Economist.com RESEARCH TOOLS SURVEYS

Too clever by half

Jan 22nd 2004
From The Economist print edition

Tools developed to make financial markets less volatile can have the opposite effect

MARKETS, even more than governments, have been bearing growing amounts of risk in recent years. At the same time, many markets, those for shares as well as for debt and commodities, have become more volatile across the world. Much effort has gone into trying to avoid the ill effects of that volatility. The Basel Committee on Banking Supervision has been working to help banks reduce their risk of failure since the 1970s. Stockmarket investors have learned to diversify. Financial institutions of all sorts have tried to create safeguards against tempestuous market forces.

Much of this effort has been successful. The most recent recession, for example, passed without any large-scale bank failures, in contrast to earlier downturns that typically brought banking crises and collapses of financial firms. Yet it would be premature to think that market risk has been conquered altogether.

The seeds for the current financial volatility were sown in 1973. Before then, the world's currencies were pegged in value, according to an agreement reached at Bretton Woods, the New Hampshire mountain retreat where the post-war economic order was born. Capital flows between rich economies were restricted. Gold, that ancient store of value, still anchored the dollar, at $35 an ounce.

Then America decided to remove the fixed peg from its dollar, which meant that currencies became more subject to market whims. Not coincidentally, other prices became more volatile at around the same time. Oil prices rocketed, helping to make the 1970s a decade of high inflation, and many rich countries put up their interest rates in an effort to tame it. The stockmarkets, of course, had always been volatile. What was new was that other prices started to yo-yo too.

Just as Bretton Woods was collapsing, the discipline of mathematical finance was reaching maturity. American academic economists had managed to reduce markets' animal spirits to just two numbers. The first was the mean, or average, return on any asset. The second was the asset's variance, or volatility, a measure of the size and speed of price changes. For example, a share whose price moves up or down by an average of 2% each day is twice as

volatile as a share whose price tends to move by 1% per day.

The wisdom of a quantitative approach appeared to be confirmed in 1973 when two professors working in America, Myron Scholes and Fischer Black, published a paper in the *Journal of Political Economy* which argued that the price of an option (a particular kind of financial instrument, of which more later) could be calculated almost perfectly using a mathematical equation. The formula was based on volatility. The key to the financial kingdom had been reduced to one figure.

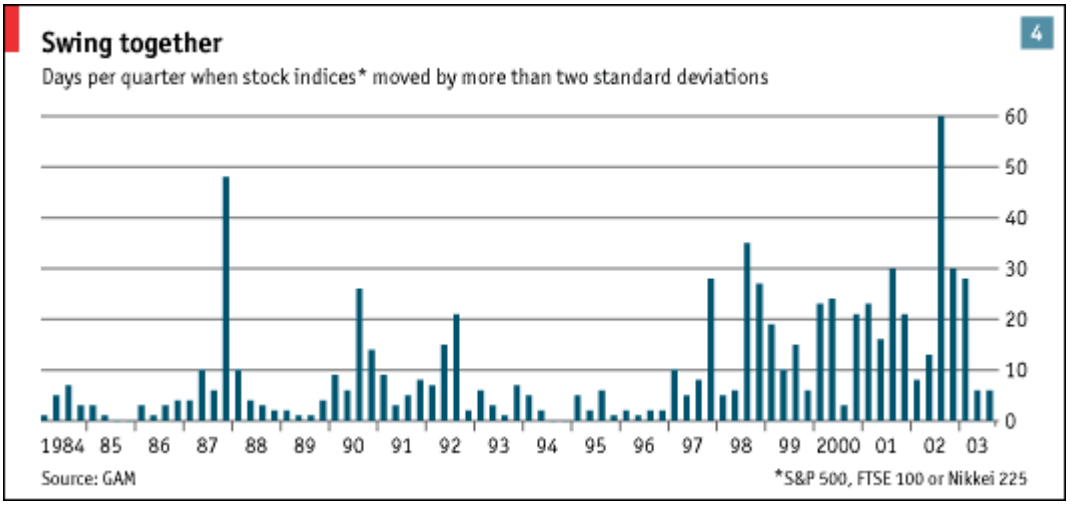
For investors, volatility has become synonymous with risk. The wider the swings in the price of a share, the riskier it is reckoned to be. That may seem odd, because it is not the size of the swings that matter to a punter, but where the price of his share ends up. Even so, volatility is often a signal of a real change in risk. When global stockmarkets fell by around 15% in the days after September 11th, they probably reflected real concerns about the effects of terrorism. A drop in global trade and increased spending on security and defence could reduce companies' profits.

Out of the blue

But not all market swings depend on such news. Another year, 1987, marks an earlier milestone for volatility. Markets fell by 10-20% in a single day when nothing much seemed to be happening in the world. That meltdown posed a problem for financial economists, as well as for investors who sold that day and lost a packet. Financial markets are meant to be aggregators of financial information. If markets are efficient (meaning that they reflect a collective best guess about future profits), price changes should reflect real events.

The 1987 crash inflicted serious damage on this theory. All the attempts to explain the debacle—and there have been many— have failed to come up with a satisfactory answer. Much of the blame was put on portfolio insurance, in which investors program their computers to buy and sell according to rules laid down beforehand, creating the risk of a herd-like reaction when the market turns. What probably happened was that a comparatively modest fall in shares prompted a number of investors to sell, driving prices yet lower. This triggered the computer programs to sell even more shares in an effort to minimise investors' exposure to falling prices. A downward spiral ensued, leaving everyone poorer on paper.

Although nothing on that scale has happened since, there have been increasingly frequent smaller market tumbles. The past five years have been much more volatile than the previous two decades, and volatility has become more global. Avinash Persaud of GAM, a London-based fund manager, has found that storms which send at least one of the three big stockmarkets reeling have become much more common (see chart 4).



Some of this is only to be expected. In an economic downturn, forecasts both for broad economic trends and for profits generally diverge more widely than in good times. Technological change may also have increased volatility. The same goes for increased trading by hedge funds, which can take short positions (betting on a fall in shares rather than a rise)—although the greater liquidity they offer may actually help to stabilise markets.

Now the finger is pointing at the attempts by banks and investors to reduce their own risk of market exposures. That is ironic, because they adopted these risk-management techniques expressly to protect themselves against the whims of the stockmarkets. The technique that has become near-ubiquitous over the past decade is called value at risk (VAR). It started as a project by J.P. Morgan in the early 1990s to help its clients summarise their risks in a single number. Today it has become part of the institutional rule-book. It will be enshrined in Basel II, the proposed new international system of capital-adequacy rules, as part of banks' risk-management requirements.

VARy risky

A typical VAR model will put a figure on your chances of losing no more than a certain amount of money over a certain period of time. Before VAR was widely introduced, many traders or banks' boards would have found it hard to quantify the risk they were taking. They might have had a broad idea of the circumstances in which they could lose a bundle, but they would not have known how likely this was to happen. After a series of losses in the early 1990s, banks widely adopted the model.

VAR is firmly based on the tradition of quantitative finance. That may offer the comfort of mathematical authority in an uncertain world, but its foundations are shaky in several ways. First, it assumes that market returns conform with a particular pattern. That is what allows risk managers at big banks to express “99% confidence” in a certain outcome. But although economists hate to admit it, the patterns of financial markets are nowhere near as certain as those of, say, physics. The second problem is the possibility of “fat tails” in those statistical patterns. This is the risk that a 1% chance of losing more than a certain amount suddenly becomes a 5% chance.

A third problem is the way that VAR models view the relationship between different kinds of assets. If shares in, say, Argentina and Japan have been moving in step for the past five years, a VAR model will assume that they will continue to do so. But such relationships, known as “co-variances”, are far from stable: markets are as likely to defy history as to repeat it. VAR models take insufficient account of this.

When a nasty surprise such as the LTCM crisis in 1998 comes along, it gets labelled as a “100-year storm”, suggesting that such events are very rare. In real life, though, financial debacles seem to happen much more frequently than once a century. Emerging markets collapse every so often, and prices for debt or commodities regularly break new records. By now, banks should have realised that their models are far too optimistic.

Perhaps the biggest problem of all is the illusion of certainty that VAR creates. Even when the models are accurate, a 99% chance of not losing a bundle also means a 1% chance of losing a fortune, so on two days in every year the VAR loss-limits are likely to be exceeded.

Mr Persaud thinks that VAR models have massively increased the volatility of financial markets by forcing all investors to buy almost identical portfolios. The same VAR models then tell them all to sell at the same time. In doing so, the investors change the pattern of returns that had made the portfolio so attractive in the first place. There are echoes here of the herd instincts let loose by the program trading of 1987, or the dotcom mania of the recent equity bubble.

Mr Persaud points to another source of folly: chasing cross-country correlations in equity

markets. In the mid-1990s, investors piled into Asian investments because recent returns there had been high and, more importantly, uncorrelated with other markets. This made them especially attractive to global portfolio investors. But this allure was fleeting. By 1998, the Asian crisis had changed these patterns and investors got burned. In developing countries, Mr Persaud says, the cost of volatility is a big obstacle to foreign investment.

"Extreme value analysis" is a new buzzword for trying to think of all the ways the markets might depart from past form. But as long as VAR models remain the basis for decisions about market risk, market wobbles will continue to catch punters out.

VAR and other quantitative risk models seem to have failed to eliminate dangerous gyrations in banks' profit-and-loss accounts. Kevin Buehler, head of the financial-institutions practice at McKinsey, who has analysed the performance of more than 200 American banks between 1997 and 2002, found that big upsets (defined as bankruptcy, a ratings downgrade of two or more notches or a drop in profits of 20% or more) were far more common than the term "100-year storm" would lead you to expect. His study came up with around 150 such upsets at 90 of the banks in his study. Few of them were big enough to make newspaper headlines, but they caused lots of managers to lose their jobs.

Even so, many investors find the "quant" models reassuring. Banks keep their fingers crossed that as long as their systems are approved by regulators, all will be well. These days they worry more about something that VAR models find it hard to deal with: derivatives.