 | 15.25 | 13.67 | 11.76 | 16.80 |
| | T value | 3.89** | 2.71** | 2.43** | 1.69* | 0.62 | 1.77 | -0.27 | -1.77 |
| 00-05 | Av Ret | 2.07 | 2.05 | 1.16 | 2.46 | 10.37 | 18.02 | 9.75 | 10.75 |
| | Std | 22.00 | 15.89 | 16.51 | 14.66 | 16.91 | 14.64 | 11.23 | 16.19 |
| | T value | 0.23 | 0.32 | 0.17 | 0.41 | 1.50 | 3.02** | 2.13* | 1.63 |
| 74-05 | Av Ret | 9.25 | 6.87 | 4.02 | 6.56 | 5.76 | 6.60 | 4.48 | 3.08 |
| | Std | 17.39 | 15.29 | 15.58 | 16.21 | 15.74 | 14.73 | 12.53 | 17.44 |
| | T value | 3.05** | 2.58** | 1.48 | 2.33** | 2.10* | 2.57** | 2.05* | 1.01 |
| 74/99 | Av Ret | 10.88 | 7.97 | 4.67 | 7.50 | 4.71 | 4.00 | 3.28 | 1.33 |
| | Std | 16.17 | 15.15 | 15.38 | 16.55 | 15.48 | 14.68 | 12.80 | 17.69 |
| | T value | 3.50** | 2.73** | 1.58 | 2.35** | 1.58 | 1.42 | 1.33 | 0.39 |

* significant at 5%

** significant at 1%

**Table 10 - Performance of Long/Short Implied Growth Strategies**

| Ex Post Earnings | | | | Ex Ante Earnings | |
|---|---|---|---|---|---|
| Panel A | | Implied Gwth | 5 year Gwth | Panel B Implied Gwth | Z Imp Gwth |
| 74-79 | Av Ret | 1.45 | -1.40 | -8.65 | 6.05 |
| | Std | 12.65 | 11.53 | 10.73 | 6.31 |
| | T Val | 0.28 | -0.30 | 1.97* | 2.35** |
| 80-89 | Av Ret | -2.17 | 2.11 | -4.32 | 5.88 |
| | Std | 14.06 | 12.62 | 13.23 | 7.23 |
| | T Val | -0.49 | 0.54 | -1.04 | 2.60** |
| 90-99 | Av Ret | 2.06 | 1.56 | 4.89 | 4.14 |
| | Std | 13.03 | 13.96 | 16.31 | 7.59 |
| | T Val | 0.51 | 0.36 | 0.96 | 1.74* |
| 00-05 | Av Ret | 5.14 | 1.44 | -24.91 | 1.39 |
| | Std | 11.30 | 15.64 | 18.85 | 11.55 |
| | T Val | 1.11 | 0.23 | -3.24 | 0.30 |
| 74-05 | Av Ret | 1.18 | 1.24 | -5.98 | 4.46 |
| | Std | 12.98 | 13.47 | 15.38 | 8.22 |
| | T Val | 0.52 | 0.52 | -2.20 | 3.1** |
| 74/99 | Av Ret | 0.24 | 1.19 | -1.50 | 5.20 |
| | Std | 13.35 | 12.94 | 14.17 | 7.20 |
| | T Val | 0.09 | 0.48 | -0.55 | 3.75** |

*** significant at 5%**
**** significant at 1%**

**Table 11 Correlation Matrix 1974-2005**

| Long Only | | | | | Long/Short | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Mom | Val | Combo | Gwth | | Mom | Val | Combo | Gwth |
| Mom | 1.00 | 0.65 | 0.71 | 0.77 | Mom | 1.00 | -0.17 | 0.48 | 0.23 |
| Val | | 1.00 | 0.76 | 0.81 | Val | | 1.00 | 0.42 | 0.09 |
| Combo | | | 1.00 | 0.73 | Combo | | | 1.00 | 0.30 |
| Gwth | | | | 1.00 | Gwth | | | | 1.00 |

**Table 12 - Aggregate Strategy**

| | Panel A | LONG ONLY | | | | | | L/S | Panel B | Long/Short | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mom Dec10 | Val Dec10 | Combo | Gwth | Agglong | MSCI | Agglong-MSCI | Mom D10-D1 | Val D10-D1 | Combo | Gwth | AggLS |
| | WGT | 0.25 | 0.25 | 0.25 | 0.25 | | | | 0.25 | 0.25 | 0.25 | 0.25 | |
| 74-79 | Av Ret | 16.50 | 17.50 | 21.69 | 16.14 | 16.95 | 8.68 | 8.27 | 10.37 | 10.69 | 18.36 | 6.14 | 10.98 |
| | Std | 15.37 | 14.93 | 16.24 | 12.78 | 13.07 | 14.36 | 5.30 | 11.79 | 10.37 | 9.59 | 6.37 | 5.59 |
| | T val | | | | | | | 3.82** | 2.15* | 2.53** | 4.69** | 2.36** | 4.81** |
| 80-89 | Av Ret | 28.29 | 24.54 | 26.39 | 25.29 | 26.13 | 19.38 | 6.75 | 11.95 | 4.32 | 7.97 | 5.88 | 7.53 |
| | Std | 19.13 | 14.33 | 17.47 | 14.44 | 14.83 | 14.65 | 6.48 | 17.36 | 13.23 | 16.53 | 7.23 | 8.38 |
| | T val | | | | | | | 3.33** | 2.2* | 1.04 | 1.54 | 2.6** | 2.87** |
| 90-99 | Av Ret | 23.61 | 10.99 | 14.39 | 13.30 | 15.57 | 12.33 | 3.24 | 21.86 | -4.89 | 11.20 | 4.14 | 8.08 |
| | Std | 16.17 | 12.18 | 13.87 | 13.44 | 11.91 | 13.98 | 6.61 | 18.20 | 16.31 | 15.66 | 7.59 | 9.23 |
| | T val | | | | | | | 1.57 | 3.84** | -0.96 | 2.29* | 1.74 | 2.80** |
| 00-05 | Av Ret | 8.55 | 18.59 | 13.85 | 8.08 | 12.30 | 0.94 | 11.73 | 3.74 | 24.91 | 14.64 | 1.39 | 11.17 |
| | Std | 17.56 | 15.21 | 15.16 | 13.79 | 13.76 | 14.63 | 8.34 | 23.73 | 18.85 | 18.09 | 11.55 | 13.39 |
| | T val | | | | | | | 3.44** | 0.39 | 3.24** | 1.98* | 0.30 | 2.04* |
| 74-05 | Av Ret | 20.92 | 17.87 | 19.43 | 16.64 | 18.53 | 11.71 | 6.86 | 13.23 | 6.45 | 12.17 | 4.47 | 9.03 |
| | Std | 17.33 | 14.01 | 15.76 | 13.82 | 13.48 | 14.45 | 6.74 | 18.15 | 15.22 | 15.49 | 8.23 | 9.34 |
| | T val | | | | | | | 5.8** | 4.16** | 2.42** | 4.48** | 3.09** | 5.51** |
| 74/99 | Av Ret | 23.77 | 17.71 | 20.69 | 18.71 | 19.95 | 14.20 | 5.75 | 15.40 | 2.25 | 11.61 | 5.21 | 8.54 |
| | Std | 17.20 | 13.75 | 15.90 | 13.79 | 13.40 | 14.34 | 6.29 | 16.61 | 14.02 | 14.86 | 7.21 | 8.17 |
| | T val | | | | | | | 4.76** | 4.82** | 0.83 | 4.06** | 3.76** | 5.43** |

*** significant at 5%**
**** significant at 1%**

**Table 13 -Performance of Global Industry Strategies in relation to the US Yield Curve**

| Panel A | | CURVE INVERTED | | | | Panel B | CURVE NORMAL | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Mom | Val | Combo | Gwth | | Mom | Val | Combo | Gwth |
| 74-79 | Av Ret | 5.02 | 12.86 | 30.53 | 1.56 | | 12.15 | 9.97 | 14.30 | 5.51 |
| | Std | 15.54 | 8.89 | 10.93 | 4.20 | | 10.38 | 10.88 | 8.91 | 5.89 |
| | T val | 0.79 | 3.54** | 6.84** | 0.91 | | 2.87** | 2.24* | 3.93** | 2.29* |
| 80-89 | Av Ret | -6.37 | 11.05 | 13.59 | 10.22 | | 16.06 | 2.81 | 6.71 | 4.90 |
| | Std | 14.53 | 12.53 | 16.91 | 6.52 | | 17.78 | 13.41 | 16.51 | 7.38 |
| | T val | -1.40 | 2.82** | 2.57** | 5.02** | | 2.21* | 0.51 | 1.00 | 1.63 |
| 90-99 | Av Ret | NA | NA | NA | NA | | 21.86 | -4.89 | 11.20 | 4.14 |
| | Std | NA | NA | NA | NA | | 18.20 | 16.31 | 15.66 | 7.59 |
| | T val | NA | NA | NA | NA | | 3.84** | -0.96 | 2.29* | 1.74* |
| 00-05 | Av Ret | -41.04 | 66.84 | 28.36 | -0.40 | | 8.64 | 20.32 | 13.14 | 1.59 |
| | Std | 32.03 | 25.46 | 22.86 | 14.14 | | 22.52 | 17.75 | 17.67 | 11.36 |
| | T val | -3.14** | 6.43** | 3.04** | -0.07 | | 0.94 | 2.80** | 1.82* | 0.34 |
| 74-05 | Av Ret | -7.17 | 20.05 | 22.28 | 5.32 | | 16.09 | 4.55 | 10.76 | 4.09 |
| | Std | 18.41 | 14.77 | 15.76 | 7.34 | | 17.99 | 15.22 | 15.43 | 8.13 |
| | T val | -2.22* | 7.74** | 8.06** | 4.14** | | 5.10** | 1.70 | 3.98** | 2.87** |
| 74/99 | Av Ret | -1.24 | 11.86 | 21.21 | 6.32 | | 17.84 | 0.83 | 10.20 | 4.68 |
| | Std | 14.89 | 10.91 | 14.56 | 5.67 | | 16.76 | 14.39 | 14.88 | 7.18 |
| | T val | -0.43 | 5.65** | 7.57** | 5.80** | | 5.50** | 0.30 | 3.56** | 3.39** |

*** significant at 5%**

**** significant at 1%**

**Figure 1**
**Implied Growth vs Return**
**Return(t) = a + b * Implied Growth(t) + e(t)**
**a = 5.94 (t=5.0), b= 0.54 (t=5.6), R^2 = 0.46**

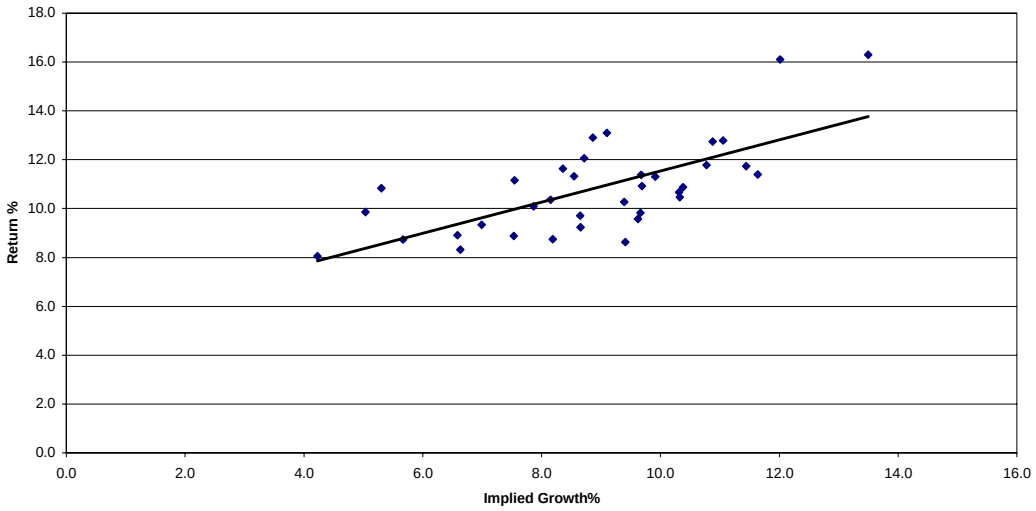

**Figure 2 Ex Ante  Implied Growth Aerospace/Defense**