Implications of the Financial Crisis for Financial Education

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A continually recurring debate in finance education involves the role of theory versus practice, or in a similar vein mathematical modeling versus explanation of actual practice. The complaint voiced by many students is that they are forced to learn esoteric theories that are not applicable in the fabled "real world." That debate is likely to become more intense as we go forward from what has been the biggest financial crisis since the great depression.

From the perspective of hindsight it is clear that the financial crisis involved three widely researched issues in finance: the evolution of asset price bubbles, the trading and pricing of derivatives, and the impact of agency problems on the management of financial firms. Despite the extensive research on these issues, the financial crisis, which led to worldwide governmental intervention to support national banking systems and to the disappearance of all five independent investment banks in the United States, was basically a surprise to the academic finance community. A careful reader of articles published in leading finance journals over the past decade on bubbles, derivatives, and agency problems would not have been led to the conclusion that the financial system was fundamentally unstable.

There were, however, noted practitioners who had been ringing alarm bells for years. The most famous is Warren Buffett. His comments on the risks created by the interaction of agency problems and derivatives in Berkshire Hathaway’s 2002 annual report is so prophetic as to be eerie. Rather than quote selectively from Buffett’s remarks which run only two pages, I include the full transcript of his comments as an appendix. Buffett’s insight raises the obvious question regarding what he saw that finance scholars and students overlooked. I suggest that what made Buffett so insightful was the ability to distinguish first-order from second-order effects because of his extensive experience. Academic research touches on all the issues that Buffett stresses in the annual report including: difficulties in valuing complex derivatives and related issues with mark to market accounting, linkages between derivative contracts, risks posed by counterparty default, and conflicts of interest between traders and managers on one hand and shareholders on the other, but fails to appreciate the overall impact of their interaction. Instead, the focus in the literature is on the ability of derivatives to more efficiently allocate risk and reduce transaction costs. While agency problems were recognized, they are seen as manageable details and their interaction with derivatives is not seen as a
potentially lethal combination.

To illustrate how the failure to distinguish first-order and second-order effects can lead to misleading theorizing, I take my students at Caltech through the following exercise. I bring a heavy iron ball to class and drop it. The motion of the ball is well explained by the textbook version Newton’s law of gravity. I then drop a sheet of paper. The textbook model basic theory fails miserably. In light of this failure, I suggest Newton’s law needs to be revised to take account of the extensions developed by Einstein in his general theory of relativity. The error in my suggestion is obvious to the students. While is it true that Einstein’s theory is a brilliant extension of Newton, that extension has nothing to do with the problem at hand. The first order issue for the sheet of paper is not the curvature of space, but the impact of air resistance. Of course, all the students in the class know this, but they know it because years of experience with atmosphere has taught them that it has a first order impact when a sheet of paper is dropped from a height of a few feet, but not an iron ball. Without this appreciation for which effects are first order, however, the students might well have been drawn into an irrelevant study of general relativity. In social sciences such as finance, where the distinction between first-order and second-order effects is not so obvious, this is a significant problem.

One consequence of the problem for finance education is the proliferation of models without the ability to discern which aspects of those models are first order and, thereby, which models are most applicable in practice. While this may not be a critical issue for narrowly defined areas, such as certain aspects of financial engineering, when treating more general topics, such as the agency problems caused by the trading, clearing and accounting for derivative contracts, it is critical. There is no apparent limitation on the number of game theoretic models of agency relationships that can be developed by varying assumptions such as the number of participants, the information sets, the payoff matrices, and the rules of play. Unfortunately, there is virtually no way for students to discern which of those models reflect first-order effects and which do not. Seen in this light, the relevant distinction is not between theory and practice, which makes no sense to begin with because all understanding of practice comes from theory, but distinguishing the first-order effects that need to be modeled from the second-order effects that can be ignored.

In some limited situations, perhaps, this distinction can be drawn without detailed institutional knowledge, but when complex agency problems and systemic risk come into play there is no substitute for extensive, informed experience. It is that experience that Mr. Buffett drew on to anticipate how interaction between linked and highly leveraged derivative contracts and agency problems and conflicts of interest in valuing and reporting derivative positions would eventually result in a catastrophic meltdown in the operation of financial markets. Scholars lacking that experience were limited to making only minor modifications in previous theories without seeing the overall risks. In this context, students have a right to complain that financial research and education was “irrelevant” because it failed to highlight the first-order effects and focused too much on second-order technical details.
It may seem that one solution to this first-order problem is to include more practitioners in the finance curriculum, but that is a mirage. Remember, that in the case of current crisis it was the greed, short-term thinking and poor judgments of practitioners that led to the problem in the first place. The solution is not to teach current practice, but to understand and improve it. That requires understanding which institutional details are first order and integrating them into research and teaching, not teaching current practice. While such a recommendation is easy to offer, it is difficult to see how it could be implemented. Most young scholars emerging from PhD programs have little institutional knowledge and no real means of acquiring it. Most practitioners willing to teach in business schools are anxious to explain what they did and why it was the right thing to do. As a result it is all too common that business schools develop parallel lines of finance courses. Those taught by practitioners stress current practice. Those taught by research scholars focus on theoretical models.

In contrast, what is needed is extensive interaction between scholars with technical skills and deep practical thinkers like Mr. Buffett. Unfortunately, there is a significant adverse selection problem in making this happen. Scholars willing to postpone their research agenda to acquire detailed institutional knowledge are likely to be those making less extensive contributions to the theoretical literature. Practitioners willing to take significant time away from their business activities are likely to be those who can afford the time. Mr. Buffett, for example, is unlikely to become a finance professor. This adverse selection problem exacerbates the parallel curriculum issue.

Despite these concerns, if there was ever an opportunity to tackle this issue it is now. The financial crisis has made it clear that effective modeling requires identification of first-order effects. However, first-order effects cannot be identified, particularly with respect to broader issues such as the operation of financial markets without detailed institutional knowledge.

ENDNOTES

1 I would like to thank John Spiegel for helpful comments on earlier drafts on this paper. Of course, the errors remain my own.

REFERENCES

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Appendix

Warren Buffet on Derivatives

Following are edited excerpts from the Berkshire Hathaway annual report for 2002:

I view derivatives as time bombs, both for the parties that deal in them and the economic system. Basically these instruments call for money to change hands at some future date, with the amount to be determined by one or more reference items, such as interest rates, stock prices, or currency values. For example, if you are either long or short an S&P 500 futures contract, you are a party to a very simple derivatives transaction, with your gain or loss derived from movements in the index. Derivatives contracts are of varying duration, running sometimes to 20 or more years, and their value is often tied to several variables.

Unless derivatives contracts are collateralized or guaranteed, their ultimate value also depends on the creditworthiness of the counter-parties to them. But before a contract is settled, the counter-parties record profits and losses—often huge in amount—in their current earnings statements without so much as a penny changing hands. Reported earnings on derivatives are often wildly overstated. That’s because today’s earnings are in a significant way based on estimates whose inaccuracy may not be exposed for many years.

The errors usually reflect the human tendency to take an optimistic view of one’s commitments. But the parties to derivatives also have enormous incentives to cheat in accounting for them. Those who trade derivatives are usually paid, in whole or part, on ‘earnings’ calculated by mark-to-market accounting. But often there is no real market, and “mark-to-model” is utilized. This substitution can bring on large-scale mischief. As a general rule, contracts involving multiple reference items and distant settlement dates increase the opportunities for counter-parties to use fanciful assumptions. The two parties to the contract might well use differing models allowing both to show substantial profits for many years. In extreme cases, mark-to-model degenerates into what I would call mark-to-myth.

I can assure you that the marking errors in the derivatives business have not been symmetrical. Almost invariably, they have favored either the trader who was eyeing a multi-million dollar bonus or the CEO who wanted to report impressive “earnings” (or both). The bonuses were paid, and the CEO profited from his options. Only much later did shareholders learn that the reported earnings were a sham.

Another problem about derivatives is that they can exacerbate trouble that a corporation has run into for completely unrelated reasons. This pile-on effect occurs because many derivatives contracts require that a company suffering a credit downgrade immediately supply collateral to counter-parties. Imagine then that a company is downgraded because of general adversity and that its derivatives instantly kick in with their requirement, imp the company. The need crisis that may, in some can lead to a corporate

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their requirement, imposing an unexpected and enormous demand for cash collateral on the company. The need to meet this demand can then throw the company into a liquidity crisis that may, in some cases, trigger still more downgrades. It all becomes a spiral that can lead to a corporate meltdown.

Derivatives also create a daisy-chain risk that is akin to the risk run by insurers or reinsurers that lay off much of their business with others. In both cases, huge receivables from many counter-parties tend to build up over time. A participant may see himself as prudent, believing his large credit exposures to be diversified and therefore not dangerous. However under certain circumstances, an exogenous event that causes the receivable from Company A to go bad will also affect those from Companies B through Z.

In banking, the recognition of a “linkage” problem was one of the reasons for the formation of the Federal Reserve System. Before the Fed was established, the failure of weak banks would sometimes put sudden and unanticipated liquidity demands on previously strong banks, causing them to fail in turn. The Fed now insulates the strong from the troubles of the weak. But there is no central bank assigned to the job of preventing the dominoes toppling in insurance or derivatives. In these industries, firms that are fundamentally solid can become troubled simply because of the travails of other firms further down the chain.

Many people argue that derivatives reduce systemic problems, in that participants who can’t bear certain risks are able to transfer them to stronger hands. These people believe that derivatives act to stabilize the economy, facilitate trade, and eliminate bumps for individual participants.

On a micro level, what they say is often true. I believe, however, that the macro picture is dangerous and getting more so. Large amounts of risk, particularly credit risk, have become concentrated in the hands of relatively few derivatives dealers, who in addition trade extensively with one other. The troubles of one could quickly infect the others.

On top of that, these dealers are owed huge amounts by non-dealer counter-parties. Some of these counter-parties, are linked in ways that could cause them to run into a problem because of a single event, such as the implosion of the telecom industry. Linkage, when it suddenly surfaces, can trigger serious systemic problems.

Indeed, in 1998, the leveraged and derivatives-heavy activities of a single hedge fund, Long-Term Capital Management, caused the Federal Reserve anxieties so severe that it hastily orchestrated a rescue effort. In later Congressional testimony, Fed officials acknowledged that, had they not intervened, the outstanding trades of LTCM – a firm unknown to the general public and employing only a few hundred people – could well have posed a serious threat to the stability of American markets. In other words, the Fed acted because its leaders were fearful of what might have happened to other financial institutions had the LTCM domino toppled. And this affair, though it paralyzed many parts of the fixed-income market for weeks, was far from a worst-case scenario.
One of the derivatives instruments that LTCM used was total-return swaps, contracts that facilitate 100% leverage in various markets, including stocks. For example, Party A to a contract, usually a bank, puts up all of the money for the purchase of a stock while Party B, without putting up any capital, agrees that at a future date it will receive any gain or pay any loss that the bank realizes.

Total-return swaps of this type make a joke of margin requirements. Beyond that, other types of derivatives severely curtail the ability of regulators to curb leverage and generally get their arms around the risk profiles of banks, insurers and other financial institutions. Similarly, even experienced investors and analysts encounter major problems in analyzing the financial condition of firms that are heavily involved with derivatives contracts.

The derivatives genie is now well out of the bottle, and these instruments will almost certainly multiply in variety and number until some event makes their toxicity clear. Central banks and governments have so far found no effective way to control, or even monitor, the risks posed by these contracts. In my view, derivatives are financial weapons of mass destruction, carrying dangers that, while now latent, are potentially lethal.