



# Hidden Linkages

The author of *Against the Gods* takes a fresh look at the nature of risk, offering alternatives to the limited perspective of volatility and shedding new light on the function of risk management in the world of financial services.

By Peter L. Bernstein

**W**E MEASURE AND MANAGE RISK TODAY within the constraints of a useful but nevertheless controversial convention. We equate risk with volatility. Volatility has important attractions as a proxy for risk, but an important question cries for an answer: Is volatility at the root of what we mean by risk?

Volatility has been the favored proxy for risk for nearly 50 years, ever since 1952 when Harry Markowitz launched the study of investment risk by proposing variance for this purpose in his seminal article on portfolio selection. Volatility of asset prices, or asset returns, proxies for risk on two levels. One level is subjective, the other objective, and both enjoy strong arguments in their favor.

First, on a subjective level, volatility conforms with the way our gut reacts when we make decisions with uncertain outcomes. Some experts argue that volatility is a deceptive proxy for risk because only downside volatility is a bad thing. I dis-

rivative instruments?

Volatility is important in another dimension. As Markowitz emphasized half a century ago, volatility is for the most part determined by the covariance among the assets in the portfolio. If Markowitz contributed nothing else, his work focused our attention on diversification and how best to put diversification to good use in portfolio selection. Diversification isn't the only technique of risk management, but it's nevertheless the central concept that spawned the elaborate business of risk management as we know it today. That includes recognizing that we can take on greater individual risks in a portfolio than we would dare take with all our eggs in one basket.

Having said all these nice things about volatility, why should I go any further? Because volatility is incomplete as a measure of risk or as a target for risk management. Even though volatility reaches deeply into our subjective sense of what risk is all about, the process of making decisions in an uncertain future provokes concerns even more profound than those stimulated by volatility.

## Risk Management, Financial Markets, and Insurance

agree. Who can deny the sense of discomfort and uneasiness produced by an asset whose valuation jumps around a lot? That it jumps up part of the time is little comfort when you sense that at any moment it's going to take a steep fall back down again. The more the asset jumps around, the less confidence we can place in our projections of its future value.

These observations about volatility need not be restricted to assets. Increased volatility in the rate of inflation, economic growth, interest rates, or exchange rates is always distressing. These disturbances also strike at our gut. As a result, volatility in the economic fundamentals intensifies our overall sense of risk and increases the premium we require for entering into deals of any kind.

The objective feature of volatility is the elegant manner in which it lends itself to mathematical analysis. Much of risk management and measurement is a matter of building models. An attribute we can treat mathematically in so many ways can convert what might otherwise be a hopeless job into a task that comes up with hard answers—and answers that stand up well in the tests of logic.

I'm not referring only to beta or standard deviation in their many applications but also to more sophisticated measurements like value at risk and the manifold variations on that theme that have become increasingly popular. Volatility is also at the heart of the valuation of derivatives, philosophically as well as mathematically. Where would the world be today without the proliferation of both defensive and offensive strategies based on de-

### Financial Time Machine

Let's look first at the notion of liquidity. The common practice is to consider liquidity a particular kind of risk rather than a generality. We acknowledge that more-liquid assets are less risky than illiquid assets, but most often we fail to recognize the broader significance of those differences.

I'll begin the argument with what appears to be a digression but actually goes to the heart of the matter.

Professor Paul Davidson of the University of Tennessee recently pointed out that it's not just in the marketplaces that liquidity is established. Liquidity is meaningless without a firm structure of laws and regulations.

Liquidity means that buyers are available on demand for what you have to sell and willing to pay a price, after transaction costs, that's close to the current price. Buyers you can find everywhere. On the other hand, who needs buyers who pay you with plug nickels, or who fail to settle when payment is due?

Counterparty risk is dominant in assessing liquidity risk, and counterparty risk is shaped by laws and regulations and, perhaps most important, by a society's culture and ethical traditions. Liquidity is meaningless unless individuals recognize their responsibilities to one another.

The importance of counterparty risk is only a special case in a much broader view of liquidity. Liquidity depends on information or, to use today's buzzword, "transparency." Who buys an asset without knowing anything about it? Today, some opti-

mists are buying stocks about which they know practically nothing, but most of us would agree that they're taking a big risk.

At the other extreme, everybody knows what a dollar bill is. Shortcuts to information also help to create liquidity. Merchandise with the *Good Housekeeping* Seal of Approval is a lot easier to sell than goods without that endorsement. CDs of member banks of the Federal Reserve System are more negotiable than obligations of local credit unions. Wall Street has learned that markets get into trouble when important information is withheld. The point needs no further elaboration.

It's interesting to consider the interaction between liquidity and control. The owners of most liquid instruments have no control over the behavior of these assets. We have no control over the supply of money or the volume of bank deposits. We have minimal control over the management of money market funds.

Minority shareowners have no control over the management of the companies they own, but small lots of stock are much more liquid than big blocks. Investors who own big blocks of stock—the giant pension funds College Retirement Equity Fund (CREF) and California Public Employee Retirement System (CALPERS) as examples—insist on some degree of control over management precisely because their blocks are too large to provide an effective exit strategy.

Marketable bonds contain fewer covenants than the loan agreement between a commercial bank and one of its customers; the bondholder has the market as an exit, while the bank has no exit other than its control over the customer's decisions.

But why do we care about liquidity anyway? Keynes once said something to the effect that only a madman would hold money for its own sake. As I just suggested, liquidity is an exit strategy, a necessary condition for changing your mind about your assets. Liquidity means that we're not locked into our decisions. Again, think of the contrast between the investor with a thousand shares of stock and the investor with half a million, or between an owner of a marketable corporate bond and a bank that has made a loan to the same corporation.

When we dig under this layer of exit strategy, we find an important corollary. Where does liquidity abide? In money, in the first instance. On the next level, in assets that are about to turn into cash, such as debt instruments close to maturity. Now we come to the most uncertain but most interesting abode of liquidity: the financial markets. This step bears further analysis.

What's that frenzied activity that we see in financial markets all about? Financial markets are the grease in our economy that keeps the wheels of enterprise turning. Financial markets are in the first instance a vehicle for financing governments and enterprises that need money. But why is it that financial markets are so important in this process?

Financial markets are a place where owners of outstanding assets can convert those assets into cash, or where owners of cash can find longer-term uses for their money. Financial markets thus give holders of assets with future cash flows the option of realizing the discounted value of those future cash flows in the present.

To paraphrase Paul Davidson, financial markets are a kind of time machine that allows selling investors to compress the future into the present and buying investors to stretch the present into the future. Without financial markets, all assets would be buy-and-hold and the cost of capital would be orders of magnitude higher than it is today.

In panic conditions, as Alan Greenspan so often reminds us (he uses the expression "fear-induced disengagement"), financial markets come to a screeching halt because buyers evaporate and even supposedly liquid assets are transformed into buy-and-hold.

### Liquidity and Reversibility

Now cut through to the next layer by asking a simple question: What has all of that to do with measuring or managing risk?

Which has greater risk, an asset you can liquidate at any time? Or an asset that locks you in all the way to maturity or, as in the case of an equity interest, essentially forever?

The answer is obvious. Liquidity is critical because liquidity enables us to change our minds. Therefore, assets with an attribute of liquidity are less risky than illiquid assets.

I once made the not altogether facetious comment that some portfolio managers I know have spent more time deciding about whether to buy a house for their families than they spent in deciding whether to buy or sell millions of dollars of General Electric or Microsoft for their clients.

The true long-term investor is immune to worries about volatility and liquidity, because such investors have no intention of changing their minds or do so only on widely separated occasions. These are rare birds in the security markets—although not non-existent—but many investors who own private equity, especially in their own businesses, will give little or no thought to volatility or liquidity. The trade-off for them is that they have control over the performance of their investment, while owners of more liquid and reversible investments have no control, as I pointed out above.

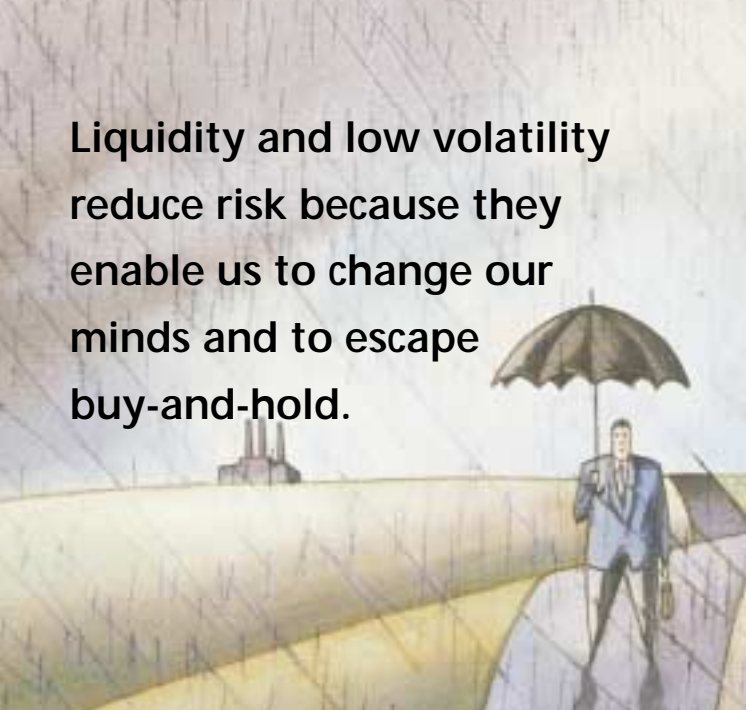
In short, reversibility is the key element in risk, which explains the importance of volatility and liquidity. Financial markets persist because they provide reversibility. Hence, financial markets reduce the risk of owning assets and thereby lower the cost of capital. That is their most important attribute.

### Risk and Time

In our search for the meaning of risk, we've moved from volatility to liquidity to reversibility. We've also observed that financial markets serve as a risk-reducing time machine that allows investors to compress the future into the present. But we're not yet at our destination. We have to dig still deeper. At this level, some of the most basic truths of all become visible.

In his monumental work, *Capital*, Karl Marx models the essential nature of capitalist enterprise in a simple three-letter mathematical expression: M-C-M'. The capitalist starts out with money M, invests the money in capital assets C, and ends up with more money than he started with M'.

## Liquidity and low volatility reduce risk because they enable us to change our minds and to escape buy-and-hold.



The simplicity of this statement disguises the profound wisdom that lies behind it. The object of all investment is to end up with money. We may be patient or we may be impatient, we may want the money to reinvest in existing projects or to finance investments in new projects, we may want the money for ourselves or to meet oncoming liabilities to others, or we may want to leave assets that will finance the lives of our heirs. But there's always a pot of money at the end of these rainbows.

To be blunt, money is what we use to pay our bills. Unless we're hopelessly irrational Scrooges, the mere pleasure of owning economic assets will get us nowhere unless somehow, somewhere, sometime, they produce cash flows.

It's the fashion today for investors to belittle the importance of cash flows. Fewer and fewer companies are even bothering to pay out dividends to their stockholders. Nevertheless, Marx's model holds even if we own an investment in companies like Microsoft or Cisco, that spurn the need to distribute cash flows to their owners. We may be as patient as we choose, but unless Microsoft or Cisco at some point begin to distribute cash in some form, or unless they sell out to some other company, or unless something happens that will generate cash flows to their shareholders, owning these companies makes no sense.

Some people will argue that it might make sense to own Microsoft even under those conditions so long as we find somebody willing to buy our shares and therefore willing to hold an asset with no future cash flows. Only believers in an infinite number of greater fools will accept that argument, because you're then playing in Keynes' beauty contest rather than investing. At some point the truth will out and the prospective buyers will vanish. To paraphrase Abraham Lincoln, you can't fool all the greater fools all of the time. The sums we earn from investing did not earn the title of "return" for no reason at all.

This view of the matter leads to a helpful overview of the whole process. When you add up everything I've said up to this point, it turns out that the essence of business or investment risk is about how long we have to wait to get back our original investment of cash. The longer we can wait for the cash, the more risk we can take.

Nevertheless, the longer we have to wait, the greater the chances that something goes wrong and we never get back our original investment. Furthermore, the longer we have to wait, the greater the chances that we'll find something else more attractive to do with our money.

Liquidity and low volatility reduce risk because they enable us to change our minds and to escape buy-and-hold. Liquidity gives us the option of seeing our money in advance of the maturity of the asset in question; it transforms long-term into short-term.

Hence, at the bottom of the well we've been digging in this analysis is time. Risk and time are opposite sides of the same coin.

This conclusion suggests that duration—the concept of risk that the fixed-income people use—has relevance for all kinds of risks, not just for bonds and mortgages. Duration is a weighted average of cash flows over the life of an investment, with the present values of those cash flows as the weights. Duration does not always fill the bill precisely, because it doesn't reflect the uncertainty of those cash flows, but it does capture the sense of what we're after.

Indeed, in a fundamental sense, duration conveys more information about riskiness than volatility can convey. As fixed-income investors learned long ago, duration explains volatility—long-term bonds are more volatile than Treasury bills, and stocks

are more volatile than long-term bonds. Thus, as I argued at the outset, volatility is a useful concept but an incomplete one. We're closer to the essence of risk when we look at it through the prism of duration.

### The Importance of Consequences

But we're not there yet. We have one more layer to cut away, and then we'll be able to put all of this in a framework that's relevant to insurance.

No matter how elegant the instruments we choose to measure risk, and no matter how accurate for our purposes our method of calibration may be, measurement is only the first step in risk management. In the end, risk management is about consequences.

The magnitude of a given risk is an attribute of the asset involved; its determination is an objective process whose solution remains the same no matter who owns the asset being evaluated. The consequences of a given risk, however, are an attribute of the owner or decision-maker, not of the instrument.

Determination of the consequences is a subjective process whose results will vary widely depending upon who is considering the matter. Measuring risk without consideration of consequences converts risk management into little more than a game for mathematicians to play. Life is more serious than that. The focus of risk management must be on consequences. And the more difficult or debatable the process of measurement, the greater the likelihood of surprise and the more important the consequences become.


Consequences will dominate decisions even when measurement is simple. We can project with impressive accuracy the probability that a man of 30 will die before he hits 31. The financial consequences of the death of a man that young, however, will be catastrophic to a family with no source of income other than the husband's earning power.

On the other hand, if the man is single or independently wealthy, the financial consequences of his death will be smaller. Owning a highflying stock like Amazon.com may seem like a small risk to a young man with a lifetime to recoup his losses and an insurmountable risk to an old man with little time to recoup his losses. And so on.

There's a more challenging example. We hear with increasing frequency today that stocks in the long run will provide higher returns at less risk than bonds. Therefore, those of us who can take a long-run position should put 100 percent of our financial assets into equities, right now.

The hypothesis comes furnished with impressive historical data, but no hypothesis is certain. John Maynard Keynes hit this point hard in his seminal *Treatise on Probability* nearly 80 years ago.

"Perception of probability, weight, and risk are all highly dependent on judgment," he wrote. "The basis of our degrees of belief is part of our human outfit ... There is little likelihood of our discovering a method of recognizing particular probabilities, without any assistance whatever from intuition or direct judgment...."



**Insurance  
companies  
don't deal *with*  
consequences—  
they deal *in*  
consequences!  
This feature is  
their reason for  
being.**

A proposition is not probable because we think it so."

Suppose I'm skeptical about this recommendation and hold only 60 percent of my wealth in stocks—and the hypothesis turns out to be valid. I'll still be wealthier than I am today even if my tree doesn't grow to the sky.

Now suppose that I believe these soothsayers and put all my money in stocks—and the soothsayers turn out to be wrong. I'll turn out to be broke. I can't evaluate the risk in acting on this recommendation—regardless of my beliefs as to probabilities—without considering the consequences to my wealth of acting versus not-acting.

### Guaranteed Reversibility

Where does insurance fit into this line of analysis? Insurance companies are deeply involved in the decisions of customers who worry about consequences. Indeed, insurance companies don't deal *with* consequences—they deal *in* consequences! This feature is their reason for being.

But everything else in the analysis of risk up to this point also involves insurance. For example, insurance is an important player in the financial markets. Insurance managers, like all managers in financial services, are constantly studying their liabilities to determine the importance of liquidity and the degree to which they can take the risk of owning less-liquid assets, where returns are highest.

Let's begin this part of our analysis by contemplating a flight of fancy to a happy land that I shall call Nirvana.

Nirvana is a world without unfavorable consequences, a world in which every decision I make can be reversed, at my option, if it's turning out wrong.

"*Rien ne va plus!*" (no further bets) cries the croupier at the roulette table as he spins the wheel, but in Nirvana I can change my bet if the little ball isn't going to land where I've bet it would land.

Or if my house catches fire, I can just say, “Abracadabra!” and the fire vanishes. Or if the airline I manage has built up a big inventory of oil in anticipation of higher oil prices and the price of oil declines, I snap my fingers and, lo! the excess inventory disappears or the price of oil goes up.

Or if the doctor tells me I need a major operation, I can say, “Nuts to you!” and the illness is cured without any operation. Or when I find I’m too old to work and earn a living, I can reverse my age back to where I’m still employable. Or, to go even further, when I’m about to die I can wave my magic wand and be restored to life.

In Nirvana, I can throw time into reverse if the outcome would have a negative impact on my well-being or wealth.

That is fantasy. Only in Nirvana can we turn back the clock. In the real world, the bet at the roulette table, the fire in the house, the excess oil inventory, the illness, old age, and death itself are all irreversible realities. Once they occur, they’ll impose their consequences on me, my business, and my family. The croupier’s cry of “*Rien ne va plus!*” applies to all of them. These are outcomes over which I have no control. I’m at the mercy of the fates or my own fallible judgment.

Even though insurance companies can’t turn back the clock for their policyholders, insurance companies nevertheless exist to reverse the consequences of unfavorable outcomes. In-

urance companies are, I hope, smart enough to refuse to insure my gambling bets, but, for an appropriate premium, they are ready to step up and insure the havoc that may be wreaked upon my fortune by fire, certain business risks, the loss of earning power due to age, and my health. Thereby, insurance companies provide liquidity to decisions, assets, and outcomes that are inherently irreversible and beyond my control but that can have harmful consequences to their policyholders.

Insurance companies create a kind of Nirvana for their customers by transforming damaging consequences into manageable consequences. These companies throw time in reverse by restoring at least part of their customers’ financial condition to what it was before this unfavorable event occurred. The same observation applies to all hedging strategies, but insurance is the most reliable—that is, least risky—among such strategies.

When we look at risk and at insurance from the perspective of reversibility, we can see at once that insurance, other forms of financial services, and financial markets are in the same game. Financial markets are where sellers of securities seek to reverse decisions made earlier. In those markets, sellers will find buyers who in their own self-interest go to do business with investors seeking liquidity.

Consider what these simple statements mean. The investors we call the buyers in financial markets are in fact in the busi-

ness of selling reversibility to investors seeking liquidity! Buyers of securities are the magicians who create the miracle in which financial markets compress time.

But so are insurance companies. Like buyers in financial markets, insurance companies are also selling reversibility—that's their business. Insurance companies work an even more startling marvel. They don't just compress time; they throw time in reverse. Coinsurance aside, insurance companies are prepared to restore the status quo ante.

I don't want to carry the resemblance too far, because two important differences do exist. Most of the time in financial markets, buyers or at least market makers are there to accommodate sellers seeking to reverse decisions. Insurance companies will provide reversibility only conditional on an event, rather than on demand.

There's a trade-off in this distinction, however. Buyers in financial markets won't guarantee sellers against loss—or even that they'll step forward when needed. Insurance companies pledge to pay specified amounts when the moment of need arises.

#### A Common Game

The increase in the level of sophistication in understanding risk has been remarkable in the past few years, not just among professionals but among individuals as well. The extraordinary dis-

coveries in the statistics of measuring risk and in the theory of utility—or the judgment of consequences—have led to a proliferation of new instruments and new strategies for risk management. In the process, the market for these instruments and strategies has spread far beyond its original precincts. Risk has become one of the hottest four-letter words in our vocabulary.

We've achieved huge advances in our understanding of not just what risk management and financial instruments are all about, but also of the true meaning of such familiar concepts as assets and liabilities.

In their very earliest published work, Black and Scholes, using the expression “contingent claims,” showed how we can apply option pricing theory to explain the corporate structure, the value of a corporation, and the essential attributes of stocks and bonds. This ingenious step was just the first of many that have led to the proliferation of elaborate forms of risk management over the past 30 years. The slicing and dicing of risk in modern markets is just one example of how we've learned to blur and even overcome the formal distinctions in accounting and finance that were accepted without question in the old days.

The rapid convergence of finance, financial services, and insurance is just part of this whole process of breaking down the traditional barriers among industries and economic sectors. Once people realize that they're in the same game, they'll find an increasing number of ways to play that game together, especially when that game provides the one free lunch in all of economics—diversification, which reduces risk without reducing expected return.

Buyers in financial markets need not limit their purchases to what they're offered by conventional sellers seeking reversibility of earlier decisions. Why not diversify against the vagaries of conventional financial markets by participating in the conditional reversibility offered by the insurance industry?

By the same token, insurance companies are recognizing that their product has applicability in many areas that had never considered insurance in the past, such as conventional business decisions where unfavorable outcomes could threaten the very viability of the enterprise. Insurance will play a paramount role in all areas where conditional reversibility applies, and financial markets will play a cooperative role in all areas where money is involved.

Once we recognize that insurance, other forms of financial services, and financial markets are all in the business of selling reversibility, the most successful players will be those who pursue all areas where a demand for that product might exist. The possibilities are limitless. ●

---

**PETER L. BERNSTEIN** IS PRESIDENT OF PETER L. BERNSTEIN, INC. AND AUTHOR OF *AGAINST THE GODS: THE REMARKABLE STORY OF RISK*. (JOHN WILEY & SONS, 1996). HIS NEW BOOK, *THE POWER OF GOLD: THE HISTORY OF AN OBSESSION*, WAS PUBLISHED BY WILEY THIS OCTOBER. HE LIVES AND WORKS IN NEW YORK CITY.