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Financial Risk: An Overview of Market and Policy Considerations

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An Overview of Market and Policy Considerations

Summary

Financial risk is a measure of the variance of return on investment. In general, the higher the potential return, the greater is the probability of a loss. All financial choices are risky, not just those that involve new and untried ventures. Market discipline – balancing fear of losses against hope for gains – is what underlies the efficient allocation of capital in the economy.

Recent decades have seen striking advances in methods of risk measurement, as well as the development of financial instruments that allow users to separate the various risks bound up in single financial transactions and decide which risks they wish to bear and which they wish to transfer to others. These developments should promote financial efficiency (as firms specialize in the risks they understand best) and make market discipline more robust. However, even as private risk management has improved, financial crises have become more common around the world, leading government regulators to pay more attention to private risk taking.

Given the near-universal belief that private markets do a better job of allocating capital and judging risk than central planners, what justifies government intervention in the risk management process? The problem is that under certain circumstances financial losses may be borne not just by risk takers, but by "innocent bystanders" in the real economy. While all market participants have the incentive to limit their risk taking to prevent the loss of their own capital, no market participant has an incentive to limit its risk taking to reduce risks to the economy as a whole. The possibility that the failure of a single large financial institution, or simultaneous risk misjudgements by many firms (and regulators), may trigger a disruption in the markets that could damage the real economy is called systemic risk.

Regulators seek to control systemic risk by preventive measures, such as requiring financial intermediaries to maintain capital reserves as a cushion against unexpected losses. In addition, they are prepared to intervene when markets are under stress to prevent widening crises (or "falling dominoes"), by acting as the lender of last resort, in effect bailing out market participants who have misjudged risk. Both these regulatory tools have costs: they reduce funds available for lending or investment and weaken market discipline. A fundamental question that remains unresolved is how much time and resources governments should devote to preparation for systemic financial crises, which may be damaging when they occur, but which happen very seldom. Do the benefits justify the costs of intervening in private risk taking decisions?

This report surveys private market developments and policy issues related to financial risk. It is intended as an introductory overview, and will be updated only if warranted by significant market or legislative events.

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Financial Risk: An Overview of Market and Policy Considerations

Risk taking is the central feature of a free market economy. As such, the best oversight of private risk decisions is generally provided by market discipline (that is, the possibility of loss) rather than government regulation. Losses that follow from risky financial investments are painful to the individuals and firms who suffer them, but have positive economic effects: they send signals to the markets that guide capital to the most productive uses, maximizing economic growth and well-being.

However, in certain cases – as when a large financial institution makes a catastrophic error, or when many firms or investors make similar misjudgements at the same time – private risk taking becomes, in the view of most economists, a proper object for government oversight. In these extreme cases, losses may be borne not only by those who took risks in hope of gain, but by "innocent bystanders" as well. If these spillover effects are serious enough, a financial crisis may emerge, with potential damage to the real economy of jobs and production of goods and services.

The line between risk taking that spurs innovation and efficiency and excessive risk that threatens stability is never easy to discern. Making the distinction, however, is a key responsibility of Congress. Private markets and government agencies exercise risk judgement day-to-day, but Congress decides which markets are to be regulated and sets the parameters within which the regulators operate.

This report sets out a framework for considering the issue of financial risk and its regulation. First, basic concepts and the state of the art in private risk management are discussed. Then, scenarios for financial crises that may require government intervention are explored. The next section deals with the development and the shortcomings of tools available to regulators to prevent or cope with crises. The report ends with an analysis of current trends in financial markets and their implications for risk oversight.

Definitions

Financial risk is a measure of the variance of return on investment. In general, the higher the potential return, the greater is the probability of a loss. Financial risk is a subset of economic risk. The latter may be defined as the unpredictability of the outcome of decisions regarding the production of goods and services in the real economy, while the former reflects variations in the prices of contracts and instruments that represent claims on goods and services.

Economic growth depends on risky investment in new productive facilities; financial risk taking is necessary to supply innovators and entrepreneurs (as well as established firms) with capital. All financial choices are risky, not just those that involve new and untried ventures. A healthy capitalist economy requires "creative destruction" – the status quo must be constantly undermined. The replacement of the obsolete, upon which gains in general welfare depend, is accomplished by risk taking.

Losses are certain to accompany risk taking. However, while losses are painful to those directly affected, they do not ordinarily interfere with the progress of the financial system and the economy. Fear of loss is what prevents excessive risk taking that would result in the wasteful allocation of scarce resources, and also provides the incentive for risk takers to monitor their choices carefully.

There are four types of financial risk:

- market risk, which stems from fluctuations in financial variables (such as interest rates) or in the prices of financial assets;
- credit risk, or the possibility that borrowers may default on their obligation to repay debt;
- liquidity risk, or the possibility that assets may not be readily convertible into cash, except perhaps at a price too low to cover liabilities; and
- operational risk, a term not precisely defined, but which includes the possibility that risk management controls may break down and leave one exposed to unexpected losses.

In the markets, these types of risk are often closely intertwined. Any of them may result in sudden and unexpected losses to financial market participants. Systemic risk – defined more fully below – is not a distinct type of risk, but occurs when losses stemming from one or several of the four types of risk have repercussions beyond the firm or individual directly involved. A systemic risk, as the term is generally used, is one that can cause not just widespread disruption of financial markets, but harm to the real economy as well.

Advances in Risk Management

Individuals and firms active in financial markets have strong incentives to monitor the risks they take. Excessive risk taking may lead to ruin; excessive caution may have opportunity costs in the form of lost income. The need to measure risk has driven many of the most notable advances in financial theory and practice over the past half-century.[1] Sophisticated mathematical and statistical techniques have been

[1] This intellectual project, which has involved economists, physicists, statisticians, gamblers, psychologists, mathematicians, and traders, as well as finance professors, is recounted in:
(continued...)

developed to gauge the probabilities of gain or loss in individual financial assets or in complex portfolios of assets. No one believes that present techniques for measuring risk are the best that can be devised: theoretical and applied research continues. A measure of progress, however, is that a small investor with a personal computer can now perform more rigorous risk analysis, based on greater amounts of data, than was possible even a few years ago for the professional traders at institutions like Morgan Stanley or Citibank.

A general survey of risk measurement tools is beyond the scope of this report. However, to give a sense of the field, two key features of the current "state of the art" are discussed briefly below.

Value At Risk

Value-at-risk (VAR) analysis has become nearly universal at financial institutions over the past six years. The VAR calculation measures the probable distribution of profits or losses, producing a single dollar figure for the maximum amount that a portfolio should experience over a given time period. The calculation can be adjusted to produce various confidence levels: the standard is the 95% level, which means that in 95% of time periods of the specified length, losses will not exceed the VAR figure. The power of VAR is that it measures market risk across a firm's entire portfolio. The VAR figure provides a basis for decisions about how much capital a firm should set aside to cover possible losses, or about making adjustments to a firm's portfolio to conform with its risk tolerance.

VAR measures only market risk, but its popularity is partly a result of concerns about operational risk. As the variety and complexity of financial instruments have increased, and as more and more firms (including nonfinancial companies) have put significant resources at risk in trading markets, the importance of internal controls on risk taking has been highlighted. Regulators (as well as shareholders and directors) insist that senior management be aware of the risks implied by a firm's portfolio, no matter how complex or innovative its trading department's strategies may be. Several firms have lost billions or have failed because of "rogue traders," whose transactions were either not authorized or not understood. The VAR figure, as a comprehensive measure of market risk, is a useful tool for managers and regulators who have neither the time nor the expertise to evaluate the risk of every single transaction or investment position.

Derivatives

In addition to techniques for measuring risk, markets have over the past few decades developed new financial contracts to control financial risk. Derivative instruments, whose value is based on – derived from – the price of some other financial asset, can be used to modify the risk of holding many financial assets. For example, the owner of a portfolio of fixed interest bonds – which will lose value if

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[1] (...continued)
Bernstein, Peter L. *Against the Gods : The Remarkable Story of Risk.* New York, John Wiley, 1996. 383 p.

current interest rates rise – may purchase derivatives that will gain value if rates do go up. A drop in the price of bonds will be offset by a rise in the value of the derivatives. The market risk of holding bonds is thereby transferred, or hedged.

Derivatives now traded in the market offer protection against changes in currency exchange rates and the prices of stocks and commodities, as well as interest rates. The value of such contracts now in force is in the trillions of dollars. A relatively new form of derivative offers protection against credit risk. Credit swaps are a form of default insurance: the buyer is compensated if a borrower defaults on a loan or a bond, or if the borrower's credit rating is downgraded.

The availability of derivatives lets firms choose the risks they wish to bear. Often a single transaction carries many risks. For instance, if an American bank makes a fixed-rate loan, denominated in Euros, to a German firm, the bank faces three distinct risks. First, interest rates may rise, making the loan less profitable (because the rate is fixed) than loans it could make at the new rate. Second, the dollar/euro exchange rate may change: if the dollar's value rises relative to the Euro, the income stream from the loan will be worth less in dollar terms. Third, the borrower may default. Swaps allow the bank to hedge any or all of these risks: an interest rate swap will allow the bank to receive floating rate interest payments,[2] a currency swap allows it to fix the exchange rate over the term of the loan,[3] and, finally, it can use a credit swap to hedge the risk of default.

Derivatives markets do not reduce the total amount of risk in the financial system; they merely permit it to be reallocated. A risk that is hedged does not disappear. It must be assumed by someone else, often a speculator seeking to profit by forecasting trends in the financial variables that underlie derivative instruments. In the aggregate, derivatives ought to increase the efficiency of the financial system by allowing market participants to specialize in the risks that they best understand.

Summary

In summary, the past several decades have seen advances in risk measurement and risk management tools. To the extent that they can quantify and control financial risk, firms can avoid real economic costs. If they can limit losses to tolerable levels, they avoid financial distress and its accompanying costs. If they can reduce volatility in the cash flows linked to their financial operations, they eliminate "noise" from their accounting statements, which may make them appear less risky to investors and

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[2] With an interest rate swap, the bank would agree to pay a swap dealer a fixed interest rate (the amount it will receive from its German customer) and to receive from the swap dealer a floating rate pegged to Libor or some other interest rate benchmark. If interest rates rise, income from the swap rises. Notice that the borrower continues to pay fixed interest; the swapping of fixed for floating rates takes place in the derivatives market.

[3] A currency swap consists of the two counterparties (in this case, the bank and a swap dealer) agreeing to exchange currencies at a fixed rate over a certain term. If, in the example, the dollar rises relative to the Euro, the bank is unharmed, because it continues to receive (from the swap dealer) a fixed number of dollars for the fixed number of Euros it receives from the borrower.

lenders and lower their cost of capital. Their return on financial investment may be higher if they can "unbundle" the various risks inherent in individual transactions and decide to bear some of those risks and hedge others. They may gain flexibility in their financing arrangements – U.S. firms may find it advantageous to borrow in foreign markets and swap their repayment obligations into dollars, for example.

The Government Role

If private market participants have strong incentives to monitor the financial risks they assume, and if the risk measurement tools available to them have become – and continue to grow – more sophisticated, what is the need for government regulation? It is an axiom of market economics that no central planner can allocate capital (that is, weigh risks and rewards) as efficiently as the invisible hand, which is the collective judgement of millions of firms and investors with their own money at stake. Why then do central bankers and other regulators seek to impose limits on risk-taking by financial institutions? Why should we expect them to be any more successful in preserving the soundness of the financial system than the market itself?

There are several ways to justify government intervention in financial markets. Even if all individual market participants adopt rational risk strategies, the result may be market instability at the aggregate level. Each member of an audience may be capable of running to the theater exit, but if all do so at once there will be chaos. In the mid-1980s, many large institutional investors in the stock market followed a "portfolio insurance" strategy which directed them to sell stock index futures and options[4] as stock prices declined. The value of these derivatives contracts would rise if the market continued to fall: the net effect of the strategy was supposed to be to put a floor under the value of a stock portfolio and limit the maximum possible loss. The assumption was that the futures and options markets would always provide liquidity, that is, that they would be willing to assume the risk the portfolio insurers wished to avoid. This was not the case in October 1987. As stock prices weakened, the portfolio insurers' orders overwhelmed the available liquidity in the derivatives markets and futures and options prices plunged. Unable to hedge their growing risk exposure, many institutions dumped stocks and the market crashed. According to the Securities and Exchange Commission (SEC), the widespread use of portfolio insurance "accelerated and exacerbated" the price drop on October 19, 1987, when the Dow Jones Industrial Average fell 23% in a single day.[5]

In other words, while all market participants have the incentive to limit their risk-taking to prevent the loss of their own capital, no market participant has an incentive to limit its risk-taking in order to reduce risks to the market as a whole. Another way

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[4] Index futures and options are derivatives contracts whose value is a multiple of the underlying stock index figure (e.g., the S&P 500 times $500). These contracts allow speculators to play the market without actually owning stock, while holders of stock portfolios may hedge market risk by purchasing contracts that will gain value as the underlying stock indexes fall.

[5] U.S. Securities and Exchange Commission. Division of Market Regulation. *The October 1987 Market Break.* Washington, SEC, February 1988. p. xiii.

to put this is that private risk taking has externalities: losses that occur may not be borne entirely by the profit-seeking risk takers, but may also fall upon "innocent bystanders" in the economy.

For example, if banks have a large share of their assets in the form of loans to real estate developers, and there is a downturn in the property market, loan losses will rise and the banks will have to build up capital reserves by curtailing new lending and/or calling in existing loans. The availability of credit to all firms (not just developers) will decline. If enough banks are affected, there will be an economy-wide contraction of lending, reducing business investment and slowing economic growth.[6]

Other financial events, such as sudden volatility or disruption in securities or currency markets, may also interrupt the smooth functioning of the financial system. Herd behavior is often observed in investors and financial institutions. When a widely-followed market trend unexpectedly reverses itself, what appeared to be reasonable, manageable, and measurable risks are transformed into uncertainty. In common usage, risk and uncertainty are synonyms, but in finance they are opposites: risk can be measured, uncertainty cannot. Investors know that risks can produce losses, but when there is uncertainty they cannot estimate the probability of loss.

In market conditions dominated by uncertainty, investors may become excessively risk-averse. If enough seek to liquidate their risky assets or refuse to accept any new risk, the result may be a panicky over-reaction which disrupts the process of financial intermediation, whereupon, in extreme cases, the system will cease to funnel capital from suppliers to users, and the real economy of jobs, goods, and services will feel the impact.

This sequence of events – serious financial disruptions constricting the flow of funds to industries and entrepreneurs – is called systemic risk. It begins when a single loss, or series of losses, triggers repercussions throughout the financial system. The vast majority of financial losses, or shocks, do not become systemic crises. The conditions under which a widespread crisis develops, and the pathways by which problems in one market are transmitted to others, are unpredictable and often mysterious. The key point, however, is that these conditions and transmittal mechanisms fall outside the scope of the risk management concerns of private firms and investors. Therefore, it is up to regulators to be vigilant against the possibility that risk taking by private market participants – even though it is subject to market discipline that enforces prudence through fear of loss – may suddenly and unexpectedly become the source of a systemic crisis.

The next two sections of this report consider various systemic risk scenarios and the tools that regulators have to prevent or cope with financial crises.

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[6] This example is based on actual events in the recession of 1990-91. See CRS Report 93-649 E, *Credit Crunch: A Monetary or a Regulatory Problem?*, by William Jackson and Gail Makinen.

Systemic Risk Scenarios

Contagion/Falling Dominoes

The classic case of systemic risk is the bank run. In the absence of deposit insurance, it is reasonable for customers to withdraw their money when the bank is in difficulty (or even rumored to be). However, if all depositors do this, the bank will fail, because depositors' funds are not held in the vault but are lent to businesses and individuals. Thus, there is a premium on being first in the withdrawal line. If one bank fails, otherwise sound neighboring banks may face runs if their customers adopt a "better safe than sorry" attitude (individually rational but collectively disastrous). Bank runs are contagious – a problem in a single institution can spread quickly to others.

The phenomenon of the bank run was largely (but not entirely[7]) eliminated by deposit insurance, established in the United States in the 1930s. Financial contagion may take other forms, however. During the Asian financial crisis of 1997-98, the domino theory provided an apt description of events. The crisis began in Thailand and then jumped to half-a-dozen other countries in the region where macroeconomic conditions and government policies were significantly different.[8] A similar pattern was observed in Europe in the early 1990s, when several countries in sequence were forced to abandon their exchange rate targets and devalue their currencies after coming under intense speculative pressure in the foreign exchange market. Again, there were similar financial episodes, in countries as diverse as Great Britain and Greece. According to the Financial Stability Forum, "international liquidity crises ... can emerge as the international analog to the domestic bank run."[9]

Many economists argue that the focus on contagion is misplaced or exaggerated, that financial crisis is generally a symptom of some underlying imbalance in the macro economy, or a misguided economic policy (such as, in the examples cited above, a fixed exchange rate). A number of developments in financial markets (in addition to the crises noted above), however, make it impossible for regulators to ignore the possibility of contagion. What is generally called the "globalization" of markets consists of several factors, including the following:

- communications and computer links make it practical for large traders to effect transactions in all major markets around the world;

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[7] Several thrift institutions experienced runs during the savings and loan crisis of the 1980s, as depositors feared not the loss of their savings but the prospect of having their funds frozen for several months as the institution was reorganized or closed.

[8] See CRS report RL30272, *Global Financial Turmoil, the IMF, and the New Financial Architecture*, by Dick Nanto.

[9] Financial Stability Forum. *Report of the Working Group on Highly Leveraged Institutions*. April 5, 2000. p. 144. (The Financial Stability Forum is an international group of central bank regulators meeting under the auspices of the Bank for International Settlements, the "central banker's central bank.")

- news that affects prices is instantly available worldwide;
- major securities, derivatives, and currency markets trade on a 24-hour basis;
- legal and regulatory barriers to cross-border trading and capital movements have been relaxed or eliminated; and
- there exist large pools of speculative capital ("hot money") that can shift rapidly from market to market, often with little or no regulatory oversight.[10]

The result is that financial events have "echoes" around the world, which often seem to ignore fundamental economic conditions. For example, the 554-point drop in the Dow Jones Industrial Average recorded on October 27, 1997, was attributed to Hong Kong's financial crisis, even though the U.S. economy and stock market were both in the midst of long booms, and U.S./Hong Kong trade and U.S. positions in Hong Kong's financial markets were both extremely modest in proportion to the U.S. economy.[11] Rather than seek an explanation for this sudden market volatility based on fundamentals, it seems more plausible to say that investors got a whiff of panic. (Other markets around the world also fell sharply.[12])

The increasing linkages among world markets mean that national financial systems and their regulators have to contend with random "shocks" generated elsewhere. Of course, most such shocks do not cause financial crises – in the 1997 Hong Kong episode, the Dow had a record gain the next day. But these short-lived disruptions do have the potential to trigger systemic problems if they expose underlying imbalances in financial markets that regulators and market participants have not recognized or addressed. Hence, this form of financial contagion may be a result of the breakdown of the relative insulation in which national markets used to operate.

Too Big to Fail

A variation on the domino theory is the concern that failure of a single large financial firm could damage others, both directly – by defaulting on uninsured obligations – and indirectly – by creating uncertainty about the financial condition of other institutions thought to have similar portfolios. Hence, it is commonly assumed that regulators stand ready to bail out certain key institutions that are deemed "too big to fail."

The U.S. financial system has proved robust in cases of large financial failures. In the past few decades, systemic problems failed to appear after the failures of the

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[10] Examples of such pools are hedge funds (unregulated mutual funds) and the proprietary trading operations of large commercial and investment banks.

[11] See CRS Report 97-992 E, *Hong Kong's Financial Crisis and the U.S. Market*, by Mark Jickling.

[12] It has been observed that price movements in international stock markets have become more closely correlated. See: Highly Contagious. *Economist*, March 24, 2001. p. 83.

Penn Central railroad (which some predicted would destroy the commercial paper market), the investment bank Drexel Burnham Lambert (which dominated the junk bond market), and Continental Illinois, at one time the second largest commercial bank in the United States.

The potential for disruptions stemming from a single institution in difficulty remains, however, as was demonstrated in 1998 by the case of the hedge fund Long-Term Capital Management (LTCM). LTCM was saved from collapse by the Federal Reserve Bank of New York, because of the systemic risk implications of default.[13]

The nature of the systemic threat posed by LTCM remains unclear, because details of the hedge fund's portfolio were never made public, even after the regulatory intervention. However, it is generally known that LTCM had a highly-leveraged bond portfolio[14] worth about $100 billion and a derivatives portfolio of about $1.2 trillion in notional value. Liquidating a bond portfolio of that size might have depressed markets, or caused them to "seize up." (International bond markets were already under stress because of the Asian crises and the Russian government's default on its debt.) The consequences of a default on LTCM's derivatives obligations are harder to assess, because of the existence of a large, unregulated market, about which government agencies have little timely information.

Unregulated over-the-counter (OTC) derivatives[15] make up a huge market in instruments that are linked to the prices of various economic variables, principally interest rates and currencies. Customers for these instruments include thousands of financial institutions, corporations, institutional investors, and units of government that seek to avoid financial risk or speculate on price changes. At the dealer level, however, the OTC derivatives market is dominated by a handful of large firms – two dozen American, European, and Japanese commercial and investment banks account for about 95% of all contracts. These dealer firms trade heavily with each other and operate on a global scale. The failure of a major OTC dealer could have unpredictable consequences; this may have been one of the considerations of the Federal Reserve when it decided to prevent the collapse of LTCM.

Other financial markets are dominated by a few institutions. Credit risk exposure in the home mortgage market, for example, is highly concentrated in the Federal Housing Administration and two government-sponsored enterprises (Fannie Mae and Freddie Mac).

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[13] The LTCM rescue did not involve government funds; rather the Fed persuaded 14 of the hedge fund's creditors to buy out the existing management and owners. Some view it as remarkable that these creditors – who had the most to lose – did not act themselves to prevent default. By some accounts, they were making short-term profits off the fund's distress, by selling in advance of LTCM's attempts to liquidate its portfolio ("frontrunning"), and it was left to the Fed to consider the potential systemic risk and intervene.

[14] A portfolio, that is, financed almost entirely with borrowed money.

[15] The major OTC contracts are swaps and options. This unregulated market contrasts to the regulated futures exchanges, which also trade instruments that gain or lose value as an underlying price or rate changes, and offer the same risk management possibilities.

The passage of financial modernization legislation in the 106th Congress (the Gramm-Leach-Bliley Act, P.L. 106-102) opened the way to further consolidation among financial firms, as barriers to affiliation among banks, brokers, and insurers were removed. The result may be the creation of increasingly large and complex financial institutions. While regional and product diversification may reduce risk in a large institution, there is also the opposite possibility. A recent Group of Ten study suggests that "if such an institution became seriously distressed, consolidation and any attendant complexity might increase the chance that winding down the organization would be difficult or disorderly."[16]

Irrational Exuberance and Asset Bubbles

In the wake of the recent Asian crisis, failure of a single institution is less often put forward as a model for systemic risk than a situation in which many institutions and investors make the same mistake at the same time. Before 1997, the conventional wisdom was that the "Asian tigers" could continue to grow at annual rates of above 10% indefinitely. This belief was current not just among private lenders avid for profits, but was supported – tacitly or explicitly – by the actions of government regulators and international financial organizations like the International Monetary Fund (IMF). Lending to Asian businesses appeared much less risky than it was, and Asian banks took out foreign currency loans from foreign institutions to support domestic credit expansion. When trouble came, the affected countries faced simultaneous crises in banking and foreign exchange markets, overwhelming their financial systems and triggering drops in real economic output of the magnitude of the Great Depression in the United States.

The recent performance of technology stocks on the Nasdaq market[17] made the concept of an "asset bubble" familiar. A bubble forms when investors become convinced that asset values far above historical norms are now the standard. Historical analyses that suggest that current prices are too high and not likely to be sustained carry little weight when the market believes that a "new era" has arrived and that the old economic yardsticks are no longer useful. An amplifying phenomenon is the "greater fool" theory – even investors who accept that prices must fall eventually may be swept into the buying mania on the assumption that the rising trend will continue for some time and that someone else will pay even more than they did. Trends are further reinforced by many investors' convictions that they will be able to get out of the market before the bubble bursts: in fact, few do.

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[16] Federal Reserve Vice-Chairman Roger Ferguson, Jr. *Understanding Financial Consolidation.* Speech at the 11th Annual Hyman P. Minsky Conference on Financial Structure, Annandale-on-Hudson, New York. April 26, 2001. (Available on the Internet at <www.federalreserve.gov/boarddocs/speeches/2001>)

[17] The Nasdaq index lost 68% of its value between March 2000 and April 2001– costing shareholders $3.5 trillion.

In markets for physical goods, the law of supply and demand acts as a restraint upon the formation of bubbles.[18] If the supply of a good increases, for whatever reason, the price will fall and producers' profits will drop, leading some to curtail investment or leave the market. Eventually, equilibrium will be restored. In financial markets, this kind of built-in stabilizing effect is absent. If there is an expansion of credit, the price that falls is the interest rate. Lower interest rates push up the value of assets (such as stocks) and make the balance sheets of both lenders and borrowers appear less risky. Higher-priced assets (which can serve as collateral) and more robust balance sheets both encourage further expansion in credit growth. This cycle does not have to end in a financial crisis, but the tendency is to create imbalances in the system as market participants collectively underestimate risk. The Asian crisis was an example of unrealistic expectations in credit markets coinciding with exchange rate difficulties, with disastrous results.

The creation of asset bubbles is a recurring feature of financial markets. Why do investors, with the lessons of history before them, continue to drive asset prices above the level justified by fundamental economic conditions? The problem is that fundamental value cannot be determined with any certainty. There is no financial recording angel to be consulted, only the market's judgement, which reflects the opinions of firms and investors who base their decisions in large part on what they believe others' views to be.

Even if we assume that market prices must eventually return to fundamental values, timing is crucial. Consider Alan Greenspan's famous remarks about "irrational exuberance" in the stock market in late 1996. In retrospect, he may have been right, but investors who heeded his warning (and there were some) and sold the market short would have been crushed during the next three years as the market registered annual gains of over 20%. It is difficult for regulators, no less than investors, to judge whether a bubble is underway, or when it will burst.

Regulatory Tools Against Financial Instability

Regulators' efforts to preserve financial stability fall into two categories: the preventive and the reactive. Private risk taking is monitored and in some cases limited to reduce the possibility of systemic disturbances, and when a crisis does develop, regulators must take quick action to minimize the damage.

Prevention

The traditional focus of laws and regulations designed to promote financial stability has been the risk profile of the individual firm. More recently, regulators have turned their attention to system-wide risk, that is, to the correlation of risks among many firms. But risk supervision at the firm level remains the most important element in the prevention of financial crisis.

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[18] The argument that follows is based upon: Crockett, Andrew. *Monetary Policy and Financial Stability*. Lecture before the Hong Kong Monetary Authority, February 13, 2001.

In the United States, how regulators approach the risk taking activities of firms depends on the type of firm. There are two basic forms of supervision: risk disclosure and direct regulation of risk taking. Disclosure requirements contained in the securities laws apply to all firms that sell stocks or bonds to the public. These publicly traded companies must register with the Securities and Exchange Commission (SEC) and must file detailed financial statements which are made public. With this information, the market can compare the riskiness of investment in various firms or industry sectors. Firms whose risk taking appears to be prudent or well-managed will generally have access to capital at lower rates. The SEC itself, however, does not place any restrictions on risk taking – no amount of risk is excessive, from a legal and regulatory viewpoint, as long as it is fully disclosed.[19]

Bank regulation starts from a different premise. Since the government insures bank deposits, regulators do not rely solely on market discipline to enforce prudence in bank risk taking. If bank examiners conclude that an insured institution's balance sheet is too risky, under the banking laws it is engaged in "unsafe or unsound banking practices," and regulators have a wide range of sanctions available. They can intervene directly in the bank's business decisions and require it to change its lending practices or otherwise adjust its portfolio.

Other financial institutions subject to direct regulation of risk taking include insurance companies (regulated by the states) and pension funds (regulated by the Department of Labor under ERISA, the Employee Retirement Income Security Act). Both insurers and pension funds are subject to various forms of prudential regulation: they may be barred from engaging in certain transactions or from holding certain types of assets.

The Basel Accords

In 1988, the Bank for International Settlements (BIS) established an international capital standard, which requires banks to set aside a percentage of their outstanding loans (and other risky assets) to provide a cushion against unexpected losses. Under the BIS standard, known as the Basel Accord, banks must maintain capital equal to at least 8% of their risk-weighted assets. To determine this figure, different classes of assets are assigned different risk weights: the riskier an asset, the more capital is required.

In the early 1990s, an unsuccessful attempt was made to extend the Basel capital standard to securities firms. However, the SEC has a net capital rule that requires U.S. stockbrokers doing business with the public to maintain a capital cushion, the amount of which is also calculated according to risk factors assigned to different types of assets.

Capital requirements are an effective way to lessen the risk of bank failure, but they are costly. They reduce the amount of money to be loaned, which is the same

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[19] Thus, for example, the prospectus for a high-yield (junk) bond usually contains language to the effect that there is no foreseeable way the issuing corporation can meet the interest payments on the bond, let alone repay the principal. There is a huge market for such bonds.

as saying that they raise the cost of borrowing. It is useful to have a capital cushion against failure when a bank – or the financial system – is in difficult conditions, but to a sound bank in a strong macroeconomic environment setting aside capital is a drag on business investment. However, it is impractical to have a capital standard that requires capital to be set aside only when an institution is distressed: the act of compliance would make the institution's problems worse. To be effective, a capital standard must apply in good times as well as bad, but this implies a tradeoff: reducing vulnerability to failure also means limiting opportunities for profit and growth.

Capital requirements impose other costs – they affect, and may distort, portfolio decisions. The Basel Accord, which sorts millions of uniquely risky financial instruments into a few risk classes, is by necessity a blunt instrument. In the real world, the riskiness of a portfolio is determined not by the volatility of its individual components, but by the correlation and interaction of risks across the entire portfolio.[20]

Feedback from capital standards to investment behavior takes several forms. The gap between the risk weightings and net portfolio risk encourages banks to structure their portfolios to reduce capital charges. The capital standards, by raising the cost of lending, have caused disintermediation, that is, they encourage corporations to raise funds in the capital markets – by issuing securities – rather than by borrowing from banks. They also encourage securitization, the process by which banks sell off the loans they make after packaging them as bonds. This allows them to reduce capital charges by moving the securitized loans off their balance sheets. None of these effects is necessarily harmful per se, and they do not appear to increase systemic risk, but most economists and regulators agree that the optimum regulatory regime is one that is neutral regarding portfolio decisions.

Finally, another weakness in regulation by capital standards should be apparent from the discussion of systemic risk above. Capital standards limit risk taking by individual institutions, but systemic risks are more likely to be caused by collective misperceptions of risk by many institutions *and their regulators*. The Asian crisis, when widely-held risk perceptions changed suddenly and dramatically, led to a reevaluation of the Basel Accord. In January 2001, the BIS issued a revised accord for comment. The proposed Basel standards, which emphasize systemic rather than individual institution risk, have three parts, or pillars.

The Three Pillars of the New Basel Accord[21]

The first pillar is the 8% capital standard. The overall capital requirement is unchanged, but the system of risk-weightings will become more sophisticated – using

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[20] For example, if half a portfolio consists of instruments that gain value as interest rates rise, while the other half loses value when rates go up, the portfolio may be "market neutral," or very low-risk, even though the instruments themselves may be extremely volatile.

[21] For a general discussion of these proposals, see: Meyer, Laurence H. *The New Basel Capital Proposal*. Remarks to the Washington Conference of the Institute of International Bankers, March 5, 2001.

more risk classes and making greater distinctions among assets in a particular type – in order that capital charges may be more closely aligned with the true riskiness of a portfolio. Capital requirements will also be linked to external credit ratings of an institution's debt securities, where available.

The second pillar calls for greater supervisory emphasis on the assessment of banks' internal risk controls. This proposal represents a recognition of the progress made in private risk measurement techniques, such as VAR, but is also a call for improvements in those techniques. The second pillar will also encourage the use of "stress testing," or subjecting a portfolio to a range of worst-case scenarios. VAR analysis asks: given past volatility, what is the maximum loss we can expect over a specified time span? A stress test, on the other hand, asks: how much could we lose if the historical price assumptions built into the VAR model fail, and if current valuations suddenly change?

The third pillar calls for greater public disclosure of banks' financial condition and portfolio choices, a move towards greater reliance on market discipline or SEC-type regulation. Traditionally, the results of bank examinations have been treated as confidential proprietary data. Making some of this information public will permit other market participants to judge more accurately the risks of doing business with a particular bank.

The common thrust of the new Basel proposals is towards greater reliance on market discipline.

Reaction

There is a fairly strong consensus among economists and central bankers that if a financial crisis does occur, in spite of all attempts at prevention, the tools and policy options available to regulators are limited, likely to be ineffective or counterproductive, and that steps taken to stabilize the financial system may worsen the macroeconomic situation. Since the Asian crisis, regulators tend to hold a pessimistic view of themselves as generals preparing to fight the last war: there is no reliable blueprint for crisis management, because financial trouble is likely to strike from the unexpected quarter.

Nevertheless, taking action to bring financial crises to a quick end and to minimize the concomitant damage to the real economy is one of the principal duties of financial regulators.[22] The difficulties in planning or choosing the right action stem from a theoretical conflict, almost a paradox: actions that must be taken in a crisis are often the opposite of what constitutes responsible financial regulation in normal times.

In general, financial efficiency is best served by letting those who have mispriced risk suffer the resulting losses. In a crisis, however, when the stability of the entire system is in doubt, the central bank may have no choice but to act as the lender of last resort. In this role, it provides liquidity to enable market participants to meet their

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[22] It could be argued that the bulk of regulation of banking and securities markets in the United States was enacted primarily to prevent a recurrence of the Great Depression.

short-term obligations. This may well mean bailing out those who have taken excessive risks in search of high profits. Market discipline must be set aside in order to prevent either a falling-domino sequence of defaults or a panic driven by uncertainty about the solvency of affected financial institutions.

Ideally, this form of intervention will be short-lived, the panic will burn itself out, and markets will return to normal. This was the case during the stock market crash in October 1987, when the Federal Reserve was widely praised for announcing that it would supply liquidity and for urging banks not to withdraw credit from their customers in the securities industry.

However, there is no guarantee that future crises will follow this pattern. If the financial system does not stabilize itself fairly quickly, the lender of last resort itself faces a potentially unlimited risk exposure. Second, actions taken to deal with a financial crisis may conflict with monetary policy, with negative macroeconomic consequences. (In the Asian crisis, for instance, the prescription for falling exchange rates was to drive up domestic interest rates, which of course further depressed stock prices and worsened corporate balance sheets.)

Third, and finally, the major problem with intervention to prevent widespread failure or panic is the creation of what is called moral hazard. The concept of moral hazard is that if firms believe they will be rescued from their mistakes, or that they are too big to fail, they are likely to take greater risks than they would otherwise. The costs of this excess risk taking are borne by the government, rather than by the firm – which nevertheless keeps any profits that may accrue.

The president of the Federal Reserve bank of New York recently spoke in favor of what he called "principled" intervention. The essence of a successful case-by-case crisis management, he said, is

> the development of viable plans that link broader, generally acceptable principles to the particulars of a given situation. To achieve this, a clearer and more transparent articulation of the public sector's objectives is necessary. Greater emphasis and clarity are needed as to the the purposes and limits of public intervention... In this way all parties will be better placed to understand current developments and how the international community might react to future strains.[23]

The problem is that moral hazard requires regulators to be somewhat vague and imprecise about what actions they are prepared to take in a crisis. Risk takers cannot be assured beforehand that they will be rescued from their mistakes. In their public postures, regulators must appear to be much less willing to act as the lender of last resort than in fact they are, and less willing than the market assumes them to be. This imperative works against the clarity and certainty that could be useful in reducing panic in a crisis, if regulators could set out their actions in advance in a transparent manner.

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[23] McDonough, William J. *The Role of Financial Stability.* Remarks at the XIII International Frankfurt Banking Evening, May 3, 2001.

Other forms of crisis reaction are available to government regulators, but these constitute such extreme intrusions into the workings of the free market that their use in the United States is seldom proposed or even discussed (except dismissively). In 1998, the Malaysian government sought to stem the financial crisis by imposing currency controls – foreign investors were prohibited from withdrawing their capital from the country and the exchange value of the ringgit, which had plunged in previous months, was frozen. In Hong Kong, the Monetary Authority reacted to renewed speculation against the currency, which it viewed as an attempt to drive down stock prices,[24] by purchasing about 10% of all outstanding shares in the market.

The conventional wisdom among U.S. policymakers and economists was that the long-term costs of such interventions would outweigh the benefits: foreign firms in particular would be deterred from investing or lending. However, both interventions appear to have been effective. It is clear that there is still much to be learned about crisis management.

Conclusions and a Look Forward

The tools available to government regulators to prevent financial crises from developing and to control those that do develop are imperfect, and impose costs on the financial system. To avoid these costs, regulators would like to rely on market discipline to regulate private risk taking. Complete reliance on the market is unacceptable, however, given the historical tendency of financial market participants to become over-exuberant, to follow the herd, to underestimate risk, and, at times, to over-correct for these mistakes when they become apparent. The link between financial crisis and economic slowdowns, though debated in particular instances, is also part of the historical record. Thus systemic risk becomes a subject of regulatory attention.

A fundamental question, not yet addressed in this report, is how much time and resources risk managers (in both the private and public sectors) should devote to preparing for events that have a very low probability of ever occurring. One's answer depends on one's views of the robustness and self-stabilizing capacity of the financial system. Many economists argue that concerns about systemic risk – which have certainly grown since the crises of 1997-98 – are overstated. The more productive course for government policymakers, in this view, is to tend to macroeconomic policy: stable prices, predictable fiscal and monetary policies, and an appropriate exchange rate regime will do more to promote financial stability than any amount of tinkering with private risk decisions.

However, regulators today are more likely to be swayed by the observation that while price stability and other macroeconomic conditions have generally improved in most countries since 1980, financial crises have become more common. There are a number of reasons why this should be so:

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[24] This "double-dip" speculation was based on the premise that Hong Kong would defend its currency's value by raising interest rates, which would cause stock prices to fall. The speculators would then profit from short positions in stocks.

- **!** globalization of markets, as discussed on page 7 above, with its adjunct features: instantaneous electronic communication and deregulation;

- **!** consolidation of financial institutions, which may lead to the establishment of firms of such complexity and size that distress in one of them would almost automatically have systemic implications; and

- **!** the introduction of new trading markets, such as credit swaps, that are unregulated and have the potential for concentrating risk exposures in single firms or market sectors, or redistributing risk in ways that are invisible to regulators and market participants alike.

Striking improvements in risk measurement and management have been made by private firms and (to a lesser degree) government regulators in recent years, yet uncertainty remains. The financial markets find themselves in a position analogous to physicists who find that certain subatomic phenomena cannot be measured because the act of observation changes those phenomena. If there is a corresponding principle in human affairs, it certainly applies to financial risk. When risk can be measured in a new way, that information becomes the basis for new trading strategies. When risky investment strategies change, markets respond to information (and to regulatory stimuli) differently. The fact is that risk is inherent in financial markets as long as we cannot see the future. The limits are contained in the observation that "risk management is not rocket science – it cannot be, since the past does not repeat itself on a sufficiently reliable basis."[25]

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[25] Stulz, Rene. Why Risk Management is not Rocket Science. *Financial Times*, June 27, 2000. Special supplement, p. 7.