

# Commentary: Has Financial Development Made the World Riskier?

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It is a great privilege to participate in the symposium and to comment on Raghu's paper. Raghu has written a lucid, thoughtful, and indeed, thought-provoking piece on an issue of great relevance to central bankers.

The main theme running through Raghu's paper is liquidity, but you'll have noticed that he is careful not to give a formal definition of liquidity. This is understandable since liquidity defies a simple definition. But we know two things about liquidity:

- It has attributes of a *public good*,
- but it's a public good that arises from the *diversity* of intended actions.

So, when I buy or sell, it is only by virtue of the fact that there are other people doing the opposite that I am contributing to liquidity. Just as with any other public good, a very natural question is whether we can have market failure. Raghu's diagnosis is that yes, on occasion, this public good can give rise to market failure, and financial development has, in some ways, made the problem worse. Unlike Don Kohn, I have more sympathy with Raghu's diagnosis.

For the sceptics among you, I'd like to tell you about the Millennium Bridge in London. You may wonder why a bridge is relevant for financial markets, but it turns out that the Millennium Bridge offers a classic case study of market failure from engineering.

Many of you will be familiar with the Millennium Bridge. As the name suggests, the bridge was built as part of the millennium celebrations in the year 2000. It's a pedestrian bridge that used an innovative "lateral suspension" design, built without the tall supporting columns that are more familiar with other suspension bridges. The vision was of a "blade of light" across the Thames.

The bridge was opened by the queen on a sunny day in June, the press was there in force, and many thousands of people turned up to savor the occasion. However, within moments of the bridge's opening, it began to shake violently. The shaking was so severe that many pedestrians clung on to the side rails. The BBC's Web site has some interesting video news clips, in case you're interested. The bridge was closed later on its opening day and was to remain closed for more than 18 months.

When engineers used shaking machines to send vibrations through the bridge, they found that horizontal shaking at 1 hertz (that is, at one cycle per second) set off the wobble seen on the opening day.

Now, this was an important clue, since normal walking pace is around two strides per second, which means that we're on our left foot every second and on our right foot every second. And because our legs are slightly apart, our body sways from side to side when we walk. Those of you who have ever been on a rope bridge will need no convincing from me.

But why should this be a problem? We all know that soldiers should break step before they cross a bridge. And for thousands of pedestrians walking at random, one person's sway to the left should be cancelled out by another's sway to the right. If anything, the principle of diversification suggests that having lots of people on the bridge is the best way of cancelling out the sideways forces on the bridge.

Or, to put it another way, what is the probability that a thousand people walking at random will end up walking exactly in step, and remain in lock-step thereafter? It is tempting to say “close to zero.” After all, if each person’s step is an independent event, then the probability of everyone walking in step would be the product of many small numbers—giving us a probability close to zero.

However, we have to take into account the way that people react to their environment. Pedestrians on the bridge react to how the bridge is moving. When the bridge moves from under your feet, it is a natural reaction to adjust your stance to regain balance.

But here is the catch. When the bridge moves, everyone adjusts his or her stance *at the same time*. This synchronized movement pushes the bridge that the people are standing on, and makes the bridge move even more. This, in turn, makes the people adjust their stance more drastically, and so on. In other words, the wobble of the bridge feeds on itself. The wobble will continue and get stronger even though the initial shock (say, a small gust of wind) has long passed.

The wobble results from shocks that are generated and amplified *within* the system. It is very different from a shock that comes from a storm or an earthquake, which come from outside the system. Stress testing on the computer that looks only at storms, earthquakes, and heavy loads on the bridge would regard the events on the opening day as a “perfect storm.” But this is a perfect storm that is guaranteed to come every day.

So, what does all this have to do with financial markets? Actually, quite a lot. Financial markets are the supreme example of an environment where individuals *react* to what’s happening around them, and where individuals’ actions *affect* the outcomes themselves. The pedestrians on the bridge are like banks adjusting their stance and the movements of the bridge itself are like price changes. You want diversity, but the market price is a lightning rod that imposes uniformity.

There have been many instances of failure of liquidity of this type. Take the 1987 stock market crash for example. The Brady Commission highlighted practices such as portfolio insurance and dynamic hedging in amplifying the price fall. As you know, dynamic hedging attempts to position one's portfolio in reaction to price changes in order to mimic the payoffs from a put option. And since put options pay out when prices are low, this means maintaining a short position in the asset that becomes steeper as the price falls. In other words, dynamic hedging dictates that when the price falls, you sell more of the asset. This is a strategy that relies on liquid markets—on others who will buy when you sell. When the price falls, dynamic hedging dictates even larger sales. And as the market adage goes, one should never try to catch a falling knife, and so potential buyers stand on the sidelines until the knife drops to the ground.

We can all name many more episodes of market distress of this type since the 1987 crash. The events of the summer 1998 are still fresh in our minds.

Both the 1987 crash and the events of summer 1998, as serious as they were, were restricted to small segments of the economy. Financial development has meant that the potential for feedback is now much more pervasive. The advent of credit derivatives has brought closer the prospect of marking bank loan books to market, so that the galvanizing role of market prices soon will reach into every nook and cranny of the financial system.

Even previously boring banks are now at the cutting edge of *price-sensitive* incentive schemes and *price-sensitive* risk-management systems. And mark-to-market accounting ensures that any price change shows up immediately on the balance sheet. So, when the bridge moves, banks adjust their stance more than they used to, and marking to market ensures that they all do so *at the same time*.

The engineers for the Millennium Bridge found that there was a critical threshold for the number of pedestrians on the bridge at

which the wobble kicked in (160, as it happens). Below that threshold, there were no outward signs of trouble.

As ever, engineers have the advantage over economists in being able to conduct controlled experiments. For financial markets, it is very difficult to ascertain what the tolerance threshold for market liquidity is, beyond which we see events such as the financial distress of summer 1998.

But we know two things:

- Below the threshold, markets will function well, shocks are absorbed, and volatility will be dampened as the market performs its task.
- But beyond that threshold, all the elements that formed a virtuous circle to promote stability now will conspire to undermine it. There is a big difference between *risk* and *volatility*.

What we don't know is where that threshold is. It is possible that the threshold is so distant that we needn't worry. On the other hand, it would be safe to assume that the developments Raghu highlights have moved us just a little closer to that threshold.

Now, let me turn to Raghu's policy proposal. The engineers for the Millennium Bridge decided to attach shock absorbers underneath the bridge. For financial markets, this solution would be rather like increasing market frictions so as to make trading more difficult—somewhat like Tobin's notion of throwing sand into the wheels of financial markets.

Raghu's proposal for the regulation of incentives is an alternative way to address the problem. I realize that my bridge analogy is already creaking under the strain, but let me push it a little further.

Raghu's proposal is intended to alter the way that banks react to short-run price changes. It would be rather like giving pedestrians on the bridge *balancing frames* (picture those baby walkers with wheels

on the side), so that they do not have to adjust their stance if the bridge were to move from under their feet. If they do not react, then the bridge will stabilize.

For financial markets, Raghu is surely right that balancing frames are far superior to shock absorbers. Indeed, Raghu himself has written extensively on the benefits that we all reap from financial development. Shock absorbers would be like throwing the baby out with the bath water.

But I think Raghu himself would recognize that his proposal is a non-starter, at least under current circumstances. There just isn't the appetite for this kind of reform. And there are many practical hurdles. Don has mentioned some. Let me add a couple more. Lawyers will point out that interfering in contractual arrangements between willing parties will not be looked upon kindly by the courts. There are also competitive level-playing-field considerations. Piecemeal implementation by one country will succeed only in weakening one's own financial industry.

But this sounds strangely familiar. Indeed, we have been here before. The Basel Capital Accord of 1988 was precisely such an attempt at collective de-escalation. The question is one of political appetite. Or as Raghu might say, the appetite for reform will be a matter of how severe the next crisis will be.

It is apt that Malcolm Knight is chairing this morning's session, because when the time comes, this will be a matter for a Bank for International Settlements committee.