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Bank of Japan

Looking through Prices in Financial Markets

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Introduction

Today, I am very pleased to appear before you, for the second time since 2009, at the Paris Europlace Financial Forum in Tokyo. When discussing the issues facing the financial industry at a meeting like this, it is clear that we have yet to put behind us the Great Financial Crisis (hereafter "the Crisis"), the scars of which have hardly healed, even three years after I last spoke here. We are still dealing with the consequences, not only in terms of needing to fix problems in the real economy but also with regard to rebuilding confidence in finance. There is also extensive discussion on how we could improve the conduct of monetary, prudential, payment and other policies in the light of the Crisis. In the following few minutes, I would like to pick up one theme on which I have not fully offered my views so far -- that is, how we should view prices in financial markets.

The Crisis That Never Should Have Happened

The starting point for my discussion is what people generally thought about finance in general and financial markets in particular before the onset of the Crisis. The prevailing worldview at that time was along the following lines.

It all started from the innocuous belief that the market was the best arbiter of economic outcomes. If markets seamlessly covered every economic activity, and if they functioned flawlessly in transmitting price signals, decisions made by economic agents on the basis of such signals would intrinsically maximize social welfare. Any effort to achieve such a state -- completing markets and removing regulation -- was regarded as desirable in its own right. Of all markets, financial markets were generally regarded as the ones closest to such an ideal state of the economy.

On top of this foundation, the financial institutions built an intricate system of risk management. Prices determined by financial markets were deemed to reflect the fair value of financial assets. By looking at historical patterns of price fluctuations, it was thought that risks arising from future price movements could be managed effectively. Observations of prices were fitted into the bell curve and transmuted into concrete numbers such as value-at-risk. Such tools gave financial institutions confidence that they had firm control over the risks they were taking. If too much risk were being taken, then just the

right amount of excess risk could be offloaded most quickly and inexpensively by using derivatives, or offsetting positions could be conjured up swiftly and cheaply from the wide universe of financial products.

Market participants -- banks, securities houses, insurers, hedge funds, and all the rest -- were thought to have had every incentive to manage the risks they were taking, because, as individual firms, their survival was at stake. If each participant could thus be assumed to act prudently, there was no reason to question the stability of the whole financial system. The sum of the parts would at least be equal to the whole. In official jargon, microprudence would ensure macroprudence.

Meanwhile, in the area of macroeconomic policy, it was supposed that, macroeconomic stability would be achieved, if central banks would implement monetary policy with a view to reducing the variability of inflation at around a certain level. The nexus between price and financial stability, however, was not adequately addressed.¹

It was a wonderful world of macroeconomic stability while it lasted. This came to be called the Great Moderation, sometime in the early 2000s. In the advanced economies, 10-year average inflation fell from 6.3 percent in the 1980s to 2.9 percent in the 1990s, and further to 2.0 percent in the decade before the Crisis -- that is, from 1998 to 2007. The financial industry flourished, and cities around the world aimed for the status of a global financial center. The beauty of the whole development was that not only were actual macroeconomic and financial performance good, they also were founded on established economic and financial theories. There were hiccups, of course, with some of them quite serious, like the collapse of Long-Term Capital Management in September 1998, but these were regarded as failures to employ the theoretical framework rigorously enough.

¹ For a discussion of the prevailing monetary policy framework, see Mervyn King, "Twenty years of inflation targeting" (The Stamp Memorial Lecture at the London School of Economics), October 9, 2012.

<http://www.bankofengland.co.uk/publications/Documents/speeches/2012/speech606.pdf>

See also Masaaki Shirakawa, "Revisiting the Philosophy behind Central Bank Policy" (Speech at the Economic Club of New York), April 22, 2010.

http://www.boj.or.jp/en/announcements/press/koen_2010/data/ko1004e.pdf

Structural Roots of the Crisis

From the viewpoint of actors during the Great Moderation, the Crisis should never have happened. If central banks had maintained price stability, public authorities had worked to remove impediments to market functioning, and financial actors had continued to refine their risk management framework, it was inconceivable that a global credit bubble so large could develop in the first place, let alone pop with such devastating consequences. A consensus has yet to emerge on the reason why the Crisis occurred, but it seems to me that blaming it solely on the greed or fallibility of the actors involved is definitely not appropriate. We can now identify a widely-shared mind-set regarding prices in financial markets that bred the Crisis. Today, I would like to illustrate the shortcomings of this mind-set from two angles. One is the fact that financial markets can and sometimes do overshoot. The other is that there is only so much information that could be extracted from prices in financial markets.

The prevailing view before the Crisis drew an important conclusion from the apparent "random walk" of market prices, which reflected all available information. Prices changing at random, most often reflecting new information, were regarded as the best estimate of the intrinsic value of financial instruments. In such a market, a market participant that consistently makes mistakes and keeps on selling low and buying high will inevitably be forced out because of mounting losses. Consequently, the market will have to be populated by participants who can generally make the right calls, and a market populated by such well-informed participants should not be susceptible to persistent price overshoots. As a footnote, short selling and derivatives are seen as beneficial practices in this context, because they will allow market participants to bet against misalignments more easily and cheaply.

Why, then, do bubbles appear? In other words, how can market prices continue to overshoot for a long time?

One way to answer this question is to place the blame on market participants' excess optimism. When market participants become too optimistic, this distorts market prices,

which then begin to overshoot. This can even happen among perfectly rational market participants, because the intrinsic value of any financial instrument cannot be observed.

Prices in the market may be "fair value," in the sense that this is the best of all available estimates. Nevertheless, that does not guarantee that the market price equals the intrinsic value. In order for that to happen, market participants have to compete to determine the intrinsic value of a traded instrument. As pointed out by Lord Keynes, however, market participants could instead be focused on anticipating what other market participants would consider the market price to be. The market price would then be the best estimate of the average opinion on that price, and not the best estimate of the intrinsic value. If, for some reason, market participants come to believe that other market participants would expect prices to rise, the market price will rise irrespective of any changes in intrinsic value. Such a self-fulfilling cycle would lead to overshooting prices and bubbles.

The confusion of fair value and intrinsic value also led to the mistaken belief that information extracted from market prices would prevent future disasters. The prevailing financial theories and financial technology derived from such theories masked the obvious fallacy of such a view.

It was widely believed that, by observing the past patterns of market price fluctuations, the intrinsic probability distribution of such fluctuations and the correlations between various prices could be estimated. Once the probability distributions -- conveniently reduced to volatility and the mean under the assumption of the bell curve -- and correlations were determined, those numbers were fed into computers to compute measures of risk, such as value-at-risk. Estimated probability distributions also gave market participants a sense of security that, if they could construct reasonably diversified portfolios, outcomes would be in line with the expected returns implied by the distributions.

As a result, market participants became too sanguine in their risk-taking activities. They conveniently assumed that, as long as they followed the models and heeded the risk measures, they were taking only small risks and were managing them very carefully. The situation was exacerbated by the fact that the alignment of expectations among market

participants, which led to an ever-widening gap between intrinsic value and market prices, had the effect of reducing volatility and thus risk measures. The risk measures were reaching their lows just as the Crisis was about to strike. This is why market participants were so dumbstruck when volatility exploded and correlations became unhinged in 2008. The Crisis was not meant to happen if the reality fitted the models and theories, and if information extracted from prices had forewarned all calamities. Sadly, however, models and theories are descriptive views on how the world is working, and not prescriptive views on how the world should work. Financial markets will inevitably deviate from what could be inferred from models, theories, and past patterns of market prices.

Lessons of the Crisis for Central Banks

So, what are the lessons of the Crisis with respect to our approach to markets?

It may be strange to say this after a lengthy description of faults in processing market information, but developments in the financial markets will continue to be some of the most important sources of information from the perspective of central banks, as they conduct their monetary and financial stability policies. Financial markets mirror what is happening in the broader economy. Even if central banks were not completely free of the prevailing attitude toward the market that led to the Crisis, there were forceful voices within the community that warned against the buildup of risks based on market observations. Central banks should continue to make every effort to extract information from the markets. As Alan Blinder once remarked, broad, deep, fluid markets are indeed repositories of enormous power and wisdom.²

Having said this, the first lesson is that central banks should not look away from market reactions of which they may disapprove. For example, during the 1990s and early 2000s, after the bubble burst in Japan, in spite of repeated assurances by the Japanese government and the Bank of Japan, markets questioned the viability of the Japanese banking system. There was dissatisfaction with this tyranny of the markets. Because of the self-fulfilling nature of problems in the banking sector, the situation could easily have gotten out of hand. Similar developments were observed in the recent Crisis as well. Nevertheless, looking

² Blinder, Alan, *Central Banking in Theory and Practice*, The MIT Press, 1998.

back, there was some measure of reason in the reactions of markets. One should never stop talking to the mirror, even if it says that the prettiest of them all is somewhere else.

The second lesson is that, central banks should never forget the ephemeral nature of information that could be extracted from market prices. As I explained earlier, these are prone to overshooting. Central banks can calculate all sorts of implied information, but the informational content of such numbers is heavily influenced by the models adopted. Sometimes, market prices may only be reflecting the positions and actions of the central banks themselves. Accordingly, while market prices allow central banks to come up with the best estimates, central banks must not lose sight of what they are trying to estimate.

The third lesson is the importance of the diversity of market participants, especially in terms of their risk preferences and investment horizons. Homogenous market participants tend to magnify mistakes, increasing the risks of market instability. Diversity is preferable, but irresistible forces such as rules and regulations regarding capital, risk management, and disclosure could inadvertently homogenize the risk preferences and time horizons adopted by market participants. Unfortunately, there are no good answers, and central banks must stand ready to fix any problems as they arise.

Lastly, while central banks should have deep respect for financial markets, for the reasons I have just explained, they should be willing to stand up to the market from time to time. In order to deliver sustainable economic growth under price stability, central banks must have a very long time horizon. This point is especially relevant for financial stability, because financial cycles tend to be quite long. As Alan Blinder had noted, central banks must avoid a situation where "the market reacts, or rather overreacts, to perceptions about what the central bank *might* do, and the central bank looks to the markets for guidance about what it *should* do."³

An example of how a central bank should conduct its policy in the face of market expectations is the Bank of Japan's current commitment to ease monetary policy aggressively. That commitment is conditional on there being no significant risk to the

³ Blinder, Alan, *id.*

sustainability of economic growth, including the accumulation of financial imbalances. The Bank of Japan will, in this context, conduct an assessment independent of what markets might be thinking, while taking full account of information derived from markets. Turning to Europe, the European Central Bank is committed to fixing the transmission mechanism of monetary policy in the euro area, showing that the Bank may have a different view from the market on where the various sovereign spreads should be.

Concluding Remarks

Today, I have offered my views on how overconfidence in extracting information from financial markets contributed to the formation of financial bubbles that brought about the Crisis. The strong emphasis, by market participants as well as public authorities, on the deep wisdom of financial markets before the Crisis has now brought about a public backlash against anything that even has a whiff of using finance or market forces to solve social issues. This is unfortunate because, if used wisely, the market is still the best arbiter of economic outcomes, finance is the art of the possible, and well- functioning markets will open new horizons. The lessons for central banks that I have just described apply largely to market participants as well. The financial industry should also read the writing on the wall about acceptable behavior regarding profits and compensation in the aftermath of the Crisis. What the market will bear is no longer an acceptable attitude. With the full recognition of such changes, leading to a more nuanced approach to information extracted from market prices, financial institutions should be able to maximize their contribution to global economic recovery.

Thank you for your attention.