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BEFORE THE U.S. HOUSE OF REPRESENTATIVES COMMITTEEE ON OVERSIGHT AND GOVERNMENT REFORM

NOVEMBER 13, 2008

Thank you Mr. Chairman and members of the Committee.

The salient feature of the current financial crisis is that it was not caused by some external shock like OPEC raising the price of oil or a particular country or financial institution defaulting. The crisis was generated by the financial system itself. This fact—that the defect was inherent in the system—contradicts the prevailing theory, which holds that financial markets tend toward equilibrium and that deviations from the equilibrium either occur in a random manner or are caused by some sudden external event to which markets have difficulty adjusting. The severity and amplitude of the crisis provides convincing evidence that there is something fundamentally wrong with this prevailing theory and with the approach to market regulation that has gone with it. To understand what has happened, and what should be done to avoid such a catastrophic crisis in the future, will require a new way of thinking about how markets work.

Consider how the crisis has unfolded over the past eighteen months. The proximate cause is to be found in the housing bubble or more exactly in the excesses of the subprime mortgage market. The longer a double-digit rise in house prices lasted, the more lax the lending practices became. In the end, people could borrow 100 percent of inflated house prices with no money down. Insiders referred to subprime loans as ninja loans—no income, no job, no questions asked.

The excesses became evident after house prices peaked in 2006 and subprime mortgage lenders began declaring bankruptcy around March 2007. The problems reached crisis proportions in August 2007. The Federal Reserve and other financial authorities had believed that the subprime crisis was an isolated phenomenon that might cause losses of around $100 billion. Instead, the crisis spread with amazing rapidity to other markets. Some highly leveraged hedge funds collapsed and some lightly regulated financial institutions declared bankruptcy.

Confidence in the creditworthiness of many financial institutions was shaken and interbank lending was disrupted. In quick succession, a variety of esoteric credit markets—ranging from collateralized debt obligations [CDOs] to auction-rated municipal bonds—broke down one after another. After periods of relative calm and partial recovery, crisis episodes recurred in January 2008, precipitated by a rogue trader at Société Générale; in April, associated with the demise of Bear Stearns; and then in July, when IndyMac Bank, the largest savings bank in the Los Angeles area, went into receivership, becoming the fourth-largest bank failure in US history. The deepest fall of all came in September, caused by the disorderly bankruptcy of Lehman Brothers in which holders of commercial paper—for example, short-term, unsecured promissory notes—issued by Lehman lost their money.

Then the inconceivable occurred: the financial system actually melted down. A large money market fund that had invested in commercial paper issued by Lehman Brothers "broke the buck," i.e., its asset value fell below the dollar amount deposited, breaking an implicit promise that deposits in such funds are totally safe and liquid. This started a run on money market funds and the funds stopped buying commercial paper. Since they were the largest buyers, the commercial paper market ceased to function. The issuers of commercial paper were forced to draw down their credit lines, bringing interbank lending to a standstill. Credit spreads—i.e., the risk premium over and above the riskless rate of interest—widened to unprecedented levels and eventually the stock market was also overwhelmed by panic. All this happened in the space of a week.

With the financial system in cardiac arrest, resuscitating it took precedence over considerations of moral hazard—i.e., the danger that coming to the rescue of a financial institution in difficulties would reward and encourage reckless behavior in the future—and the authorities injected ever larger quantities of money. The balance sheet of the Federal Reserve ballooned from $800 billion to $1,800 billion in a couple of weeks. When that was not enough, the American and European financial authorities committed themselves not to allow any other major financial institution to fail.

These unprecedented measures have begun to have an effect: interbank lending has resumed and the London Interbank Offered Rate (LIBOR) has improved. The financial crisis has showed signs of abating. But guaranteeing that the banks at the center of the global financial system will not fail has precipitated a new crisis that caught the authorities unawares: countries at the periphery, whether in Eastern Europe, Asia, or Latin America, could not offer similarly credible guarantees, and financial capital started fleeing from the periphery to the center. All currencies fell against the dollar and the yen, some of them precipitously. Commodity prices dropped like a stone and interest rates in emerging markets soared. So did premiums on insurance against credit default. Hedge funds and other leveraged investors suffered enormous losses, precipitating margin calls and forced selling that have also spread to markets at the center.

Unfortunately the authorities are always lagging behind events. The International Monetary Fund is establishing a new credit facility that allows financially sound periphery countries to borrow without any conditions up to five times their annual quota, but that is too little too late. A much larger pool of money is needed to reassure markets. And if the top tier of periphery countries is saved, what happens to the lower-tier countries? The race to save the international financial system is still ongoing. Even if it is successful, consumers, investors, and businesses are undergoing a traumatic experience whose full impact on global economic activity is yet to be felt. A deep recession is now inevitable and the possibility of a depression cannot be ruled out. When I predicted earlier this year that we were facing the worst financial crisis since the 1930s, I did not anticipate that conditions would deteriorate so badly.

This remarkable sequence of events can be understood only if we abandon the prevailing theory of market behavior. As a way of explaining financial markets, I propose an alternative paradigm that differs from the current one in two respects. First, financial markets do not reflect prevailing conditions accurately; they provide a picture that is always biased or distorted in one way or another. Second, the distorted views held by market participants and expressed in market prices can, under certain circumstances, affect the so-called fundamentals that market prices are supposed to reflect. This two-way circular connection between market prices and the underlying reality I call reflexivity.

While the two-way connection is present at all times, it is only occasionally, and in special circumstances, that it gives rise to financial crises. Usually markets correct their own mistakes, but occasionally there is a misconception or misinterpretation that finds a way to reinforce a trend that is already present in reality and by doing so it also reinforces itself. Such self-reinforcing processes may carry markets into far-from-equilibrium territory. Unless something happens to abort the reflexive interaction sooner, it may persist until the misconception becomes so glaring that it has to be recognized as such. When that happens the trend becomes unsustainable and when it is reversed the self-reinforcing process starts working in the opposite direction, causing a sharp downward movement.

The typical sequence of boom and bust has an asymmetric shape. The boom develops slowly and accelerates gradually. The bust, when it occurs, tends to be short and sharp. The asymmetry is due to the role that credit plays. As prices rise, the same collateral can support a greater amount of credit. Rising prices also tend to generate optimism and encourage a greater use of leverage—borrowing for investment purposes. At the peak of the boom both the value of the collateral and the degree of leverage reach a peak. When the price trend is reversed participants are vulnerable to margin calls and, as we've seen in 2008, the forced liquidation of collateral leads to a catastrophic acceleration on the downside.

Bubbles thus have two components: a trend that prevails in reality and a misconception relating to that trend. The simplest and most common example is to be found in real estate. The trend consists of an increased willingness to lend and a rise in prices. The misconception is that the value of the real estate is independent of the willingness to lend. That misconception encourages bankers to become more lax in their lending practices as prices rise and defaults on mortgage payments diminish. That is how real estate bubbles, including the recent housing bubble, are born. It is remarkable how the misconception continues to recur in various guises in spite of a long history of real estate bubbles bursting.

Bubbles are not the only manifestations of reflexivity in financial markets, but they are the most spectacular. Bubbles always involve the expansion and contraction of credit and they tend to have catastrophic consequences. Since financial markets are prone to produce bubbles and bubbles cause trouble, financial markets have become regulated by the financial authorities. In the United States they include the Federal Reserve, the Treasury, the Securities and Exchange Commission, and many other agencies.

It is important to recognize that regulators base their decisions on a distorted view of reality just as much as market participants—perhaps even more so because regulators are not only human but also bureaucratic and subject to political influences. So the interplay between regulators and market participants is also reflexive in character. In contrast to bubbles, which occur only infrequently, the cat-and-mouse game between regulators and markets goes on continuously. As a consequence reflexivity is at work at all times and it is a mistake to ignore its influence. Yet that is exactly what the prevailing theory of financial markets has done and that mistake is ultimately responsible for the severity of the current crisis.

In my book *The New Paradigm for Financial Markets*,* I argue that the current crisis differs from the various financial crises that preceded it. I base that assertion on the hypothesis that the explosion of the US housing bubble acted as the detonator for a much larger "super-bubble" that has been developing since the 1980s. The underlying trend in the super-bubble has been the ever-increasing use of credit and leverage. Credit—whether extended to consumers or speculators or banks—has been growing at a much faster rate than the GDP ever since the end of World War II. But the rate of growth accelerated and took on the characteristics of a bubble when it was reinforced by a misconception that became dominant in 1980 when Ronald Reagan became president and Margaret Thatcher was prime minister in the United Kingdom.

The misconception is derived from the prevailing theory of financial markets, which, as mentioned earlier, holds that financial markets tend toward equilibrium and that deviations are random and can be attributed to external causes. This theory has been used to justify the belief that the pursuit of self-interest should be given free rein and markets should be deregulated. I call that belief market fundamentalism and claim that it employs false logic. Just because regulations and all other forms of governmental interventions have proven to be faulty, it does not follow that markets are perfect.

Although market fundamentalism is based on false premises, it has served well the interests of the owners and managers of financial capital. The globalization of financial markets allowed financial capital to move around freely and made it difficult for individual states to tax it or regulate it. Deregulation of financial transactions also served the interests of the managers of financial capital; and the freedom to innovate enhanced the profitability of financial enterprises. The financial industry grew to a point where it represented 25 percent of the stock market capitalization in the United States and an even higher percentage in some other countries.

Since market fundamentalism is built on false assumptions, its adoption in the 1980s as the guiding principle of economic policy was bound to have negative consequences. Indeed, we have experienced a series of financial crises since then, but the adverse consequences were suffered principally by the countries that lie on the periphery of the global financial system, not by those at the center. The system is under the control of the developed countries, especially the United States, which enjoys veto rights in the International Monetary Fund.

Whenever a crisis endangered the prosperity of the United States—as for example the savings and loan crisis in the late 1980s, or the collapse of the hedge fund Long Term Capital Management in 1998—the authorities intervened, finding ways for the failing institutions to merge with others and providing monetary and fiscal stimulus when the pace of economic activity was endangered. Thus the periodic crises served, in effect, as successful tests that reinforced both the underlying trend of ever-greater credit expansion and the prevailing misconception that financial markets should be left to their own devices.

It was of course the intervention of the financial authorities that made the tests successful, not the ability of financial markets to correct their own excesses. But it was convenient for investors and governments to deceive themselves. The relative safety and stability of the United States, compared to the countries at the periphery, allowed the United States to suck up the savings of the rest of the world and run a current account deficit that reached nearly 7 percent of GNP at its peak in the first quarter of 2006. Eventually even the Federal Reserve and other regulators succumbed to the market fundamentalist ideology and abdicated their responsibility to regulate. They ought to have known better since it was their actions that kept the United States economy on an even keel. Alan Greenspan, in particular, believed that giving users of financial innovations such as derivatives free rein brought such great benefits that having to clean up behind the occasional financial mishap was a small price to pay. And his analysis of the costs and benefits of his permissive policies was not totally wrong while the super-bubble lasted. Only now has he been forced to acknowledge that there was a flaw in his argument.

Financial engineering involved the creation of increasingly sophisticated instruments, or derivatives, for leveraging credit and "managing" risk in order to increase potential profit. An alphabet soup of synthetic financial instruments was concocted: CDOs, CDO2s, CDSs, ABXs, CMBXs, etc. This engineering reached such heights of complexity that the regulators could no longer calculate the risks and came to rely on the risk management models of the financial institutions themselves. The rating companies followed a similar path in rating synthetic financial instruments, deriving considerable additional revenues from their proliferation. The esoteric financial instruments and risk management techniques were based on the false premise that, in the behavior of the market, deviations from the mean occur in a random fashion. But the increased use of financial engineering set in motion a process of boom and bust. So eventually there was hell to pay. At first the occasional financial crises served as successful tests. But the subprime crisis came to play a different role: it served as the culmination or reversal point of the super-bubble.

It should be emphasized that this interpretation of the current situation does not necessarily follow from my model of boom and bust. Had the financial authorities succeeded in containing the subprime crisis—as they thought at the time they would be able to do—this would have been seen as just another successful test instead of the reversal point. I have cried wolf three times: first with *The Alchemy of Finance* in 1987, then with *The Crisis of Global Capitalism* in 1998, and now. Only now did the wolf arrive.

My interpretation of financial markets based on reflexivity can explain events better than it can predict them. It is less ambitious than the previous theory. It does not claim to determine the outcome as equilibrium theory does. It can assert that a boom must eventually lead to a bust, but it cannot determine either the extent or the duration of a boom. Indeed, those of us who recognized that there was a housing bubble expected it to burst much sooner. Had it done so, the damage would have been much smaller and the super-bubble may have remained intact. Most of the damage was caused by mortgage-related securities issued in the last two years of the housing boom.

The fact that the new paradigm does not claim to predict the future explains why it did not make any headway until now, but in the light of recent experience it can no longer be ignored. We must come to terms with the fact that reflexivity introduces an element of uncertainty into financial markets that the previous theory didn't take into account. That theory was used to establish mathematical models for calculating risk and converting bundles of mortgages into tradable securities, as well as other forms of debt. Uncertainty by definition cannot be quantified. Excessive reliance on those mathematical models did untold harm.

The new paradigm has far-reaching implications for the regulation of financial markets. Since they are prone to create asset bubbles, regulators such as the Fed, the Treasury, and the SEC must accept responsibility for preventing bubbles from growing too big. Until now financial authorities have explicitly rejected that responsibility.

It is impossible to prevent bubbles from forming, but it should be possible to keep them within tolerable bounds. It cannot be done by controlling only the money supply. Regulators must also take into account credit conditions because money and credit do not move in lockstep. Markets have moods and biases and it falls to regulators to counterbalance them. That requires the use of judgment and since regulators are also human, they are bound to make mistakes. They have the advantage, however, of getting feedback from the market and that should enable them to correct their mistakes. If a tightening of margin and minimum capital requirements does not deflate a bubble, they can tighten them some more. But the process is not foolproof because markets can also be wrong. The search for the optimum equilibrium has to be a never-ending process of trial and error.

The cat-and-mouse game between regulators and market participants is already ongoing, but its true nature has not yet been acknowledged. Alan Greenspan was a past master of manipulation with his Delphic utterances, but instead of acknowledging what he was doing he pretended that he was merely a passive observer of the facts. Reflexivity remained a state secret. That is why the super-bubble could develop so far during his tenure.

Since money and credit do not move in lockstep and asset bubbles cannot be controlled purely by monetary means, additional tools must be employed, or more accurately reactivated, since they were in active use in the 1950s and 1960s. I refer to variable margin requirements and minimal capital requirements, which are meant to control the amount of leverage market participants can employ. Central banks even used to issue guidance to banks about how they should allocate loans to specific sectors of the economy. Such directives may be preferable to the blunt instruments of monetary policy in combating "irrational exuberance" in particular sectors, such as information technology or real estate.

Sophisticated financial engineering of the kind I have mentioned can render the calculation of margin and capital requirements extremely difficult if not impossible. In order to activate such requirements, financial engineering must also be regulated and new products must be registered and approved by the appropriate authorities before they can be used. Such regulation should be a high priority of the new Obama administration. It is all the more necessary because financial engineering often aims at circumventing regulations.

Take for example credit default swaps (CDSs), instruments intended to insure against the possibility of bonds and other forms of debt going into default, and whose price captures the perceived risk of such a possibility occurring. These instruments grew like Topsy because they required much less capital than owning or shorting the underlying bonds. Eventually they grew to more than $50 trillion in nominal size, which is a many-fold multiple of the underlying bonds and five times the entire US national debt. Yet the market in credit default swaps has remained entirely unregulated. AIG, the insurance company, lost a fortune selling credit default swaps as a form of insurance and had to be bailed out, costing the Treasury $126 billion so far. Although the CDS market may be eventually saved from the meltdown that has occurred in many other markets, the sheer existence of an unregulated market of this size has been a major factor in increasing risk throughout the entire financial system.

Since the risk management models used until now ignored the uncertainties inherent in reflexivity, limits on credit and leverage will have to be set substantially lower than those that were tolerated in the recent past. This means that financial institutions in the aggregate will be less profitable than they have been during the super-bubble and some business models that depended on excessive leverage will become uneconomical. The financial industry has already dropped from 25 percent of total market capitalization to 16 percent. This ratio is unlikely to recover to anywhere near its previous high; indeed, it is likely to end lower. This may be considered a healthy adjustment, but not by those who are losing their jobs.

Regarding hedge funds, it has to be recognized that hedge funds were also an integral part of the bubble which now has burst. Hedge funds grew to approximately $2 trillion of capital which at times controlled as much as $10 trillion or more in assets. But the bubble has now burst and hedge funds will be decimated. I would guess that the amount of money they manage will shrink by between 50 and 75 percent. During the current financial crisis, many hedge fund managers forgot the cardinal rule of hedge fund investing which is to protect investor capital during down markets. It is unfortunate that much of the money raised by hedge funds in recent years has come from the typically staid pension funds and endowment funds in their pursuit of "alpha."

In view of the tremendous losses suffered by the general public, there is a real danger that excessive deregulation will be succeeded by punitive reregulation. That would be unfortunate because regulations are liable to be even more deficient than the market mechanism. As I have suggested, regulators are not only human but also bureaucratic and susceptible to lobbying and corruption. It is to be hoped that the reforms outlined here will preempt a regulatory overkill.

I hope that my testimony has aided the Committee in understanding these issues, and I will do my best to answer any questions you may have.

* *The New Paradigm for Financial Markets: The Credit Crisis of 2008 and What It Means* (PublicAffairs, 2008).