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*Investment*

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**TACTICAL  
REBALANCING**

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## TACTICAL REBALANCING

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## TACTICAL REBALANCING

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Risk reduction, or risk control, is becoming of greater concern to many UK pension funds. Accelerated maturity and various aspects of the 1995 Pensions Act are drawing many plans towards asset liability modelling and fund specific benchmarks. Historically, fund-specific benchmarks have been relatively uncommon and consensus or industry group benchmarks the norm. For those funds that find themselves moving to a fund specific benchmark, the exercise begins with determining the appropriate policy mix, but does not end there. From the minute that the new benchmark is achieved, the markets will begin to unravel it, unless a firm decision is taken on how asset allocation is to be managed going forward.

Broadly, there are three choices. The passive solution, analogous to indexation at the individual security level, is some form of disciplined rebalancing methodology. The active solution is to adjust allocation tactically, on either side of the policy benchmark, within carefully prescribed limits. The third choice, a buy and hold strategy allows the asset mix to drift randomly along with market movements and will undermine the policy benchmark, no matter how carefully it has been selected. A drifting strategy also ensures a minimum position before a rally and a maximum position when a market falls, which will minimise gains and maximise losses.

Thus, the ongoing allocation of the fund is as relevant to liability considerations as the initial strategic mix. The inefficiency of drifting is gaining greater recognition, and many thoughtful investors will reject it as no longer being a serious option.

Tactical Asset Allocation is the optimal solution when a fund is moderately tolerant of risk and desires that value be added actively. Nevertheless, some funds will regard TAA as too bold a step, particularly in an initial restructuring away from the more conventional consensus policies. For these funds, simple rebalancing is often a more appropriate initial step, as it focuses on controlling the stream of returns to meet future liabilities at a minimal risk level. For a thorough discussion of rebalancing, see "Rebalancing to Benchmark", First Quadrant Monograph, No. 4, 1994.

Passive rebalancing is essentially a risk control mechanism, although it has been shown to add value versus drift over long periods [see Arnott, 1992]. However, there are also intermediate periods in which a drifting strategy outperforms on an absolute return basis. It would be potentially profitable, therefore, to be able to identify and forecast the market "states" during which drifting or rebalancing will outperform. We use the term Tactical Rebalancing (TR) to describe a new strategy in which the frequency of rebalancing is altered to suit the expected "state" of the markets.

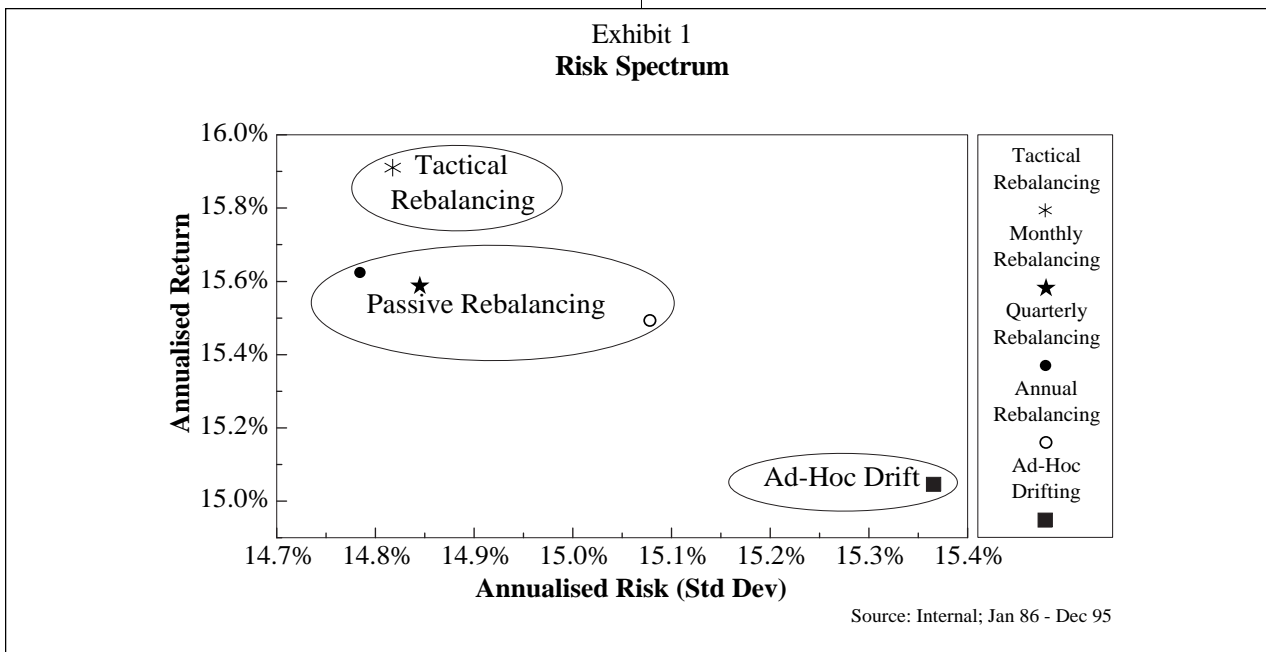
## THE MERITS OF VARIOUS ALLOCATION STRATEGIES

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Tactical Asset Allocation and rebalancing strategies share the characteristic of forcing the investor to behave in a contrarian fashion. Bill Sharpe [1989] has shown that a contrarian investor benefits from "taking on added risk when wealth has been reduced and the risk premium large and becoming more conservative when wealth is large and the risk premium small". This is achieved passively by rebalancing a portfolio back to the benchmark mix. When the asset classes are generally mean reverting, then the investor will benefit from a higher return to a rebalanced strategy than to a drifting strategy. However, when the markets experience a period of trending, the drifting strategy may outperform specifically by overweighting the outperforming class.

Tactical Rebalancing combines elements of both passive and active management. It is an active strategy to the extent that its actions depend on the expected future state of the market. However, it resembles a passive strategy since assets move away from benchmark weightings only through the natural process of drift and *never due to any active intervention*.

What is remarkable about a Tactical Rebalancing strategy is that it has a similar risk level to passive rebalancing strategies, while it has the potential to add useful additional returns (Exhibit 1). The risk level is low both when viewed statistically, using volatility measures, and mechanistically, in the method used to allocate funds. In volatility terms, it has a low tracking error relative to passive rebalancing and has a total



standard deviation equivalent to passive rebalancing and well below that of ad-hoc drifting. Also, it utilises a mechanism which is extremely conservative: the portfolio may either remain unrebanded during a period when the forecasting models suggest that rebalancing should add no value or it may move back toward the benchmark allocation. Because this strategy is not forced to rebalance on a frequent basis, turnover typically falls below that incurred through monthly or quarterly rebalancing.

An ad-hoc drifting strategy experiences both higher absolute volatility and higher volatility per unit of return than any passive rebalancing strategy. Judged on the basis of its return/risk ratio, it is clearly the inferior strategy. Consequently, this paper makes the assumption that any Trustees considering Tactical Rebalancing have already chosen to follow a stable, rebalanced benchmark and have rejected ad-hoc drifting or consensus benchmarking. Their next step is to decide amongst those strategies, including Tactical Rebalancing, which lie on the risk spectrum running from passive rebalancing up to fully active Tactical Asset Allocation, by weighing the risks and rewards of taking tactical control over the asset allocation of their portfolio.

### REBALANCING TRIGGERS

Forecasting when to rebalance the asset mix is essentially equivalent to forecasting which asset classes should outperform over the next time period. Therefore, the same type of models which are used to drive a global TAA programme can be applied toward producing signals for a Tactical Rebalancing programme. Although TR operates in an extremely constrained fashion relative to TAA and the expectations for adding value are significantly diminished, the decision matrix is just as complex and the models must be no less sophisticated.

Passive rebalancing strategies have two different triggers. Rebalancing occurs either on a periodic basis or when predefined ranges are exceeded. These two variants of plain vanilla rebalancing are quite similar, and there is a direct, intuitive relationship between narrowing the ranges and increasing the frequency of rebalancing.

From one perspective, a range rebalancing strategy is more reactive to market states than a periodic rebalancing strategy. These strategies will rebalance

*(continued on page 3)*

(continued from page 2)

more often when the markets are volatile enough to broach the ranges. However, the exact set of ranges selected in the mandate guidelines is a sensitive initial condition. Often, choosing these ranges can be an exercise in backfitting and will not necessarily be indicative of the appropriate ranges for the future. A particular set of ranges will cause rebalancing to occur at opportune times over a select time period, but might then allow drift over the entire following time span if the volatility decreases slightly. The ranges would need to fluctuate over time in order to qualify as a fully reactive process.

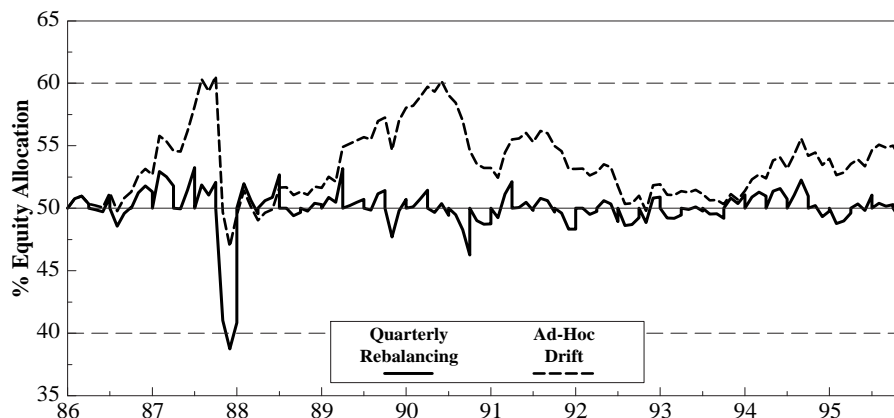
Tactical Rebalancing can be viewed from both perspectives, as either a periodic rebalancing strategy that allows tactical changes in its periodicity or a range rebalancing strategy having ranges which may fluctuate tactically. Tactical Rebalancing is simply a method of determining whether the asset mix has strayed too far away from benchmark and should be rebalanced or whether the active exposures are justified and the portfolio should be left as is.

## PATTERNS OF INVESTMENT

A strategy that does not manage ongoing asset allocation, either passively or actively, does not safeguard the integrity of the fund's investment policy. As the outperforming, riskier asset class comes to represent a larger portion of the portfolio, the risk level of the fund increases.

As an example, we have included a chart of the allocation pattern to a drifting and a quarterly rebalanced domestic mandate (Exhibit 2). For simplicity, the benchmark is assumed to be 50% UK equities and 50% UK fixed income. The drifting equity allocation follows the path of the differential returns: when equities outperform bonds, it increases; when bonds outperform, it declines. Thus, before the fall of 1987, the drifting strategy had over 60% of the portfolio invested in equities and experienced the subsequent loss of capital on 60% of the portfolio. This compares unfavourably with the passive rebalancing strategy, which felt this loss on the benchmark weight of only 50% of the portfolio.

Exhibit 2  
Quarterly Rebalancing vs. Drift



Source: Internal; Jan 86 - Dec 95

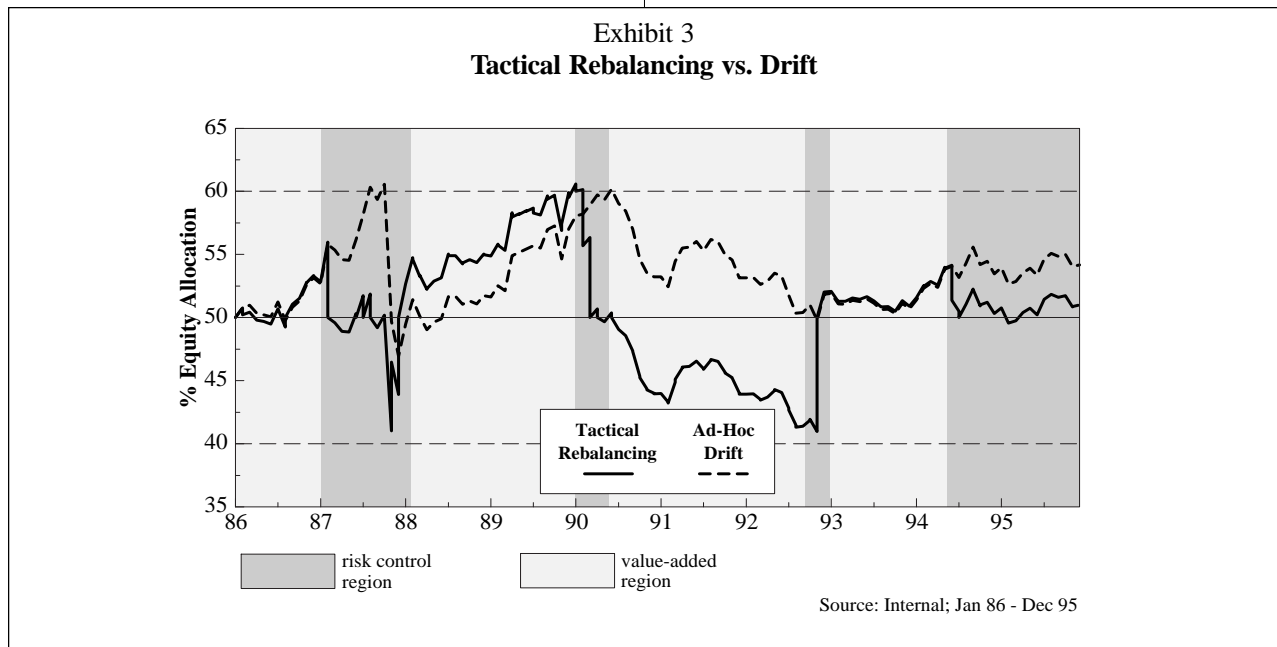
Rebalancing is essentially a contrarian strategy. In a market which is generally mean reverting, there are observable periods in which passive rebalancing will add value. In the period following the events of October 1987, the rebalanced portfolio achieved benchmark weight earlier than the drifting one, which allowed it to earn stronger rewards over the first quarter of 1988. However, over the last decade there have been several periods spanning 12 months during which there was a uniform trend of relative outperformance of a single asset class. During these trending periods, the rebalanced strategies experience a loss which is caused by the programme being forced to rebalance an appropriately underweight or overweight asset class.

Both Exhibit 2 and Exhibit 3 illustrate how critical it can be to time rebalancing events correctly. By removing the arbitrary element in the timing between the rebalancing events, most of the occasions on which the drifting strategy outperforms disappear. A TR programme is free to countermand the default rebalancing activity if the asset allocation models signal strongly trending markets. This permits the tactically rebalanced portfolio to achieve a stronger position than the drifting one, both in either a mean reverting or trending environment.

Compare the allocation patterns in Exhibit 3. Through the beginning of 1988, Tactical Rebalancing parallels the successful allocation shifts of passive rebalancing. However, when the markets exhibit trending behaviour, the TR programme is better positioned to take advantage of those trends. Over the following two years, when equities are strongly outperforming, the TR strategy has an equity allocation of greater than benchmark weight. During much of this time, its equity portion was also greater than that of the drifting strategy. When the equity allocation was rebalanced back to benchmark, it did so ahead of the bear market of 1990-1992. Of course, not all small reversals or medium-term trends will be caught by the TAA models, but even a relatively simple, value-based approach would capture the majority of these occurrences.

### A GLOBAL CASE STUDY

Tactical Rebalancing could be used to manage the asset allocation for a domestic mandate, but is particularly useful for managing more complex, global portfolios. For the initial asset mix of this simulation, we selected the WM Company All Funds universe in



the third quarter of 1995, when this research study was first initiated. We combined UK index-linked gilts (3%) into UK fixed income and we prorated the remaining asset classes to offset the absence of property (5%), as these asset classes do not have liquid futures. Within the overseas equities category, we used WM Company regional weightings and further subdivided the asset mix based on the capitalisation of those markets. Lastly, we allocated the overseas bond portion by capitalisation weighting to the top four foreign bond markets.

The simulation runs over ten years, from the beginning of January 1986 to the end of December 1995 and covers the following countries: Australia, Austria, Belgium, Canada, Denmark, France, Germany, Hong Kong, Italy, Japan, the Netherlands, Norway, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. Each asset class has ranges of 2.5% above or below benchmark. Trading is accomplished with asset class futures where available, with a cost of 20 basis points each way for equity index futures and 10 basis points for bond futures. In Austria, Belgium, Norway and Singapore, equity index futures are not available or are illiquid, so we apply physicals transactions costs of 100 basis points each way. The returns are unhedged, total returns on the MSCI indices, and the Tactical Rebalancing recommendations are driven by our TAA forecasts, which are live, unrestated figures after December 1988.

Table 1 shows the return and risk of the Tactical Rebalancing strategy, along with passive rebalancing and ad-hoc drift. A standard measure of a manager's skill is the information ratio, which is the ratio of the returns to the standard deviation of those returns. Table 1 illustrates the similarity in information ratios for passive rebalancing and TR, although Tactical

Rebalancing mildly outperforms by this measure. Lastly, the table also compares the turnover for TR with the alternative strategies.

TR added as much as 86 basis points per annum versus ad-hoc drifting and 28 basis points per annum relative to quarterly rebalancing, the best performing passive policy over the study period. While the degree of added value is modest, so is the tracking error of Tactical Rebalancing relative to the periodic rebalancing strategies.

### THE CHALLENGE OF ADDING VALUE AND CONTROLLING RISK

In order to adopt a Tactical Rebalancing strategy, a manager needs more than just a good TAA process. The process must also be highly disciplined and not incur excessive risk in pursuit of performance. TAA strategies add value in a variety of ways, some more successfully than others. For those who approach TAA in a more qualitative fashion, a few, bold tilts may determine the success or failure of a programme. Asset classes may be grouped into regions or, alternatively, only the few largest may be covered. Rule of thumb methods may be used to weigh the impact of changes in fundamental economic and financial relationships and econometric models may be used only in an advisory capacity. If blunt tools are used to set the asset mix, then the potential for adding value as well as controlling risk may well be diminished.

TAA processes with a high degree of subtlety, such as First Quadrant's, are better able to add value in most circumstances, but this subtlety becomes critical as the opportunities to add value become more constrained.

Table 1  
Returns to Tactical Rebalancing and Comparison to Passive Strategies

	Tactical Rebalancing	Monthly Rebalancing	Quarterly Rebalancing	Annualised Rebalancing	Drifting
<b>Annualised Return</b>	15.91%	15.59%	15.63%	15.49%	15.05%
<b>Annualised Risk</b>	14.82%	14.85%	14.78%	15.08%	15.37%
<b>Information Ratio</b>	1.07	1.05	1.06	1.03	0.98
<b>Annualised Turnover</b>	4.20%	12.96%	7.56%	3.60%	0.00%

Tactical Rebalancing programmes operate under very tight constraints compared to TAA programmes, so the process used for TR must be extremely rigorous and efficient. As volatility of an active process is damped down, the active return will naturally decrease. A typical Tactical Rebalancing strategy will have an annualised standard deviation of between 50 and 100 basis points. Under these conditions, the manager's ability to add value is really put to the test.

## CONCLUSIONS

A process of change is currently getting underway in the UK pensions investment market. The old paradigm, exemplified by consensus driven, competing balanced management, is coming under pressure from a number of quarters, and the shape of a new paradigm is beginning to emerge.

When a fund has gone down the route of asset liability modelling and developed a fund specific benchmark, a decision on how to manage asset allocation going forward becomes a priority. Simply drifting with the markets is no longer a serious option. The essential choice is a straightforward one between active and passive.

The active choice leads to some form of tactical asset allocation, be it subjective and judgmental, or disciplined and systematic. The passive choice points to systematic rebalancing. But there is now a third option: Tactical Rebalancing.

Tactical Rebalancing can add a modest amount of incremental return over and above that provided by plain vanilla rebalancing, but with a risk profile very close to that of the completely passive. From a risk tolerance perspective it should have some appeal to those funds which have been accustomed in the past to drifting with the markets. Because a position away from benchmark can only be "opened" by market drift, the risk should be tolerable, for it is no greater than that with which trustees have previously been prepared to live.

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## 1994 REBALANCING STUDY UPDATED THROUGH 1995

### THE “HOW?” AND “WHY?” OF REBALANCING

#### HOW DOES REBALANCING ADD VALUE?

The mechanism by which rebalancing adds value and overcomes the effects of a large return differential between asset classes is straightforward. The discipline which it imposes of buy low/sell high/book profits is remarkably powerful, acting like a ratchet mechanism, to compound a series of small benefits over time.

For purposes of illustration, let us imagine a two asset world in which we invest half our resources into each. During the first period, be it month, quarter or year, asset A outperforms asset B. At the end of this period we rebalance back to 50/50. We are thus forced to sell part of the holding of asset A which has just performed well and reinvest the proceeds in asset B which has just underperformed. Note that in doing so we are booking a profit relative to benchmark. In the second period, asset B outperforms asset A. This time we sell part of the holding of asset B and reinvest the proceeds in asset A to restore the 50/50 balance. If we are able to implement these changes in the futures markets, the costs will be a small fraction of the benefit.

Of course, the markets will not deliver a smoothly alternating set of returns from period to period. Sometimes we may see a run of periods in the same direction. This is more likely the shorter the chosen rebalancing cycle. But over time we will see the short term leadership reversing between A and B on a fairly regular basis, even if in the longer term one asset shows cumulative performance materially better than the other. Unless the longer term differential is very large, the rebalanced portfolio will probably keep pace with and may outperform the drifting portfolio. In a multi-asset world the process is slightly more complex but essentially the same.

The key point is not so much that the returns are similar, but that rebalancing does keep the portfolio in balance with longer term objectives, with more options for the future, rather than skewing the distribution further and further into one asset.

What is happening here? We are exploiting the short term noise and volatility of the markets and their tendency to overshoot in both directions in the short as well as the medium term and then to partially reverse the latest move.

#### WHY DOES THIS WORK?

The concept of risk premium is important in this context. Investors demand a higher return in the long term for holding a riskier, or more volatile asset. That is their reward for enduring the discomfort of greater short term variability. Thus riskier assets are priced such that future returns will meet those expectations. When short term enthusiasm for that asset raises the price above the trend value, absent fundamental justification for that change, such as a change in bond yields, the asset is now priced to give a below trend return in future. Other investors, perceiving this short term mispricing, will refrain from purchasing that asset or may indeed sell it, until it has reverted to a level consistent with longer term expectations of reward.

This process, known as “mean reversion” is an ever present and powerful force in the development of securities markets. Much academic work, as well as empirical practitioner experience testifies to the potency of this effect. The further that a yardstick of value strays from its mean or equilibrium level, the stronger is the pull back towards that mean - rather like a piece of elastic being stretched away from its resting position. But just like the elastic, markets are prone to overshoot and when the movement does reverse, the odds are that it will not move smoothly back to the central or mean value, but will overshoot in the other direction.

Not only does this behaviour exhibit itself across a market cycle, when we see valuation of equity go from, for example, one end of the P/E range to the other, but also in smaller ranges shorter term. Casual observation of the “jagged” progress of a line chart of the price development of a single security or entire market will give intuitive confirmation of this behaviour pattern.

Responding appropriately to valuation changes across the cycle i.e. selling markets which have moved to the top end of their valuation range and buying those which are near the bottom, forms the basis of contrarian tactical allocation disciplines. Rebalancing on a regular, passive basis captures just a little of the power of this process. For these limited purposes it is not necessary to attempt to forecast future returns, merely to respond mechanically to current returns.

# UK REBALANCING UPDATE

When we published our study in 1994 of various global asset allocation strategies, we found that disciplined rebalancing appeared to be a superior strategy over consensus active management and ad-hoc drifting.

We were careful, at that time, to test out the strategies in a variety of ways: over various different time periods - since 1919<sup>1</sup>, 1978 and 1986<sup>2</sup>, using expanding windows data and rolling 5-year periods; over various data sets - WM Company consensus returns and index returns; and over various methods of rebalancing - monthly, quarterly, annual and two different range-triggered strategies.

Under all of these alternative tests, quarterly rebalancing had the highest information ratio (return/risk). Additionally, over the main data period of January 1986 to March 1994, quarterly rebalancing actually earned higher returns than either ad-hoc drifting or consensus management

We find that the performance of the assorted passive strategies does not change substantially with the update of the study to the end of December 1995, even though the relative returns to UK equities over UK bonds widened to over 3% over the full ten year time span since January 1986, as shown in Table 1.

In our initial study, we were able to establish an empirical connection between high return differentials - the amount by which equities beat bonds - and the performance of a drifting strategy. Thus, over the 21 months of new data shown below in Table 2, when the return differential widens to almost 6%, the information ratio of the drifting portfolio matches that of quarterly rebalancing and drifting outperforms in absolute return terms.

Due to the recent underperformance of the WM consensus relative to either of the passive solutions, consensus management now holds the least favourable position in a risk/return spectrum.

Table 1 (January 86 - December 95)

	Asset Class Returns		Drifting	Period Rebalancing			Trigger Rebalancing	
	UK Equities	UK Bonds		Monthly	Quarterly	Annual	To Bounds	To Norm
<b>Annualised Return</b>	15.11%	12.05%	13.69%	13.95%	13.99%	13.84%	13.67%	13.83%
<b>Standard Deviation</b>	17.67%	7.52%	13.35%	12.77%	12.69%	13.01%	13.27%	12.99%
<b>Information Ratio</b>	0.85	1.60	1.03	1.09	1.10	1.06	1.03	1.07
<b>End Mix Equities</b>	—	—	79%	74%	74%	74%	79%	76%
<b>Turnover</b>	—	—	0%	8.55%	4.77%	1.98%	0.25%	1.55%

[Data Source: WM All Funds; initial asset allocation as of end Dec 1985 ex property]

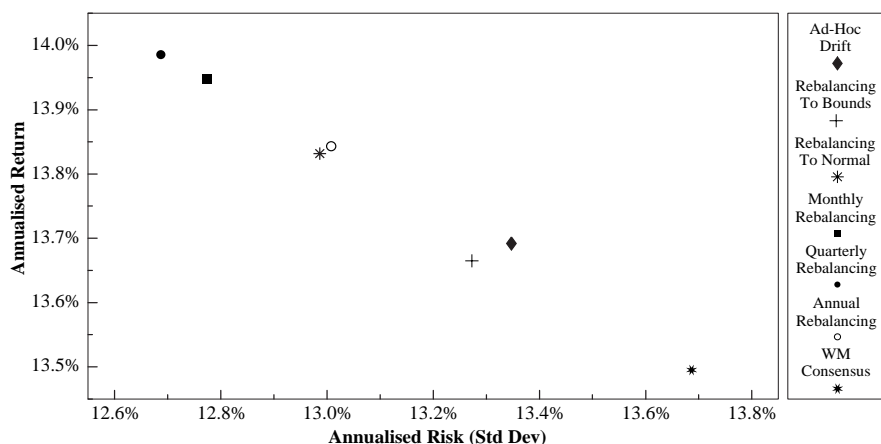
Table 2 (April 94 - December 95)

	Asset Class Returns		Drift	Quarterly Rebalancing	WM Consensus
	UK Equities	UK Bonds			
<b>Annualised Return</b>	15.24%	9.32%	12.32%	11.89%	10.80%
<b>Standard Deviation</b>	10.19%	6.14%	8.31%	8.05%	9.12%
<b>Information Ratio</b>	1.50	1.52	1.48	1.48	1.18
<b>End Mix Equities</b>	—	—	79%	74%	82%

[Data Source: WM All Funds]

- (1) Index returns alone were considered for this period.  
 (2) This period allowed us to consider monthly data, which was not available from the WM Company prior to 1986. We also focused on this period for the comparison with the WM All Funds universe.

**Exhibit 1  
Return/Risk Spectrum  
WM All Funs 8601-9512**



Source: Internal; Jan 86 - Dec 95

In Exhibit 1, we find that a) quarterly rebalancing is the best performing strategy; b) ad-hoc drift and *rebalancing to bounds*<sup>3</sup> are the least successful of the passive strategies; and c) the WM consensus is the clear under-performer over this period. It is pertinent to note that range rebalancing in the form of *rebalancing to normal* can perform as well as the periodic rebalancing depending on the ranges used. At the current +/- 5% ranges, it performs similarly to annual rebalancing. When those ranges are tightened, it works similarly to quarterly or monthly rebalancing.

Table 3 below shows the performance of the WM consensus relative to drifting and quarterly rebalanced strategies as pictured above and shown initially in Table 1. But there is an added comparison strategy, *Rebalance Quarterly to Matching Mix*, which requires a note of explanation.

In our initial study, we saw the equity allocation in the WM consensus rocket up from 74%<sup>4</sup> in January 1986 to 87% at its peak in mid-1995 (Exhibit 2). As the *default* rebalancing strategies earned higher returns than the WM consensus achieved, we tried the experiment of lowering the equity portion in the rebalancing benchmark until the returns nearly matched. Rebalancing quarterly to a mix containing only 50% equities would have earned 5 basis points more than the WM consensus from January 1986 to 1994.

Since the WM consensus has performed even less profitably over the expanded time period, the matching mix now can perform equivalently when rebalanced to a portfolio containing only 40% equities. We would hasten to note, however, that this result is sensitive to initial conditions and that we would not suggest a

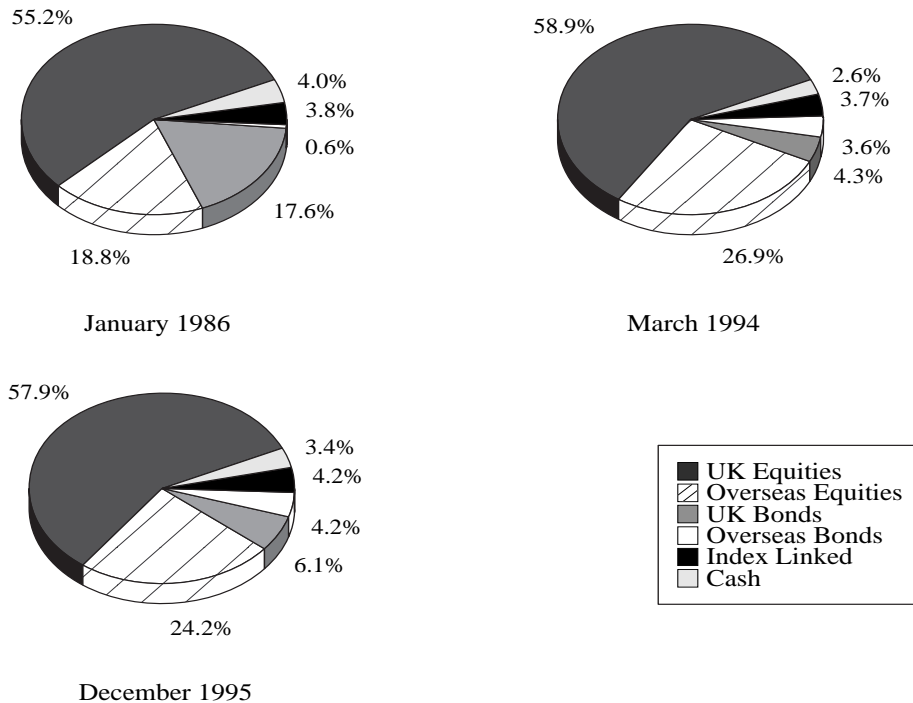
Table 3

	WM Consensus	Drift	Rebalance Quarterly	
			to Initial Mix	to Matching Mix
<b>Annualised Return</b>	13.49%	13.69%	13.99%	13.54%
<b>Standard Deviation</b>	13.69%	13.35%	12.69%	9.44%
<b>Information Ratio</b>	0.99	1.03	1.10	1.43
<b>End Mix Equities</b>	82%	79%	74%	40%

<sup>(3)</sup> Rebalancing to bounds consists of an incomplete range rebalancing strategy, in which the asset mix is rebalanced only just to within the upper or lower bounds, rather than fully back to benchmark allocation, when ranges are breached by market movement.

<sup>(4)</sup> Allocations stated are excluding property holdings.

Exhibit 2  
**WM Consensus Asset Allocation**  
 (excluding property)



policy of reducing equity allocation to this extent for most funds. It is, however, an interesting result in light of the continuing conviction of most market participants that equities are the only place to be.

The main point of this exercise is to show that the theoretical *cost* of investing a larger portion of a fund in bonds is not nearly as high as one might think, and can more than pay for itself by a switch in asset allocation from consensus benchmarking to disciplined rebalancing. A glance at the changing allocation over the past two years suggests that pension funds are already reversing some of the run-up in equity content that they put on in the previous decade. Our research shows that this may be a wise choice not only from a risk standpoint, but also from a return standpoint, if the overall investment strategy is reviewed at the same time.



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