# The EMA *Phoenix:* Shorting on Market "Hype"

Because of their volatility, emerging markets offer ample shorting opportunities for investors. Our Phoenix *model which identifies oversold markets can also be used to identify overbought extremes. In this issue, we introduce a new index for determining market tops. A statistical analysis of past "bear warnings" provides risk/return estimates for alternative time horizons. This profile can be used in developing shorting strategies.*

The need to identify emerging markets tops can hardly be overemphasized. Taken as an asset class, emerging markets are about 70% more volatile than the US market (Chart 1). On the downside, this means that investors who fail to foresee a coming bear phase stand to lose much more from an emerging market portfolio than from a comparable one in the US. On the upside, particularly for aggressive investors, being able to accurately

CHART 1: MARKET VOLATILITY - U.S. VS. EMERGING MARKETS
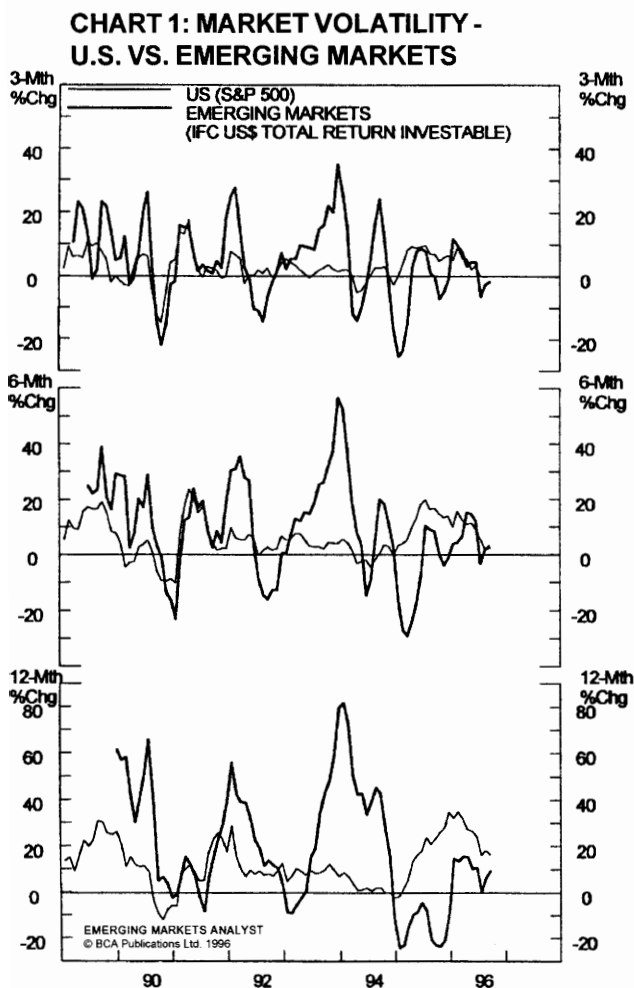
predict market peaks could yield large gains from shorting. The purpose of this article is to develop such a strategy for emerging market investors.

Long-term value and investors' "hype"

In the October 1995 issue of the *Emerging Markets Analyst* we presented our *Phoenix* model for picking "under-hyped" emerging markets.[1] The general framework of the model is based on market deviation from long-term "fair value." Such deviations are attributed to investors' "hype": excessive optimism causes the market to exceed its long-term fair value, while excessive pessimism makes it fall short of such value.

Our basic starting point is long-term fair value, measured as the present value of expected future earnings. One straightforward way of determining this present value is to discount future earning projections by the prevailing "normal" rate of return (adjusted for risk).[2]

The measurement of long-term fair value is not an objective procedure, of course. Among other things, it depends on choosing the right time horizon, on the accuracy of earnings predictions, and on using the proper measure for the "normal" rate of return. The important point, however, is that, irrespective of how it is measured, long-term fair value is a *slowly changing magnitude.*

The implication is that much of the market's short- and medium-term variability comes from fluctuating "hype" — that is, from strong swings of optimism and pessimism. The main reason is the irrational herd behavior of retail investors. Excessive greed causes many to jump onto a rising market as it approaches a peak, while mounting fears make them sell in panic just as the market is about to bottom. Institutional investors are aware of these pitfalls, but because of their need to "beat the average" they, too, cannot venture far from the herd. The net results is that "hype" swings tend to be self-reinforcing.

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[1] The general principals underlying the *Phoenix* model, together with a detailed explanation of the Market Hype Index are given in our 1996 *Guide to the EMA Indicators.* If you have not received this guide, please contact our circulation department.

[2] Note that this concept of long-term fair value is different from *EMA's* standard Valuation Indicator. The later is a composite index, combining P/E and stocks-to-bonds ratios, so its emphasis is on current rather than long-term earnings. Also, although changes in interest rates affect the Valuation Indicator through their impact on bond prices, this is partly offset by the similar effect of interest rates on equity prices.

However, *excessive* optimism or pessimism do not last indefinitely. Beyond a certain point, the market's deviation from its long-term fair value becomes obvious. A reversal of investors' "hype" then follows, with the usual consequence being a sharp rise in the market price.

Based on this framework, our *Phoenix* model is designed to select markets whose "hype" is just ready to surge. In what follows, we use a similar approach to identify markets which are just about to top.

Identifying emerging-market declines

As noted, equity prices are affected by long-term fair value, interest rates and "hype." Because these three factors, and particularly "hype," cannot be accurately modeled, market movements are inherently difficult to forecast. However, whenever some or all of these components move into *extreme* positions, forecasts could be made with a reasonable degree of confidence. The *Phoenix* model uses this principle, focusing exclusively on market "hype." In order to develop a shorting strategy based on market tops, however, it is also necessary to consider earnings and interest rates.[3]

Our strategy is based on the construction of a composite index, incorporating proprietary estimates of long-term earning growth, future changes in liquidity (which will affect the "normal" rate of return) and the prospects for swings in "investors' hype." The resulting index, standardized on the basis of its past history, is our basic point of departure.

The significance of this index is in assessing the *likelihood of market turns*. We shall therefore dub it the "**Turning-Point Index**," or *TPI*. A high reading on the *TPI* means a greater probability of a downturn, whereas a low reading suggests a larger possibility of an upturn. In this article we concentrate only on the former. The main purpose is to identify possible shorting opportunities

Chart 2 illustrates the working of our algorithm with respect to the entire emerging markets universe, as defined by the International Finance Corporation

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[3] The principal reason is the inherent asymmetry between bull and bear markets. Because earnings usually trend upward, the long-term bias of equity prices is positive. This means that the risk of issuing a false "bear warning" is generally greater than the risk of a wrong prediction of a bull run. In addition, shorting often involves buying on margins, so the cost of a wrong bet is amplified. The bottom line is that "bear warnings" require more "fine tuning," so changes in earnings and interest rates must be taken into account.

(IFC). The top panel plots the $-denominated investable total return index. The bottom panel contains the *TPI* along with its six-month moving average. The difference between the *TPI* and its moving average provides a measure of momentum, i.e. the extent to which the *TPI* is accelerating or decelerating. This momentum indicator is plotted in the middle panel.

Now, our goal is not only to identify market declines, but also to minimize the risk of false alarm. For this reason, we use two different criteria. First, the moving average of the *TPI* must exceed a predetermined entry point (set to 1 in the bottom panel). The purpose is to exclude intermediate declines which are often short-lived and followed by a resumed bull-run. The second criterion is that momentum should be positive and falling, or that it exceeds a predetermined entry point (set to 2 in the middle panel). These latter conditions would affirm that the downturn has already started or is imminent in the very near future.

Using these criteria, our algorithm correctly identified the two emerging-markets declines of

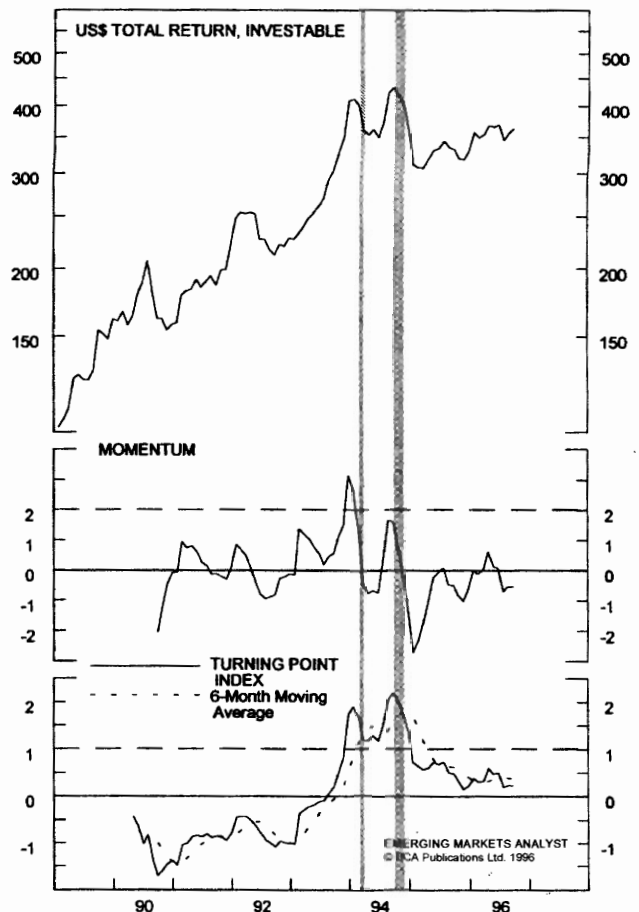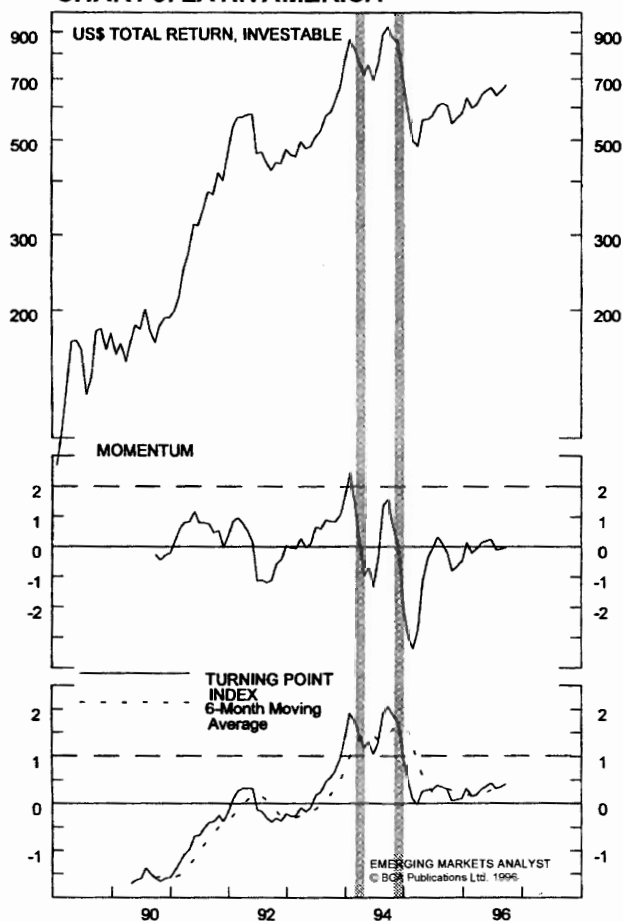### CHART 2:
ALL EMERGING MARKETS

CHART 3: LATIN AMERICA

CHART 4: ASIA

1994. It triggered three "bear warnings" – for March and then for October and for November (marked by shaded areas). The early 1992 peak did not trigger a "bear warning" because the moving average of the TPI was below the entry point. Also note that although the TPI's momentum moved above its entry point in early 1994, this did not yet signal a market decline because the TPI's moving average was still too low (below 1).

Finally, because our algorithm is turned "off" once the TPI momentum becomes negative, the risk of remaining bearish for too long is minimized. For instance, although the TPI suggested emerging markets remained susceptible to a further downturn even after their early 1994 decline, the negative momentum of the TPI indicated that this was no longer imminent. And indeed, equities have recovered strongly before resuming their downtrend later in the year.

Charts 3-5 provide a similar analysis for Latin America, Asia and EMEA (Europe, Middle East and Africa). In all cases, the "bear warnings" of the model had proven correct (warnings are marked by shaded areas).
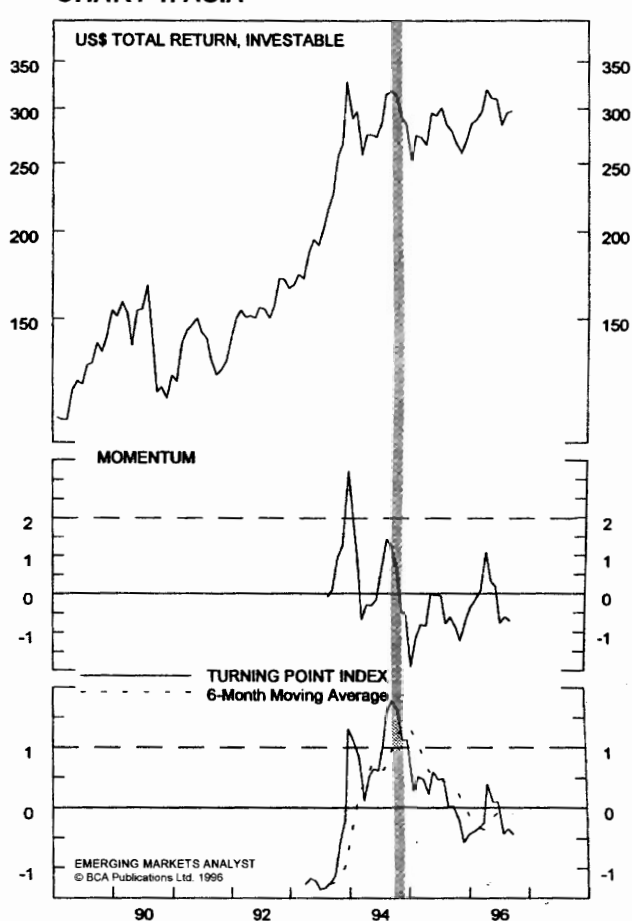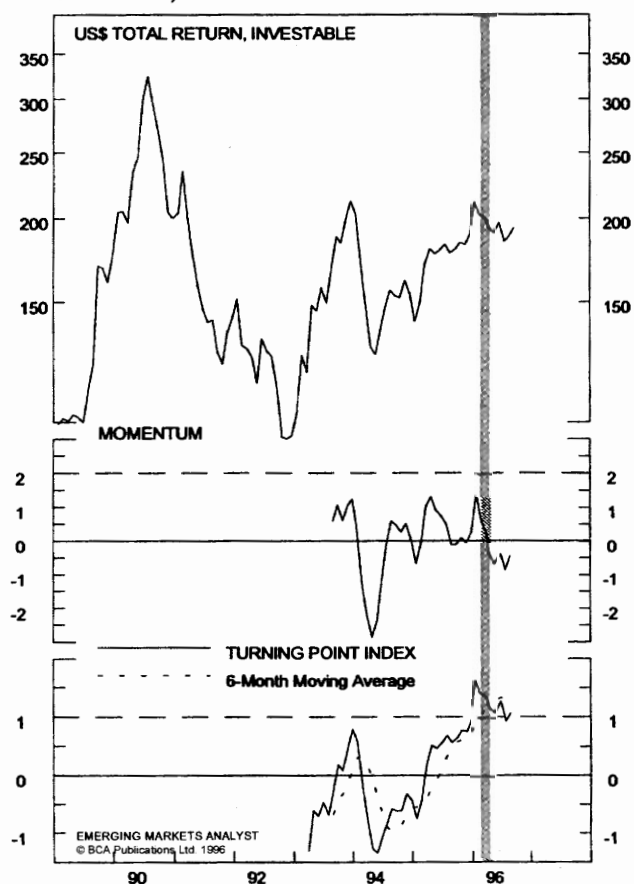
Individual markets

Because our algorithm is designed to minimize the risk of a false warning as well as identify declines, it tends to chose a limited number of peaks in each market. However, this is compensated for by the relatively large number of emerging markets from which one can choose. Even with inter-market correlation, individual market peaks do not always overlap. The reference charts at the end of the article plot the relevant indices for the individual markets. Table 1 summarizes the 50 "bear warnings" of our model since 1987 (note, however, that because of unavailable data, only Colombia, Hong Kong and South Africa have been included prior to 1990).

Risk/Return Analysis

At this point, the model only warns us which market is about to drop. In order to use this information to develop a shorting strategy, it is also necessary to have a rough idea about the risk and return associated with such market drops.

CHART 5:
EUROPE, MIDDLE EAST AND AFRICA

TABLE 1

Month	"Bear Warning"
10/1987	Hong Kong
11/1987	Hong Kong, South Africa
4/1990	Greece, Singapore
5/1990	Greece, Singapore
6/1991	Greece
3/1992	Argentina
4/1992	Argentina
5/1992	India, Mexico
6/1992	India, Mexico
7/1992	Argentina
2/1994	Hong Kong, Malaysia
3/1994	Hong Kong, Malaysia, Thailand
4/1994	Hong Kong, Malaysia, Mexico, Pakistan, Philippines
5/1994	Colombia, Pakistan
6/1994	Colombia, Pakistan
7/1994	Colombia
8/1994	Colombia
9/1994	Taiwan
10/1994	Brazil, Taiwan
11/1994	Brazil, Malaysia, Thailand
12/1994	Brazil, Chile, Korea, Malaysia
1/1995	Brazil, Chile, Korea
2/1995	Chile
8/1995	Chile
9/1995	Chile
4/1996	South Africa
5/1996	South Africa
7/1996	South Africa

Charts 6-10 provide percent frequency distributions of the 50 "bear warnings" made by our model over the past ten years. Each chart gives information about the distribution of market changes during a specified time period after a "bear warning" has been issued. For example, in Chart 6, we have the distribution of outcomes *one month later*. The horizontal axis is the percent change of the total-return $ investable index during the month. The vertical axis denotes the relative frequency of each drop/rise (how often it occurred). Black bars represent instances in which the market actually dropped (correct prediction), and gray bars denote those in which it rose (wrong prediction). For instance, Chart 6 shows that 30% of all "bear warnings" ended up with the market dropping up to 5% in one month. 2% of the warnings ended up with the market falling by 40-50%. And 2% of the cases were followed by the market rising by 10-15%. Using the same type of presentation, Charts 7-10 analyze the distributions of market outcomes 3, 6, 9 and 12 months after the issuing of the "bear warning."

These charts reflect the *historical* predictive record of our algorithm. However, because the *TPI* underlying this algorithm appears to be cyclical, we can use this record as a general guide for *future shorting opportunities.*[4]

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[4] Cyclical indices are 'mean reverting' — they tend to converge toward their own mean, or average. This is useful for prediction because the farther the index is from its own average, the greater the likelihood of reversal. Mean-reverting indices are not foolproof, however. First, because the mean itself is usually changing, the index ends up reverting toward a *moving* target. Second, in itself, the principle of mean reversion says nothing about timing: it tells you that the index should rise or fall, but not *when*.
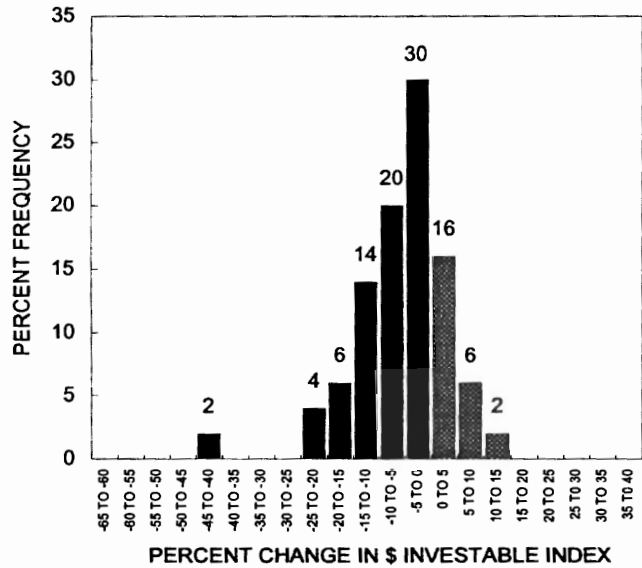
CHART 6: AFTER 1 MONTH

PERCENT FREQUENCY
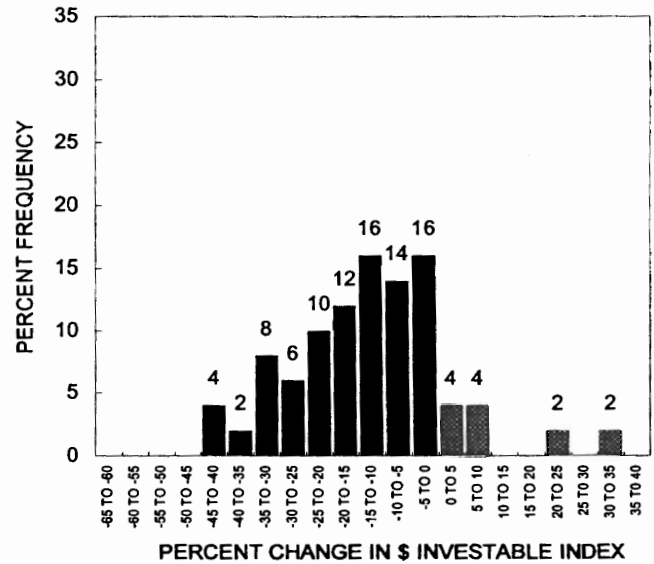
PERCENT CHANGE IN $ INVESTABLE INDEX

CHART 7: AFTER 3 MONTHS

PERCENT FREQUENCY

PERCENT CHANGE IN $ INVESTABLE INDEX

CHART 8: AFTER 6 MONTHS

PERCENT FREQUENCY

PERCENT CHANGE IN $ INVESTABLE INDEX

CHART 9: AFTER 9 MONTHS

PERCENT FREQUENCY

PERCENT CHANGE IN $ INVESTABLE INDEX

CHART 10: AFTER 12 MONTHS

PERCENT FREQUENCY

PERCENT CHANGE IN $ INVESTABLE INDEX
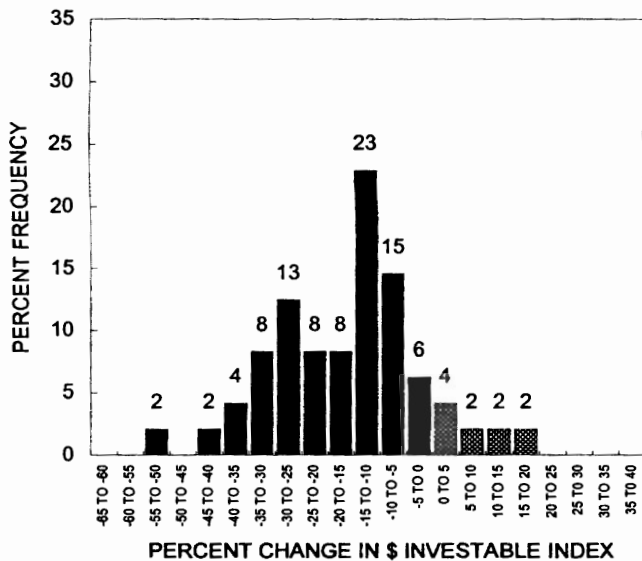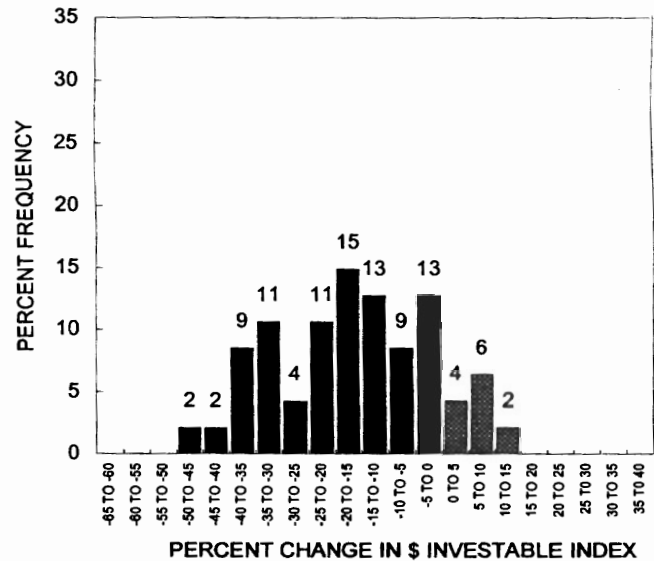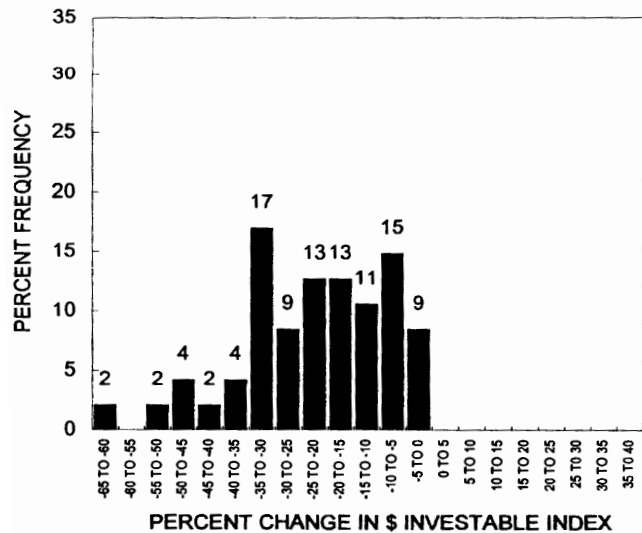
Charts 11-13 provide an overview of the risk/return profile of our strategy. Because we are comparing market outcomes over different time spans (from one month to a year), all results have been annualized in order to make comparison possible. In general, the charts confirm that there is a positive association between return, as measured by the respective annualized decline of the market, and risk, which is approximated by various measures of dispersion.[5]

5 Dispersion here refers to the extent to which individual market outcomes are spread around their average. Greater dispersion makes it more difficult to forecast, which in turn makes investment more risky.

CHART 11: RISK VERSUS RETURN
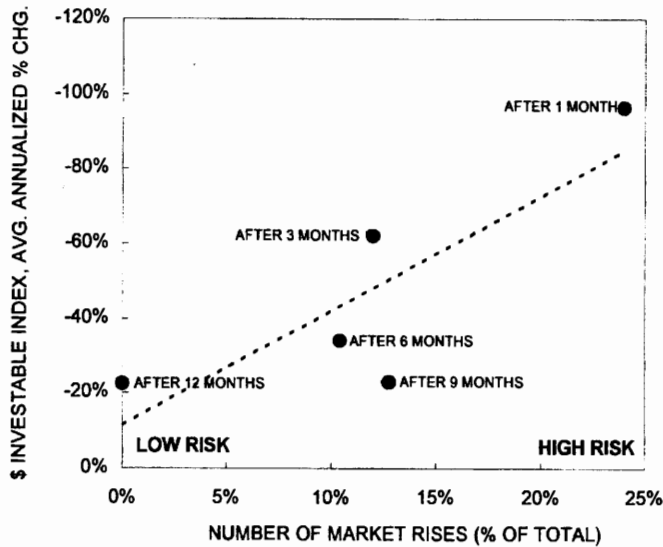
CHART 12: RISK VERSUS RETURN
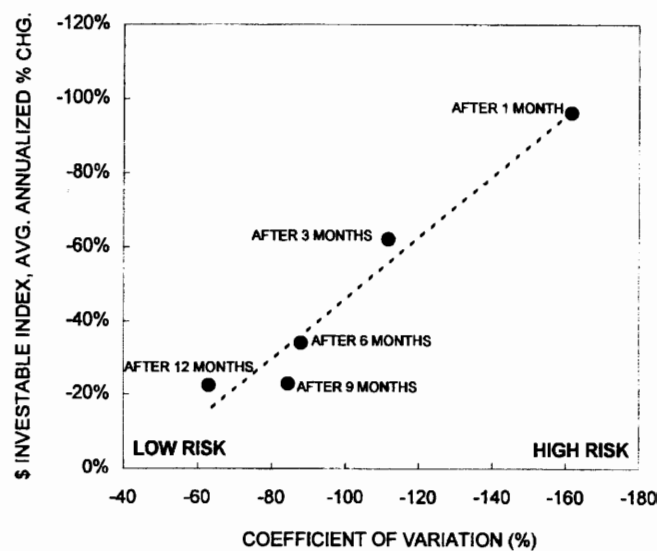
CHART 13: RISK VERSUS RETURN
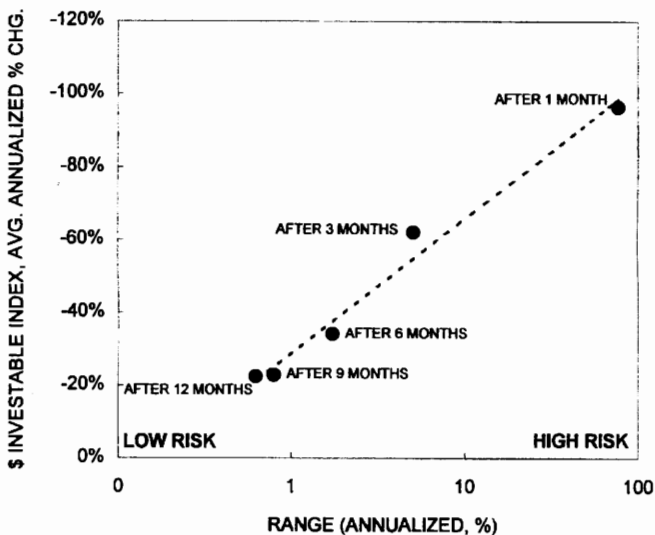
For instance, Chart 11 shows that the average annualized drop after one month was 96%, but that in 24% of the cases the market actually rose (which means that investors who sold the market short lost money). However, as the time horizon grows, both the risk of a false alarm as well as the potential gain from shorting tend to fall. After a year, the average annualized market drop is only 23% — but without a single false alarm. Charts 12 and 13 use other measures of dispersion — the coefficient of variation (standard deviation divided by the mean) and the range (maximum minus minimum market change) — as alternative measures of risk. In these cases, too, there is a clear positive relationship between risk and return.

Detailed summary statistics are provided in Table 2. The Totals section breaks down our predictions into valid warnings and false alarms. The model gave a total of 50 "bear warnings" (line 1), but as noted in Table 1, several of these occurred only recently (South Africa during April, May and July of 1996), so statistical results for the 6-12 months periods are not yet available. Valid warnings (line 1.1) indicate the number of market drops as a proportion of the total. False alarms (line 1.2) indicate the proportion of cases in which the market rose despite the "bear warning."

The Averages section indicates what investors shorting the market could expect from a typical "bear warning" over alternative time periods (line 2). A further breakdown, separating drops from rises, provides the average expected *drop* (line 2.1) and the average expected *rise* from a "bear warning" (line 2.2).

Combining totals with averages provides a basis for simple shorting strategies (assuming of course that our strategy remains valid). For instance, investors could expect a "bear warning" to yield an average market drop of 5.79% after one month (line 2). Should the market drop, its expected fall is 9.12% (line 2.1) with a probability of 76% (line 1.1). If it rises the expected increase is 4.74% (line 2.2) with a probability of 24% (line 1.2). A simple shorting strategy could then put 76% of a portfolio into a bet that the market will lose 9.12%, and hedge it with the remaining 24% of the portfolio betting that the market will gain 4.74%. Extending this into a staggered

TABLE 2

|		After 1 month	After 3 months	After 6 months	After 9 months	After 12 months
	Totals					
1	Total number of "bear warnings"	50	50	48	47	47
1.1	Valid warnings (market drops, % of total)	76.0%	88.0%	89.6%	87.2%	100.0%
1.2	False alarms (market rises, % of total)	24.0%	12.0%	10.4%	12.8%	0.0%
	Averages					
2	Mean change in market (%)	-5.79	-12.84	-15.81	-16.72	-22.51
2.1	Mean of market drops (%)	-9.12	-16.14	-18.71	-19.96	-22.51
2.2	Mean of market rises (%)	4.74	11.41	9.19	5.40	na
	Dispersion					
3.1	Minimum change in market (%)	-43.20	-41.61	-53.40	-45.80	-64.16
3.2	Maximum change in market (%)	13.50	32.30	17.70	10.80	-1.10
3.3	Range (maximum less minimum, %)	56.70	73.91	71.10	56.60	63.06
3.4	Mean deviation (%)	6.54	10.89	10.85	11.78	11.44
3.5	Standard deviation (%)	9.35	14.36	13.89	14.12	14.21
3.6	95% Confidence interval (%)	-3.17 to -8.41	-8.82 to -16.86	-11.84 to -19.78	-12.64 to -20.8	-18.4 to -26.62

shorting strategy will involve similar bets for 3, 6, 9 and 12 months, based on the respective data in the table.

More sophisticated strategies could take into account the measures of dispersion provided in the table. The minimum and maximum changes in the market provide proxies for the maximum potential gain or loss associated with any shorting strategy (lines 3.1 and 3.2). The range is the difference between these extremes (line 3.3). The mean deviation is the typical deviation from the mean, expressed in absolute values (line 3.4).

The 95% confidence interval listed in the last row of the table can be used to construct a range for average future outcomes, which investors could then expect to hold 95% of the time.[6] For instance,

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[6] A confidence interval is constructed by adding and subtracting from the mean a predetermined number of standard deviations. In general, the higher the level of confidence (say 95% instead of 80%), the wider, or less accurate, the associated confidence interval. This means that in order to be more certain in the range of outcomes you have to sacrifice precision.

the 95% confidence interval for a market drop 12 months after a "bear warning" is -18.4% to -26.62% (line 3.6). This means that we can be 95% certain that, on average, future "bear warnings" will end up a year later with the market dropping anywhere between 18.4 and 26.62%. (Note that we are only 95% confident. There is a 5% chance that the average outcome will be above or below this range). A "cautious" shorting strategy could bet on the lower limit (-18.4%), while an aggressive strategy could go for the higher limit (-26.62%).

Investment conclusions

• Emerging market volatility means that that there are investment opportunities **when markets go down** as well as when the go up.

• Because data for emerging markets are meager and only of recent vintage, models for such markets should be taken as indicative rather than definitive. Given these limitations, the very cyclicality of our "Turning-Point Index" (*TPI*), **which holds true across a large number of markets**, is highly significant. The *TPI*, together with a measure of its own momentum, offer a very potent insight into market downturns.

• A model based on the *TPI* has been developed to issue "bear warnings" with highly robust results. Its 1-month "bear warnings" have proven valid in 76% of the cases, and the record improves to about 88% for the 3 to 9 months warnings, and further to 100% for 12 months warnings.

• In the future, *EMA* "bear warnings" will be issued together with an up-to-date set of statistics, detailing the expected market drop and associated risk for different time spans (in the format of Table 2). Investors would then be able to use this information to develop shorting strategies from one to twelve months. 🜲

INDONESIA
US$ TOTAL RETURN, INVESTABLE

MOMENTUM

TURNING POINT INDEX
6-Month Moving Average

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KOREA
US$ TOTAL RETURN, INVESTABLE

MOMENTUM

TURNING POINT INDEX
6-Month Moving Average

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MALAYSIA
US$ TOTAL RETURN, INVESTABLE

MOMENTUM

TURNING POINT INDEX
6-Month Moving Average

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MEXICO
US$ TOTAL RETURN,
INVESTABLE

MOMENTUM

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MOMENTUM

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