

The Disturbing Interaction between the Madness of Crowds and the Risk Management of Banks

Avinash Persaud

Summary

In the international financial arena, G-7 policy-makers chant three things: more market-sensitive risk management, stronger prudential standards and improved transparency. The message is that we do not need a new world order, but we can improve the workings of the existing one. While many believe this is an inadequate response to the financial crises of the last two decades, few argue against risk management, prudence and transparency. Perhaps more should. The underlying idea behind this holy trinity is that it better equips markets to reward good behaviour and penalise bad across governments and market players. However, while the market is discerning in the long run, there is now compelling evidence that in the short run markets find it hard to distinguish between the good and the unsustainable, market participants herd and contagion is common. Critically, in a herding environment, tighter market-sensitive risk-management systems and more transparency actually make markets less stable and more prone to crisis. This perverse response may help to explain the growing instability of the financial system. The system has been in crisis in almost four of the last ten years. Demands for the daily release of foreign exchange reserves should be tempered, and policy-makers and regulators should support investors who do not herd – foreign direct investors, equity portfolio investors and, surprisingly, hedge funds.

A Cyclical Debate

The debate on the reform of the international financial system follows a cycle. In the middle of each crisis – and there have been at least six since the debt crisis which started in Mexico in 1982 – there are deafening demands for the wholesale reform of the entire international financial system. A few months on from the end of each crisis these demands fade. There were clear parallels between calls made in previous crises and those made in the thick of the last crisis for the IMF to become a lender of last resort, injecting substantial liquidity in times of crisis, and for hedge funds

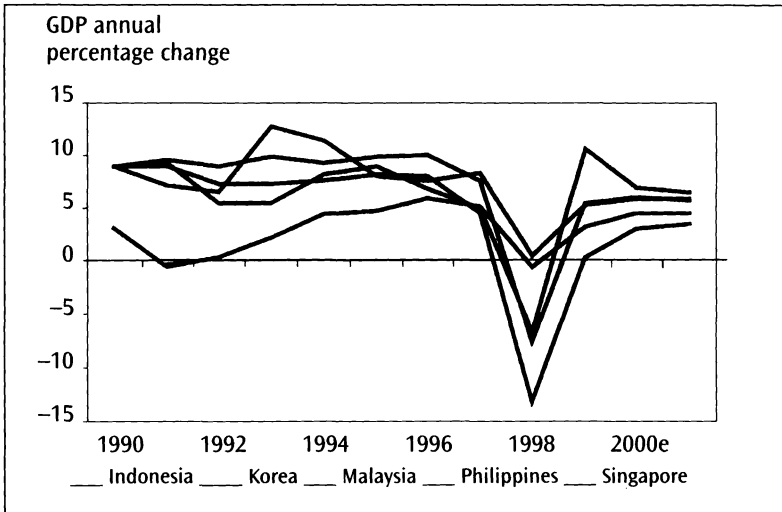
to be regulated. Every crisis inspires plans for a new financial architecture and, as the crisis ends, most of these plans are tidied away.

Table 1. Global financial crises in the 1990s

Date	Crisis	Countries where the real exchange rate fell by more than 10 per cent over one month
1992–93	‘EMS’	UK, Italy, Spain, Portugal, Sweden, Finland, Denmark, Norway, Belgium, France, Ireland, India, Venezuela
1994–95	‘Tequila’	Colombia, Venezuela, Mexico, Turkey, Japan
1997–99	‘Asia’	Thailand, Philippines, Indonesia, Malaysia, Taiwan, Korea, Brazil Colombia, Israel, Peru, South Africa, Zimbabwe, Russia, Sweden, Switzerland, Spain

Underlying this cycle of debate is that while the demand to make systemic changes is naturally strong in the middle of a crisis, the consensus on what is wrong and what to do is generally weak. Moreover, while recent crises have appeared sharper and more global than before, they have been more short-lived. Before a consensus on what to do to avoid crises can grow, they are over, and countries previously in crisis begin to enjoy economic rebound and the return of international capital flows. This was not the case during the Latin American debt crisis of the mid-1980s or after the EMS crisis in 1992–93 when economic recovery was held back by self-imposed fiscal restraint and a cheap dollar. But it was the case in the last two crises in Mexico and Asia (see Chart 1). We also live in an age where ambitions are limited. We no longer walk on the moon. In this environment, the view that often gains ground a few months after the crisis is that there are risks in meddling with a financial system that works most of the time, and that there are things that can be safely done to improve the workings of the market the rest of the time.

The proposals that emerge post-crisis, therefore, tend to focus on making it easier for the market to reward good behaviour and penalise bad behaviour. The emphasis is not on changing the rules of the game, but on strengthening the players: stronger risk management, more prudential standards and improved transparency. One of the key responses of the Interim Committee of the IMF to the latest crisis and the desire to avoid another one was the adoption on 26 September 1999 of a new Code of Good Practices on Transparency in Monetary and Financial Policies. Incidentally, these measures are all relatively inexpensive to implement. There is declining political support for large packages of tax-payers money to bail out foreign countries in trouble.

Chart 1. The rapid rebound in Asian GDP

How More Market-sensitive Risk Management Can Create Risk

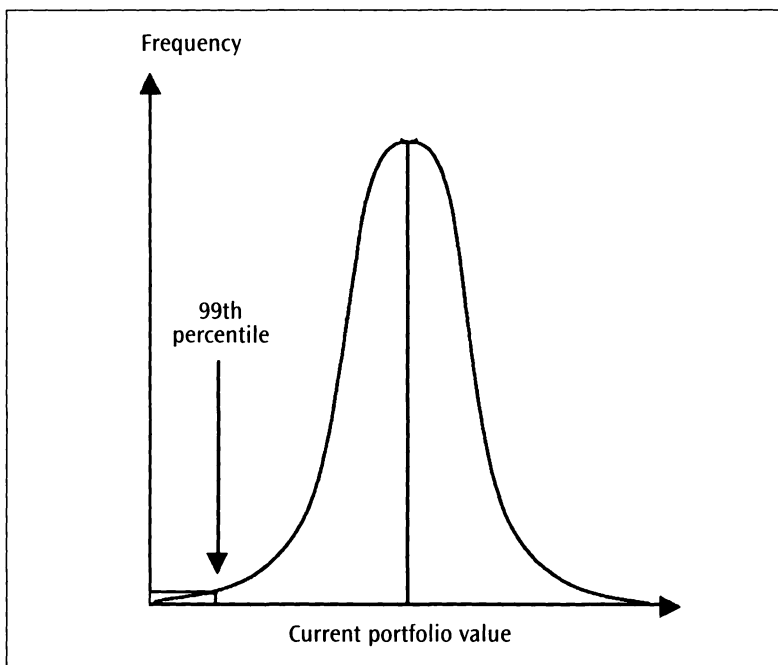
While many believe that risk management, prudential standards and transparency are probably not enough to avoid future crises, they believe these measures will probably help to provide the right discipline for governments and can surely do no harm. These measures are likely to be a positive force in the long run when markets are good at discerning between the good and bad. But in the short run, there is growing evidence that market participants find it hard to distinguish between the good and the unsustainable, that they often herd and that contagion from one crisis to another is common. The problem is that in a world of 'herding', tighter market-sensitive risk-management regulations and improved transparency can, perversely, turn events from bad to worse, aggravating and perhaps even initiating a crisis. How can this happen?

Let us explore the interaction between herding, risk management and transparency in bank lending. It is important to note that while there are strong parallels between the behaviour of herding bankers and herding investors in general, bank lending remains a powerful feature of modern-day crises. For example, the five Asian crisis countries – Thailand, Malaysia, South Korea, Indonesia and the Philippines – received \$47.8 billion in foreign bank loans in 1996. In 1997, banks withdrew \$29.9 billion – a net turnaround of almost \$80 billion in one year. In contrast,

portfolio flows remained positive throughout 1997.

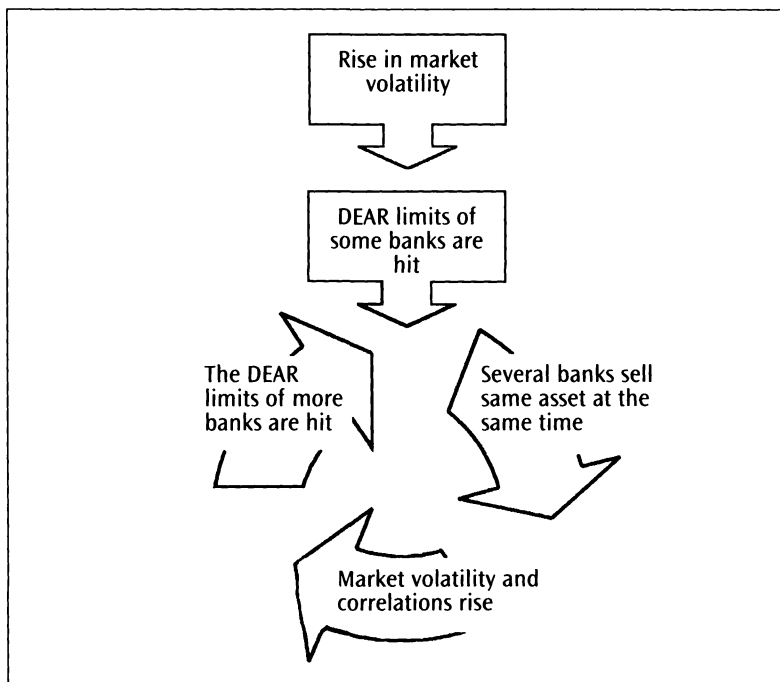
The growing fashion in risk management, supported by the Basle Committee on Banking Supervision, is a move away from discretionary judgements about risk and a move to more quantitative and market-sensitive approaches. (See *The Supervisory Treatment of Market Risks*, Basle Committee on Banking Supervision, 1993.) This is well illustrated by how banks now tend to manage market risks by setting a DEAR limit – daily earnings at risk. DEAR answers the question: ‘How much can I lose with, say, a 1 per cent probability over the next day’. It is calculated by taking the bank’s portfolio of positions and estimating the future distribution of daily returns based on past measures of market correlation and volatility. Both rising volatility and rising correlation will increase the potential loss of the portfolio, increasing DEAR. Falling volatility and correlation will do the opposite. Banks set a DEAR limit – the maximum dollar amount they are prepared to put at risk of losing with a 1 per cent probability. When DEAR exceeds the limit, the bank reduces exposure, often by switching into less volatile and less correlated assets. (See *RiskMetrics Technical Manual*, RiskMetrics Group, London, 1999.)

Figure 1. Representation of VAR: histogram of portfolio values



Herding behaviour means that banks or investors like to buy what others are buying, sell what others are selling and own what others own. There are three main explanations for why bankers and investors herd. Firstly, in a world of uncertainty, the best way of exploiting the information of others is by copying what they are doing. Secondly, bankers and investors are often measured and rewarded by relative performance so it literally does not pay a risk-averse player to stray too far from the pack. Thirdly, investors and bankers are more likely to be sacked for being wrong and alone than being wrong and in company. (For further explanations of herding see *Investor Behaviour in the October 1987 Stock Market Crash: Survey Evidence* by R. Shiller, NBER discussion paper 2446, 1990.)

Figure 2. A vicious cycle of herding and DEAR limits



Imagine that over time a herd of banks have acquired both Korean property and UK technology stocks. Imagine too that some bad news causes volatility in UK technology stocks and the banks most heavily invested there find that their DEAR limits are hit. As these banks try and reduce their DEAR by selling the same stocks at the same time, there are dramatic declines in prices and rises in volatility in both markets and in

the correlation between Korean and UK markets. Rising volatility and correlation triggers the DEAR limits of banks less heavily invested in these markets. As they join the selling milieu, prices, volatility and correlation move further in a self-feeding cycle.

The key to this environment is that market participants behave strategically in relation to one another, but DEAR measures risk 'statically', without strategic considerations. Previous volatility and correlations were measured over a period of time when the herd gradually built up and are therefore almost certain to underestimate the impact on prices, volatility and correlations when many investors sell the same asset at the same time. This strategic behaviour can be modelled more formally using game theory. (Some attempts to do so can be found in 'Risk management with interdependent choice' by Stephen Morris and Hyun Song Shin, *Oxford Review of Economic Policy*, Autumn 1999.)

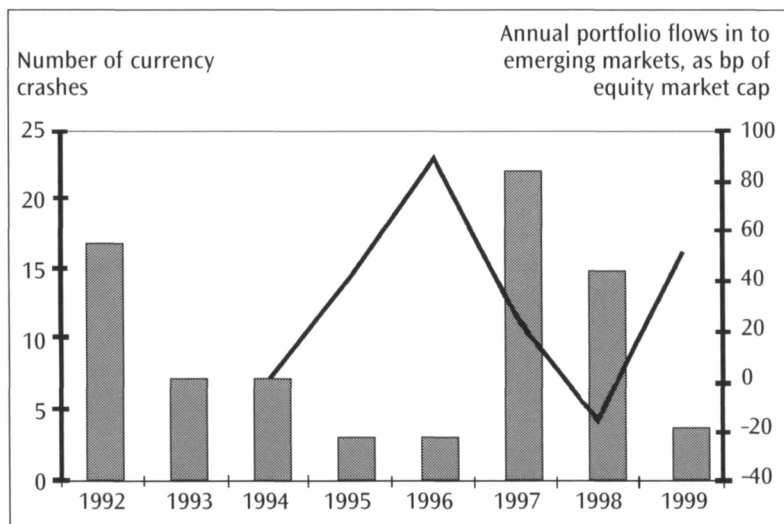
Let us add another strategic dimension to this spiralling nightmare. Further assume that the country has recently signed up to the Special Data Dissemination Standard (SDDS) – one of the lasting responses of the 1995 Tequila crisis – and the 1999 Code of Good Practice and, as a result, has started publishing its foreign exchange reserves daily. In this case bankers and investors with more modest exposures would observe that as risks grow – prices are falling and volatility rising – other bankers and investors are leaving the country rapidly. In this heightened environment they will view the country's loss of reserves as doubly increasing the risk that they will be left wrong and alone. This will trigger a further rush for the exit.

The reason why this is a major challenge to the current regulatory framework is that herding is frequent and that even short-lived financial crises have real economic impact. While herding behaviour is hard to prove directly, given the paucity of reliable data on the positions of financial institutions, there is now a growing body of evidence that markets behave as if market participants herd.

In the foreign exchange markets, for example, if we define a crash as a 10 per cent fall in the real exchange rate over three months, there have been 78 crashes across 72 countries since the EMS crisis began in September 1992. These are not distributed evenly over time, or distributed with deteriorating fundamentals, but they cluster. Contagion is rife with 70 per cent of crashes occurring in just three years. This contagion does not move predictably along the lines of trade, but along the lines of shared investors. The stepping stones of the most recent crisis, for example, were from Thailand and Indonesia to Korea, on to Russia and then to Brazil. These countries share very little trade. Furthermore, crashes are invariably

preceded by booms as the herd moves into place. Chart 2 shows the number of foreign exchange crashes per year across 72 countries as bars and the annual cross-border portfolio flows into emerging markets as a line. Note how investors rushed into emerging markets in 1995 and 1996, prior to the crashes in 1997 and 1998.

Chart 2. 'Crashes' and 'booms' in the foreign exchange market



Further evidence of herding and the problems of a static value-at-risk analysis can be found by looking at the distribution of daily market returns. In Chart 3, we imagine we are a risk manager in January 1997 looking at the distribution of daily returns of a portfolio of OECD currencies versus the dollar over the previous five years. The distribution is well behaved and fairly symmetrical – though not around zero. According to this actual distribution she would expect a more than 1 per cent decline in this portfolio's value in a day around 5 per cent of the time. Three years later and if she survived, she would have found that her portfolio fell by more than 1 per cent in a day more than 10 per cent of the time and the distribution would look very different – as shown in Chart 4. (It can be shown that the difference between these two distributions follows a beta distribution consistent with herding behaviour.)

The predominance of herding behaviour and its lethal combination with the practice of DEAR limits may explain why the 1990s have been such a decade of financial dislocation: the financial system has been in crisis for 40 out of the 120 months, or 33 per cent of the time. This instability has real economic impact. Although international portfolio flows have

Chart 3. Distribution of average daily dollar returns of an OECD less US portfolio of currencies, 1992–1996

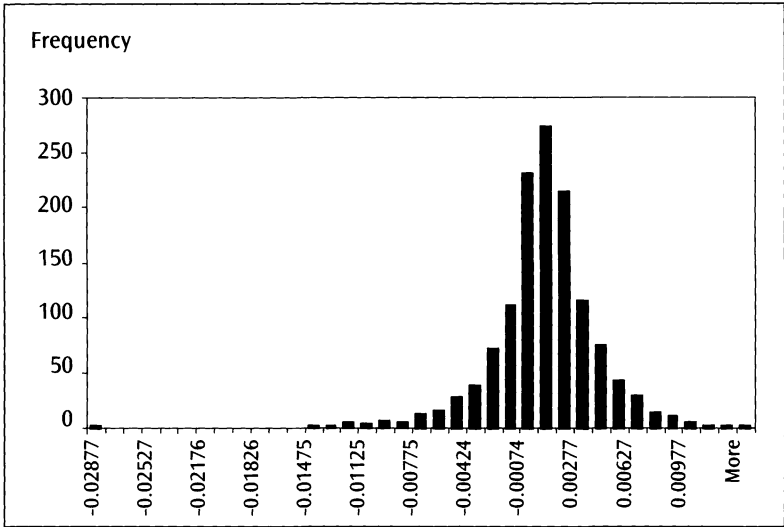
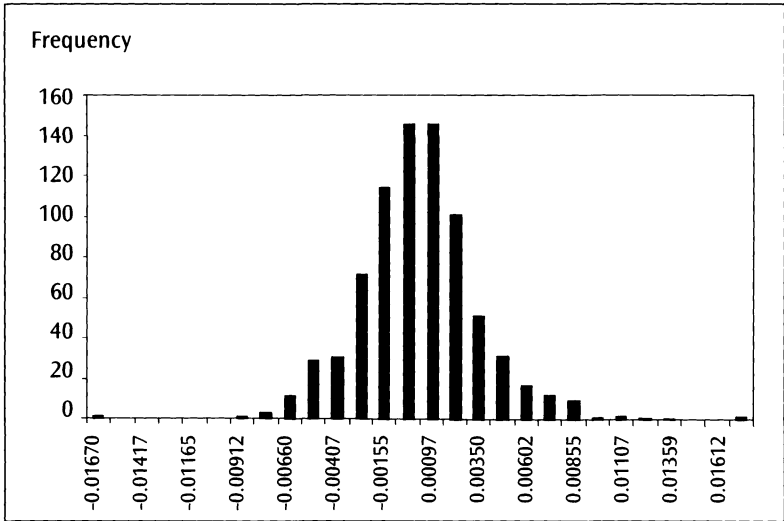


Chart 4. Distribution of average daily dollar returns of an OECD less US portfolio of currencies, 1997–1999



recovered from dips in 1998, they remain highly concentrated in just five markets: Hong Kong, Korea, Singapore and Taiwan – hardly the most capital-needy countries given either their high domestic savings and big current account surpluses. Many other markets have found it hard to raise foreign capital.

These financial crises also have a direct impact on GDP. For example, while there has been a strong rebound in GDP in 1999 in Asia in general, and in South Korea in particular, the rebound has not offset the loss of GDP during the crisis period. One way of estimating the lost GDP of the Asian crisis is to estimate where GDP would be today if Asian economies had continued the more modest but sustainable growth rates experienced in the five years before their current account deficits began to widen in 1993–94. Were it not for the crisis and its preceding boom, GDP would be an aggregate of \$130 billion higher in South Korea, Thailand, Malaysia and Indonesia. Another measure of this lasting impact is the elevation of poverty levels in Asia today compared with 1997.

The paradox is that if one or two banks followed a DEAR limit and others did not, those banks would have an effective risk-management system that at the margin would support the financial system. But if every bank follows the same approach, given that these banks follow each other into and out of markets, the DEAR limit will contribute to systemic risk. It is ironic, therefore, that the Basle Committee on Banking Supervision is supporting the rapid adoption of these systems across all banks. (See ‘An internal model-based approach to market risk capital requirements’, Bank for International Settlements, Basle, 1995.) There is a further paradox with transparency. The more herding investors and banks know about what each other are up to, the more unstable markets may become. In the long run, transparency and DEAR limits are a good development, but they are harmful in the short run in the context of herding behaviour.

What Should Policy-Makers and Regulators Do?

Herding presents a classic example of the need for intervention. The individual incentives of herding investors create systemic risks. Moreover, if regulators were so co-ordinated that they behaved like one global regulator, they would be best placed to make an intervention. Through the privileged formation they have as a regulator of individual bank balance sheets they know when banks are herding. This does require a different focus. Today regulators are warned about whether banks in their jurisdiction have exposures that threaten themselves, not whether banks around the world have the same exposure, which threatens a foreign market that could become contagious. If this information were made public, in the

context of herding investors, random shocks could quickly evolve into financial crises. But how should regulators respond if they notice herding in a particular market? They should require the bank to put aside an extra amount of capital for 'strategic risk' without specifying which markets carry that risk. Applying tighter risk-management requirements for those specific markets in which the herd has appeared will only make the stampede more vicious when negative news strikes.

It is arguable that regulators have actually promoted herding through risk-management systems. They may also have done so in their zeal for disclosure of bank positions and central bank reserves. Indeed, there is a role for one unregulated investor who is encouraged to buy near the bottom of markets through the absence of risk, capital disclosure and credit concerns. Such investors would make the system safer but would be high risk and so should be restricted to those who can afford to lose. If this investor had to be invented she would look something like a hedge fund. Interestingly, as the big-betting hedge funds have been undermined by the disclosure and credit policies of banks, market liquidity has fallen and volatility has risen. Just as the big macro hedge funds fade away we may find that they supported the market as much as they exploited it.

Those who are unable to stomach regulators promoting hedge funds will be relieved to note that there are other kinds of flows that do not herd so much – foreign direct investment, for example. Further, during the Mexican and Asian crises, equity portfolio flows also revealed less herding than bond flows. It would appear that bond investors are keen to get out before they are held in by a debt moratorium or orderly work-out. This raises some interesting questions for those trying to build in burden-sharing and orderly work-out provisions into bond constitutions.

Transparency in data and governance is clearly a good thing in the long run and promotes correct behaviour by governments. Governments should be encouraged to disclose more information every month and quarter, but not on a daily basis. In an environment of herding investors, there is not a good case for insisting that countries release central bank reserve data with such high frequency. It is telling that during the EMS crisis, many of the developed countries who had just adopted the Code of Good Practice on Transparency found it helpful to delay the monthly publication of their official reserves or to camouflage their information. Small vulnerable emerging markets will find it even more helpful not to publish their reserves every day.