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Invited Editorial

The importance of sector constraints

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ABSTRACT History provides plenty of examples of individual sectors reaching unsustainable market capitalizations relative to the total value of the market. When these sector weights fall back, it can be catastrophic for investors. Examples include energy in the early 1980s, the post millennium tech bust and the recent crisis in the financial sector. Getting in and out of the right sectors at the right times is difficult for several reasons, including the nature of the economy and the limitations of models that rely on macroeconomic variables as inputs. Previous studies suggest that putting a cap on sector weightings allows investors to avoid the most serious damage from these 'sector corrections'. We find support for this at the broad MSCI Global Industrial Classification Standard sector level using 20 years of data.

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SECTOR INVESTING AND THE BUSINESS CYCLE

Business cycles, or the short-run fluctuations in aggregate economic activity around a long-run growth path, do not occur at regular or predictable intervals. They are *recurrent but not periodic* (Zarnowitz, 1992), meaning the economy's ebbs and flows do not resemble an orderly series of repeatable patterns of similar magnitude and duration. What are referred to as cycles are really reactions to varied and random shocks from a variety of sources, including *global* (for example, China), *institutional* (for example, regulatory), *endogenous* (for example, technology) and *exogenous* (for example, central bank policy) shocks.

This means that 'Investing along the business cycle' requires the ability to forecast these shocks ahead of time and to anticipate sector performance accordingly. However, the varied constellations of economic conditions around these events make them somewhat one time affairs, unlikely to repeat themselves in ways similar enough to offer guidance for investors. Even if they did, it can be argued that markets learn and update (rational expectations), which means that the timing of performance among economic sectors would vary from one cycle or shock to the next. Perhaps that is why a recent investment study by Stangl *et al* (2007) that rotated sectors according to conventional wisdom over the past 9 post-WWII cycles found that, even with perfect hindsight, investors would have realized at best marginal outperformance insufficient to cover transaction costs[1].

BUILDING TOP-DOWN MODELS

Another approach to active sector investing uses various macroeconomic variables like exchange rates, interest rates and oil prices to forecast sector returns or earnings directly. *Prices lead quantities* is a key theme of many of these models. That is, quantity data like unemployment, GDP, consumer spending and so on, has to be counted and therefore is only available with a lag, making it backward-looking or at best coincident. Quantity data is also often based on sampling, making it subject to frequently large revisions, once more complete data become available. *Price data,* on the other hand, are forward-looking and have forecasts embedded in them. Price variables like interest rates and commodity prices are determined by supply and demand. They summarize the forward-looking expectations of the often millions of market participants who determine their magnitude. That is why it is often asserted that prices set in markets contain more information about the future than any single analyst could possess (Hayek, 1945).

Unfortunately, these 'market-based' models all suffer from what has been called 'the signal extraction problem'. That is, because market price variables are driven by supply and demand factors, the same 'signal' – like a rise in currency values – can have entirely different investment implications depending upon which influence, supply or demand, is driving it.

For a simple example take interest rates, which are determined by the supply and demand for loanable funds. Economic expansions usually result in an increase in the demand for loanable funds, which puts upward pressure on interest rates. On the other hand a reduction in the *supply* of loanable funds – perhaps because of central bank tightening – will also put upward pressure on interest rates. The demand-driven interest rate rise in the first case is bullish for investors in general because it reflects an expanding economy, while the supply-driven interest rate rise is bearish because it reflects less loan availability. Quantitative time series models that use interest rate movements as inputs will mix these two very different types of signals together, distorting the forecasting result rather than improving it.

Another example would be the supply shock-induced oil price increases of the 1970's, which were bearish, versus the global demand-driven price increases of the 2004–2008 period, which were bullish. Trained economists miss this routinely. For example, in August 2004 more than a third of the 56 economists that made up the *Wall Street Journal*'s forecasting survey felt that oil in the US$50–$59 range could lead, in a year's time, to recession. This view was revised a year later with 8 out of 10 believing that it would take a rise to more than $80 a barrel to bring on recession (Hilsenrath and Annet, 2005). Of course, when recession did occur in December 2007 the price of oil was

over $90, and the recession was widely attributed to the global financial crisis, not the price of oil, which plummeted as the recession worsened. There was clearly little comprehension at the time (though there is now) of the importance of discerning whether the higher oil price was demand driven or supply driven.

PASSIVE SECTOR APPROACHES

These hurdles to forecasting provide considerable rational for the use of more passive sector allocation strategies. Chief among these is to just hold the current market capitalization-based weights. The argument here rests on a straightforward assumption of efficient markets: Any weighting other than the market weight reflects a bet against the market, suggesting that the market is inefficient or mispriced (Jones, 2008).

Standing somewhat in contrast to this view is the notion that markets do not price sectors efficiently, at least in the short term. That is, at any point in time some sectors are overvalued and some are undervalued. This is somewhat analogous to the case for over- or underweighting individual securities. Holding all sectors at current market weights would thus mean overweighting the overvalued sectors and underweighting the undervalued sectors (Arnott *et al*, 2008), which is the opposite of what a sector strategist would want to do.

SECTOR CAPS

A promising middle ground strategy that does not rely on sector forecasting models or upon the passivity of assuming market efficiency lies in applying sector weight limits or 'caps'.

Writing in the May 2007 volume of the *Journal of Asset Management*, authors Stanley G Eakins and Stanley Stansell examined the optimal portfolio strategy across 19 sector funds for the December 1995–December 2002 period. Starting with an equal weighting of 5.26 per cent in each sector, they analyzed the returns that could be achieved by rebalancing when any one sector grew to a trigger threshold. By evaluating different trigger points they determined that the optimal portfolio returns were achieved when the portfolio was rebalanced when any sector grew to more than 9 per cent of the total portfolio value. Higher returns were achieved with a 10 per cent threshold, but with the cost of a higher standard deviation. Nine per cent had the highest Sharpe ratio. The authors' straightforward conclusion was that *consistent* rebalancing 'reduced investor exposure to sectors that have grown rapidly and may experience reduced performance'.

We conducted a similar study using the broader 10 MSCI Global Industrial Classification Standard sector codes over a longer 20-year period.[2] We sought to improve upon the performance of the S&P 500 Index by utilizing monthly rebalancing to maintain an upper capitalization on sector allocation as a percentage of total portfolio value. When sector weights exceeded the

Table 1: Investment performance across sector constraints

Description	*Returns*			
Cut off	*Absolute annual return (in percentage)*	*Sigma (in percentage)*	*Return/risk (in percentage)*	*Maximum drawdown (in percentage)*
10%	7.3	17.2	42.5	48.8
15%	6.7	17.9	37.6	50.5
20%	6.4	18.1	35.4	51.4
25%	6.3	18.2	34.6	51.4
30%	6.2	18.2	34.0	51.4
S&P 500	6.20	18.30	33.90	51.40

Table 2: Year-by-year results: 10 per cent strategy versus S&P 500 Index

Description		*10 per cent cap*				*S&P 500*			*Comparisons*	
Year	*Absolute annual return*	*Standard deviation*	*Return/risk*	*Maximum drawdown*	*Absolute annual return*	*Standard deviation*	*Return/risk*	*Maximum drawdown*	*Return/risk 10 per cent minus market*	*Maximum drawdown market minus 10 per cent strategy*
1989	2.0	8.7	22.98850575	7.1	2.0	8.7	22.98850575	7.1	0	0.0
1990	–2.7	15.9	–16.98113208	18.9	–3.1	16.1	–19.25465839	19.2	2.27352631	0.3
1991	29.0	14.1	205.67375890	12.9	30.5	14.3	213.28671330	14	–7.612954421	1.1
1992	7.9	9.5	83.15789474	5.5	7.6	9.7	78.35051546	5.6	4.807379273	0.1
1993	11.3	8.6	131.39534880	4.4	10.1	8.6	117.44186050	4.8	13.95348837	0.4
1994	2.2	9.8	22.44897959	8.6	1.3	9.8	13.26530612	8.5	9.183673469	–0.1
1995	37.8	7.6	497.36842110	2.4	37.6	7.8	482.05128210	2.6	15.317139	0.2
1996	21.1	11.3	186.72566370	7.4	23.0	11.8	194.91525420	7.4	–8.18959052	0.0
1997	31.8	16.9	188.16568050	9.9	33.4	18.1	184.53038670	10.8	3.635293733	0.9
1998	25.2	18.1	139.22651930	16.8	28.6	20.3	140.88669950	19.2	–1.66018017	2.4
1999	15.0	15.5	96.77419355	11.3	21.0	18.1	116.02209940	11.8	–19.2479059	0.5
2000	1.9	17.8	10.67415730	12.2	–9.1	22.2	–40.99099099	16.6	51.66514829	4.4
2001	–9.3	18.4	–50.54347826	23.9	–11.9	21.5	–55.34883721	35.7	4.805358948	11.8
2002	–20.3	25.1	–80.87649402	39.6	–22.1	26.0	–85.00000000	47.4	4.123505976	7.8
2003	27.2	16.1	168.94409940	36.5	28.7	17.1	167.83625730	45.4	1.107842069	8.9
2004	14.4	10.7	134.57943930	12.1	10.9	11.1	98.19819820	25.6	36.38124105	13.5
2005	6.1	10.5	58.09523810	6.8	4.9	10.3	47.57281553	19.5	10.52242256	12.7
2006	18.5	9.9	186.86868690	7.0	15.8	10.0	158.00000000	11.5	28.86868687	4.5
2007	9.9	15.7	63.05732484	9.3	5.5	16.0	34.37500000	9.9	28.68232484	0.6
2008	–35.1	40.2	–87.31343284	48.3	–37.0	41.0	–90.24390244	50.7	2.930469603	2.4
2009	–17.7	14.1	–125.53191490	48.8	–18.2	14.7	–123.80952380	51.4	–1.722391084	2.6

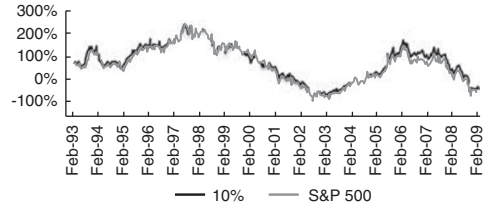

Figure 1: Three-year moving average Sharpe ratio.

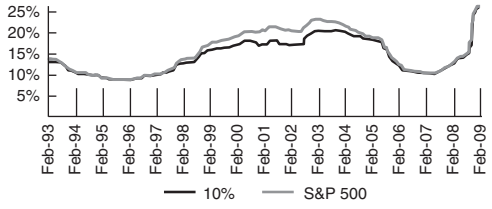

Figure 2: Three-year moving average volatility.

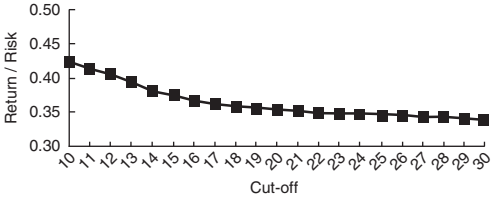

Figure 3: Risk return profile.

threshold, the excess weight was allocated to other sectors on a pro rata basis within the cap limits. No assumptions were made for transaction costs, taxes, management fees and other frictional costs.

Our study looked at the period from September 1989 to February 2009, comprising 19 full calendar years. We looked at maximum sector caps or ceilings between 10 and 30 per cent. The results, summarized in Table 1 below, indicate that a 10 per cent cut off or maximum sector weight produced the best return/risk tradeoff, where return is measured by absolute annual return and risk is measured by the annualized standard deviation of daily returns. Rebalancing the S&P 500 Index on a monthly basis with a 10 per cent sector cap produced annual returns in excess of 1.1 per cent over the S&P 500. The 10 per cent cut off also produced the lowest maximum drawdown.

Looking at batting averages, the 10 per cent cap with monthly rebalancing produced a higher risk/return ratio in 14 years, or 73 per cent of the time over the 19 full-year periods. It produced a lower maximum drawdown in 18 years, or 95 per cent of the time. These results are calculated from the far-right columns of Table 2.

Using the 3-month US Treasury Bill for calculating the Sharpe ratio, along with the annualized standard deviation of daily returns on a 3-year moving average basis, we also found that the rebalanced S&P 500 Index with a 10 per cent cap has a better Sharpe ratio (Figure 1) and reduced volatility (Figure 2) relative to the S&P 500.

Finally, Figure 3 indicates that the benefits, as measured by the return/risk profile, of placing a cap on sector weights makes sense up to about 15 per cent, but beyond that the gains from sector constraints are small.

CONCLUSION

Using data from September 1989 through February 2009, we have shown that investors may benefit by imposing caps or maximums on sector weights. Our study suggests that the best results can be achieved when sectors are rebalanced on a monthly basis whenever a particular sector exceeds 10 per cent of the value of the overall market. We feel that these results suggest that sector limitations may help investors mitigate the recurrent but unpredictable sector collapses that characterize the investment climate.[3]

NOTES

1. Conventional Wisdom refers to the upstream/downstream sequence of materials outperforming coming out of a cyclical trough, followed by industrials (manufacturing), consumer durables consumption, etc., popularly summarized in Stovall (1996).
2. The results of this study are based on various hypothetical assumptions and historical data. Past performance is not necessarily indicative of future results. The results of this study are for general informational purposes and are in no way to be construed as investment advice or reflective of

South Texas Money Management's actual investment performance or investment practices.

3. Results of this study are provided for informational purposes and do not constitute a solicitation or offer to subscribe for or purchase any securities or investment services. Results of this study are not intended to provide a sufficient basis on which to make an investment decision. Past performance should not be taken as an indication or guarantee of future performance, and no representation or warranty, expressed or implied is made regarding.

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