



Notes from the Dismal Science:

WHAT'S THE MATTER
WITH THE MILL?:

A Perspective on the Economic Disaster

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I first heard that folksong many years ago, the one titled “What’s the Matter With the Mill?” Its story is that of a town where the mill is the economic center, the economic engine that provides jobs and puts food on the table. The mill done broke down, and the townsfolk are wondering what to do. And above all, they want to know what caused it to break down. This seems like the apt metaphor for our current situation. The economy done broke down, and we want to understand why. What follows is my explanation.

Why did our economy collapse bringing the world down with it? The theory you will read here could be called a “peculiar” one, both because it is less pretty than some others and because it is less often talked about. Yet I believe that when you read it you will agree that it is plausible, and I believe that if you ask any Washington finance and economics wizard, he would tell you that there is some truth in it. And if you read elsewhere that the crash was caused by a bunch of finance and economic wizards, you’re getting close.

The story begins many years ago, back in the early 1970s,

when Fischer Black and Myron Scholes had set themselves to the task of pricing options. So first of all, to understand the story, you have to know what “options” are. These are financial instruments that allow the purchaser to avoid the downside of a stock’s fluctuations. If you purchase an “Option to Buy”, you have purchased the right to buy a specific stock at a specified price (the “strike price”) at a specified time. So if the stock’s price rises above the strike price at that time you can “buy low and sell high”. The option itself is a kind of insurance against the downside.

Black and Scholes understood thoroughly what options were. In fact the fascination with options had begun way back at the end of the 19th century with the dissertation of a French graduate student named Bachelier. Yet there were still difficult puzzles, for example no one understood the proper price to be put on options. The two set out to find an accurate pricing equation. The theory of option pricing prior to their work had been full of difficult-to-measure phenomena such as “expectations” and “risk aversion,” concepts that seemed to them more like psychotherapy than empirical science. Their approach was, step by step, to eliminate the touchy-feely measures and to replace them with measurable measures. However these steps still left them with one stubbornly, difficult-to-measure variable, the *risk* of the option. And it was their success in eliminating the risk variable that led to Nobel Prizes and also led to my present theory.

They eliminated the problem of the risk variable with a brilliant yet simple insight. It was well known, as it is today, that an investor can reduce the risk of a stock by also purchasing a stock that tends to move in the opposite direction. For example, this summer you may hope to make good money by investing in sunscreen. But you are concerned that the weather might be rainy so you “hedge” your sunscreen bet by also investing in umbrellas. Together these investments form a portfolio that eliminates both extraordinary upside and downside risks—they cancel each other out. So what’s the gain? In a reliably functioning market, the trend will be up, so you cash in

on the trend while avoiding the risky ups and downs. A “perfect” hedge is something that eliminates risk entirely. With this insight, Black and Scholes formulated a method for “dynamically hedging” their theoretical portfolio so as to develop the perfect hedge, thus eliminating the risk variable entirely from their equation. They published their paper in 1973.

Their work fascinated Bob Merton, an economics and mathematics “wunderkind,” and the fascination was mutual. Merton had been working with a calculus methodology invented by the Japanese mathematician, Ito. An irony is that we sometimes tell our students, “come on now, you can get this, it’s not rocket science.” But Ito calculus *is* rocket science, and what attracted the options group to it was the possibility of adjusting portfolios by hedging in real time, just as Ito calculus was used to adjust the trajectory of rockets in real time. This meant that adjustments would be made not every minute, nor every second, but all the time. Their options theory worked (in theory), and this proved to be a historic breakthrough. Merton and Scholes were given the Nobel Prize in Economics in 1997; unfortunately Fischer Black had passed on by that time, or he certainly would have shared in the prize.

Even though I love economics, I share with some non-economists the view that Nobel Prizes in economics are sometimes given for theories that have never been tested, or for theories that cannot be tested, even in principle. But on the level of a normally functioning stock market, the Merton/Scholes equation was fiercely effective. Traders quickly programmed it into their calculators, and the volume of trade rapidly increased. Why did volume increase? When you eliminate risk you eliminate the biggest inhibition to trading.

The story doesn’t end there by any means. Merton and Scholes went on to cofound a financial investors group called Long Term Capital Management, LTCM, which invested money based on their rocket science theory. What happened became a cautionary tale of the consequences of hubris that took on almost Greek proportions. By applying their principle of dynamic hedging, LTCM was able to reap annual returns of

30 to 40 percent. But their arrogance was to believe that their mathematical model *was* the market, that stocks in reality moved like the assumed behavior in their model. But in reality, human beings determine the market, not equations. Sometimes even the decisions of a few individuals can lead to huge market consequences. When Thailand's financial system verged on collapse, they asked the U.S. Treasury for help. In a decision with huge and surprising consequences, our Treasury said "no"; Thailand collapsed and the panic spread across Southeast Asia like a contagion. Suddenly the market was not "normal"; LTCM barely held on. But when shortly thereafter Russia defaulted on her international debts, LTCM headed south. The collapse of their trillion dollar holdings, would have brought financial markets down worldwide. Their investors were rescued with the help of the Fed and major banks, and the fund folded in 2000.

My point is that the fate of Merton and Scholes as well as LTCM tells us a lot about our present economic crisis. The theory works like this. When a bank makes an investment, it knows that this investment entails risk. There is a probability that it will make a nice profit, but there is also a probability, smaller perhaps but worrisome nonetheless, that it will suffer a loss. So to guard against the downside it keeps a supply of capital on hand to cover those losses and keep the bank afloat. Now, suppose the bank discovers that by hiring a group of financial/economic wizards who understand dynamic hedging that it can, so it believes, reduce the risk substantially. Note that it is important to this theory that the bank must come to *believe* that its risks have become much lower. They will then logically come to believe that they are holding more safety net capital than is really needed. Like LTCM, they will hold an amount of capital that is adequate for a normal market but inadequate to handle a not normal market, such as occurred with the bursting of our housing bubble.

The question to ask now is: "Why should a bursting bubble drive the entire world into depression? Normally banks would hold sufficient reserves to handle a crisis. Remember

that the IT bubble burst only a few years ago, and it caused a sluggish growth recession but no world crisis.

When we humans experience hardship, it is unfortunately natural for us to pick villains.

We pointed the accusing finger at both the Clinton and Bush administrations for overly encouraging home ownership. We pointed the finger at the Republicans, who seem to believe that the market is magic, that it will quickly correct any and all flaws, an extreme view that not even Adam Smith held. We pointed it at Alan Greenspan, who believed that bankers would be cautious enough not to need much regulation. We accused the hotshot traders of being too greedy; but we forget that the Merton and Scholes equation really does work in a normal market. Traders saw pleasant opportunities for profit, not unlike the young couple who applied for a home loan and were pleasantly surprised that their down payment would be so low. All we know for sure, however, is that the financial system was very fragile and had been so for many years. And we know that our financial system was gravely undercapitalized.

Briefly scan with me other alternative theories for the crash: It was an unintended consequence of the securitization of mortgages; lenders failed to understand the implications of new contract features; there were too many adjustable rate mortgages issued and so on. But if I really believed that such tweaking of financial market instruments could bring the entire world of finance down, I think that I would ask that we return to the barter system. The Stern School at NYU also dismisses these alternative views. They conclude that

. . . the primary culprit was that financial institutions did not follow the business model of securitization by transferring the credit risk from their balance sheets to capital market investors. (Stern School NYU)

This is much closer.

My “peculiar theory” then amounts to this. Pointing to the many details and faulty decisions of individuals provides an insufficient explanation for a massive collapse; there must be

something more basic. I believe that the fundamental thing was the hubris throughout our financial system that convinced people that they could handle risk, even eliminate it. “Hubris” to the Greeks meant that the person had begun to suppose he was a god. To our financial people it meant that having conquered risk they didn’t need to hold much capital. But the market told them *did* have to. LTCM believed that they had mastered risk, and they held little capital and they nearly started a worldwide cascade of bankruptcies. Isn’t it possible that the financial system did the same thing ten years later and for mainly the same reasons? In economic theory, there are different kinds of risk. There is the risk of one’s stock losing value. This is what Merton and Scholes proved could be eliminated by dynamic hedging. But ‘systemic risk’ is a blow to the market as a whole, and possibly to the economic system. It cannot be avoided by diversification or hedging. The blow generally comes as a surprise. The prudent banker knows this.