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Currency Research
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MS Global Risk Demand Index

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Introducing the MS Global Risk Demand Index

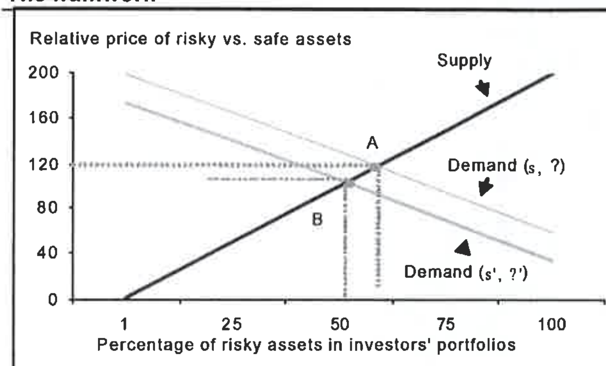
Monitoring developments in the market's risk demand can be extremely useful in helping investors guard their portfolios against increases in risk aversion and/or risk. The GRDI is a simple and effective tool of monitoring such changes as it looks at ten different asset classes and gives an overall judgement on whether the global risk demand is sufficiently low to warrant the scaling back of exposure to riskier assets.

Risk, risk aversion, and risk demand

Recent concerns about the speed and pace in the retrenchment of global liquidity have once again highlighted the importance of measuring risk and risk aversion. Although these latter two terms are often used interchangeably, an important difference distinguishes them: while risk aversion represents investors' willingness to take risk, risk itself represents the distribution of possible investment outcomes. Both affect demand for risky assets. While risk aversion and risk are very difficult to estimate individually – not only because they are influenced by a myriad of personal and non-observable variables, but also because they are closely inter-related – the net effect on demand for risky vs. safe assets is easily observed in market price action. As shown in Exhibit 1, assuming the supply of risky vs. safe assets is unchanged, changes in risk aversion (?) and risk (s) both influence the demand for risky vs. safe assets. More specifically, higher risk aversion (?') and/or higher risk (s') will shift risk demand to the left and lead to a lower price of risky vs. safe assets as well a lower percentage risky assets. In the paragraphs that follow, a simple and intuitive gauge of changes in net risk demand is introduced: the Morgan Stanely Global Risk Demand Index (GRDI).

Exhibit 1

The framwork



The nuts and bolts of the GRDI

To correctly gauge changes in risk demand from the price performance of risky assets relative to safe ones, a broad variety of asset prices need to be monitored. This is so for two reasons. First, the only way to adequately capture shifts in the risk demand driven by changes in risk aversion is to monitor different asset classes – if all risky assets outperform non-risky ones, then a shift in risk aversion is likely. Second, as it is very difficult to predict where the next financial crisis will develop, monitoring different markets maximizes the possibility of capturing early warning signs of pending risk demand changes. More specifically, the GRDI monitors the relative performance of the following assets:

- EMG vs. developed market bond performance;
- Base metals vs. precious metals performance;
- Cyclical vs. non-cyclical equity performance;
- Equity vs. bond market performance;

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- FX, bond, and equity market volatility. Here FX volatility captures two aspects: both the level of volatility as well as the steepness of the volatility curve;

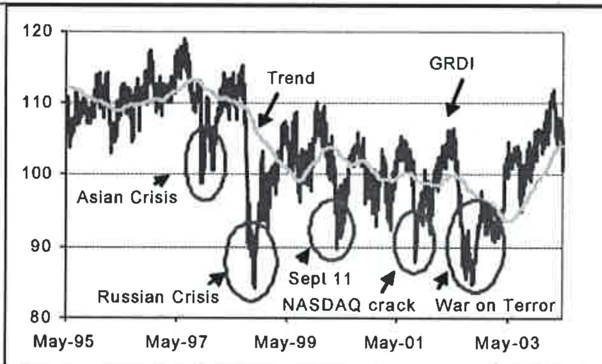
- Credit market performance – high yield vs. high grade credit and high grade credit vs. government bonds;

- Swap spreads.

The above mentioned relative performances are translated into ten distinct daily indices monitoring changes in risk demand in each asset class*: a higher reading represents higher appetite for risk and/or lower risk. The combination of such indices into the GRDI is done by a simple geometric average †. The final outcome is highlighted in Exhibit 2. As can be seen, not only does the GRDI capture significant drops in risk demand associated with crises such as September 11, but it also captures broader trends. For example, the massive financial market deleveraging which took place following the Russian crisis of 1998 is captured by the steady downtrend of the GRDI. This trend was reversed only in 2002 when the USD's aggressive Fed rate cutting cycle started to boost investment in higher yielding assets.

Exhibit 2

The GRDI

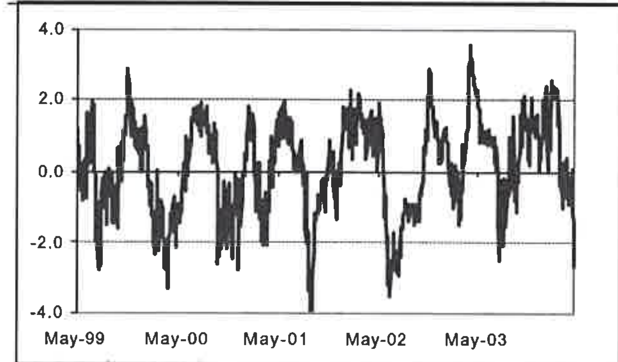


Source: Morgan Stanley and EcoWin

Although the GRDI illustrated above is ideal for gauging broader trends, a more practical measure that will help investors gauge short-term fluctuation in risk premia relative to longer term trends is needed. To this aim, the GRDI is standardized and transformed to have a mean of zero. Exhibit 3 shows the outcome: a positive reading represents higher appetite for risk and/or lower risk; conversely, a negative reading represents low appetite for risk and/or higher risk.

Exhibit 3

The Standardized GRDI



Source: Morgan Stanley and EcoWin. Note that a high reading suggests low risk aversion and/or risk, while a low reading suggests high risk aversion and/or risk

Having created this index, the litmus test is to gauge how it performs in times of crisis. To do this, an event study was performed on the standardized GRDI. This was done by identifying several crises since 1995 and studying how the index behaved in the days leading up to and following the crisis date. As can be seen in Exhibit 4, the behavior is consistent with that of an early warning indicator. Ten days prior to the crisis the standardized GRDI started to move from positive into slightly negative territory – highlighting the rising demand for risk - and then fell sharply into negative - indicating a sharp increase in risk and/or risk aversion –the day after the crisis. Interestingly, it has taken the index an average of 20 days to move back to neutral.

A practical application of the GRDI to FX

Market participants' interest in early warning systems capturing changes in risk demand stems from the desire to protect their investments. Much like in the current environment, a number of different themes can drive such portfolio shifts. Nonetheless, the FX market experience over the past few decades highlights a couple of regular patterns. First, money tends to flow from lower yielding currencies to higher yielding ones – this is also known as the 'forward bias'. Second, in times of higher risk aversion and/or higher risk investors tend to favor 'safe haven' currencies. Generally speaking, currencies tend to be considered 'safe havens' if they either have deep liquid markets or are seen as being relatively immune from geo-political risks.

The USD, JPY, EUR, and CHF are generally considered 'safe havens' currencies. To test the usefulness of the GRDI in trading FX, two baskets of daily returns are constructed, each reflecting the above-mentioned patterns:

* The data are daily and date back to 1995.

† It is worth noting that 'principal component analysis' was used to combine the indices in a single risk premium measure. However, this technique was discarded on two grounds: first, the weights were not stable over time; and second, the signs of the weights were often counterintuitive. As a result, the more simple, but much more practical, geometric average option seemed to be superior.

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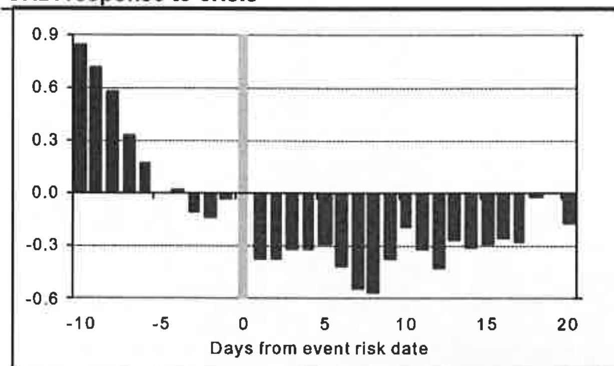
Exhibit 4

GRDI response to crisis



Source: Source: Morgan Stanley and EcoWin. Note that the following risk events were used as reference to study the reaction of the MSGRAI: Asia 97, Russia 98, Brazil 99, Nasdaq 00, Sept 11, war Afghanistan/Iraq.

- **Forward bias basket.** Every day 3-month rates are ranked across all G10 currencies – USD, EUR, JPY, GBP, AUD, CAD, NZD, SEK, NOK, CHF. The basket invests in the 4 highest yielding currencies by borrowing in the 4 lowest yielding ones.

- **Risk basket.** This basket always invests in currencies perceived to be risky – AUD, CAD, NZD, GBP, SEK, and NOK – by funding the basket in 'safe haven' currencies– EUR, USD, JPY, and CHF.

As both the forward bias as well as the flight to safety both influence FX markets, a final combination basket is compiled by investing 50% in the forward bias basket and 50% in the risk basket.

To test the usefulness of the GRDI, two separate daily trading rules are applied to each basket: in the first strategy a long exposure to both baskets is kept regardless of the reading of the standardized GRDI while in the second one, a long exposure to each basket is kept as long as the standardized GRDI signals average or above-average risk demand. In times of particularly low risk demand, the baskets are traded for the short side. Interestingly, the unconditional strategy worked best for forward bias basket, while the strategy conditional on risk demand worked best on risk basket. In addition, the combination of the unconditional forward bias and the conditional risk baskets yielded superior results to any of the individual trading strategies. This finding suggests an interesting point: while the forward bias is still a very valid strategy, the results can be significantly improved by adjusting the final weights depending on the overall level of the risk demand. Exhibit 5 details such results (the cut-off chosen as a threshold for the standardized GRDI defining a high risk demand environment was -1.1, the level that maximized the Sharpe ratio of the combination basket).

A few additional points are worth making:
First, as seen in Exhibit 6 the pull backs in cumulative returns have been relatively minor. Indeed, as highlighted in Exhibit 5, in the 1995 to date period, not only has the maximum quarterly loss been limited to only 5.32%, but the Sharpe ratio reached 1.50.

Exhibit 5

Trading rule statistics

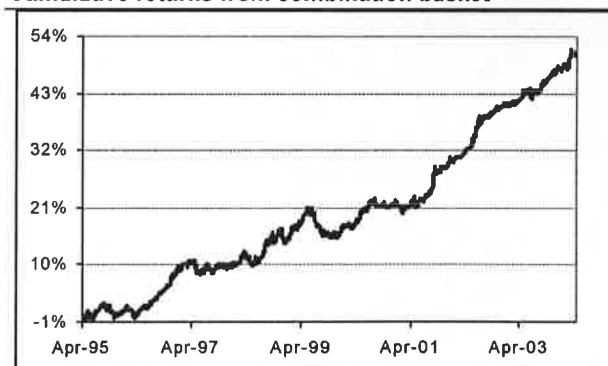
Unconditional forward	Conditional bias basket	Combo risk basket	Basket
Annualized return	4.87	6.02	5.44
Max gain: quarterly	8.54	11.72	7.91
Max loss: quarterly	-7.11	-8.43	-5.32
Sharpe Ratio	**1.07**	**1.12**	**1.50**

Source: Morgan Stanley and EcoWin

Second, Exhibit 7 highlights the distribution of daily returns of the unconditional forward bias basket, the conditional risk basket, and the combination basket and compares them to a normal distribution. As can be seen, not only does the combination strategy greatly reduce the fatness in the tails of the distribution of the returns of the individual baskets, but its tails are even thinner than those of a normal distribution. The combination basket also has a higher mean than the unconditional forward bias basket.

Exhibit 6

Cumulative returns from combination basket



Source: Morgan Stanley and EcoWin. Note: no reinvestment is made

Thirdly, Exhibit 8 highlights the Sharpe ratio of each currency pair in the combination basket. As can be seen, some Sharpe ratios are low and in some cases even negative. Although such a finding may appear to suggest the removal of such pairs from the baskets, simulations show that doing so sharply reduces the Sharpe ratio of the combination basket. This indicates that even currency crosses such as the EUR – with a Sharpe ratio of -0.44 - add value as they perform well when other currencies are down. Indeed, the Sharpe ratio of the combination basket is significantly higher than that of any of its components.

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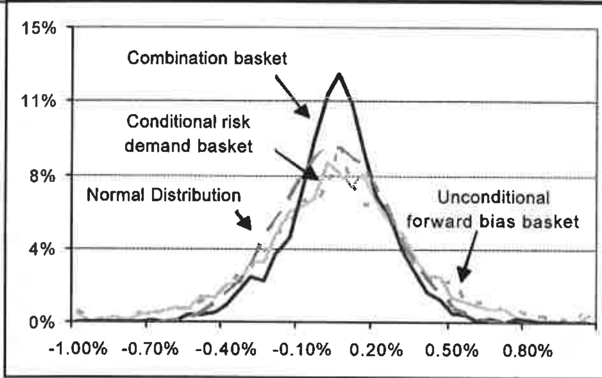
Exhibit 7

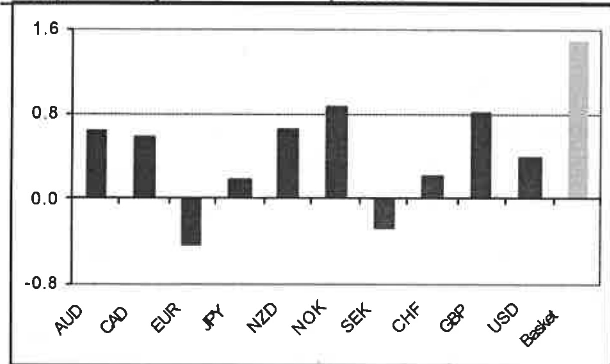
Distribution of returns



Source: Morgan Stanley and EcoWin

Exhibit 8

Sharpe ratio by individual component



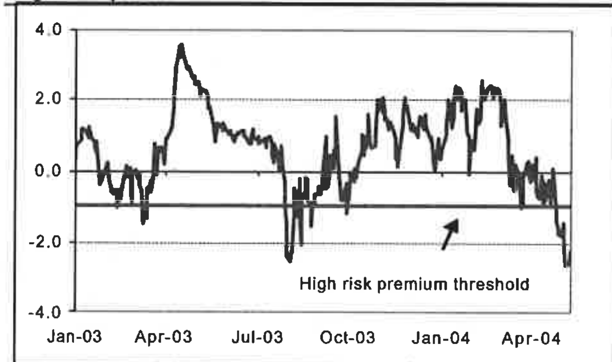
Source: Morgan Stanley and EcoWin

Conclusions

The bottom line is that monitoring developments in the markets' risk demand can be extremely useful in helping investors guard their portfolios against increases in risk aversion and/or risk. As highlighted above, the GRDI is a simple and effective tool of monitoring changes in risk demand in several assets classes and giving an overall judgement on whether the global risk demand is sufficiently low to warrant the scaling back of exposure to riskier assets. The above mentioned combination trading rule should be seen as the first step towards future research seeking to exploit the informational content of the GRDI. The next steps will be to test whether the GRDI can help in trading EMG currencies, as well as whether the performance of our Model Portfolio can be enhanced by incorporating a measure of risk demand. In the meantime, Exhibit 9 and 10 highlight the current reading of the standardized GRDI and the recommended G10 FX allocation stemming from the combination basket. Not surprisingly, while the forward bias basket still recommends investing in high yielding currencies, the weights of the combination basket reflect a reduced exposure to riskier currencies in favour of safe haven ones as the standardized GRDI currently points to extremely low risk demand.

Exhibit 9

High risk premium?



Source: Morgan Stanley and EcoWin

Exhibit 10

Weights suggested by current GRDI reading

	Unconditional forward bias basket	Conditional risk basket	Combination Basket
USD	-0.25	0.25	0.00
EUR	0.00	0.25	0.25
JPY	-0.25	0.25	0.00
GBP	0.25	-0.17	0.08
AUD	0.25	-0.17	0.08
CAD	0.00	-0.17	-0.17
NZD	0.25	-0.17	0.08
SEK	0.25	-0.17	0.08
NOK	-0.25	-0.17	-0.42
CHF	-0.25	0.25	0.00
		Standardized MSGRDI	*-2.22*

Source: Morgan Stanley and EcoWin

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