Washington University Law Review

Volume 87 | Issue 6

2010

A Proposed Fat-Tail Risk Metric: Disclosures, Derivatives, and the Measurement of Financial Risk

Peter Conti-Brown
Stanford Law School

A PROPOSED FAT-TAIL RISK METRIC: DISCLOSURES, DERIVATIVES, AND THE MEASUREMENT OF FINANCIAL RISK

PETER CONTI-BROWN*

INTRODUCTION

Accurately and precisely modeling financial risk is something of a Holy Grail for financial theorists, regulators, and market participants. But like the Holy Grail, the location of a comprehensive model of risk remains unknown; some have even suggested that such a model is a figment of financial theorists' imaginations.[1]

Nowhere has that disaster been more fully evident than in the recent failure of risk models to adequately prepare the marketplace for the collapse of the market for mortgage-backed securities and credit derivatives, and the financial crisis that followed. Because of the mistaken assumptions associated with some risk models, otherwise vigilant market participants were blinded to the risks that brought the global financial system to the brink of collapse.

One of the modeling critics' primary targets is the Value-at-Risk (VaR). In the 1980s, practitioners created a model to focus on the risk exposure experienced by a single firm.[2] VaR is meant to give traders—and, eventually, investors and regulators—a snapshot of how much money a firm might lose in a single day. That dollar figure is easy to comprehend and straightforward in its application; if a firm is uncomfortable with that exposure, the firm can make appropriate adjustments to its trading strategies and positions. As VaR continued to develop, traders and academics weren't the only ones paying attention. Soon, regulators from

* J.D. (2010), Stanford Law School. My appreciation to Professors Rob Daines, Joe Grundfest, and Larry Mitchell for engaging discussions on this topic, Professor Larry Mitchell for excellent edits, Britton Olson for LaTeX help, and especially Nikki Conti-Brown for trenchant debate, analysis, and editing. Remaining errors are my own.

1. *See* Nassim Taleb, *Against VAR*, DERIVATIVES STRATEGY, Apr. 1997, http://www.derivativesstrategy.com/magazine/archive/1997/0497fea2.asp.

2. In reality, the "model" is a family of models, whose main elements have been effectively in place since the portfolio-analysis revolution beginning in the 1950s. *See* GLYN A. HOLTON, VALUE-AT-RISK: THEORY AND PRACTICE 14–17 (2003). At risk of oversimplification, I use the term "VaR" to refer to the entire family of models, not simply the one by JP Morgan in the 1990s, which created that name.

the U.S. Federal Reserve,[3] the U.S. Securities and Exchange Commission (SEC),[4] the Basel Committee on Banking Supervision,[5] and the UK Financial Supervisory Authority[6] endorsed it as an adequate tool for setting banking capital adequacy requirements, and for appropriate risk disclosures to shareholders.[7]

The financial crisis reveals, however, an application of Mencken's aphorism: for the complex problem of risk measurement, VaR produces an answer that is "neat, plausible, and wrong."[8] VaR is not useful in times of unforeseen volatility, as extreme events occur far more frequently than a 95% confidence level would suggest. In statistical terms, the tails of the distribution become "fat." When model-altering events occur more frequently than originally anticipated, the model itself becomes useless. So it is with VaR in times of financial crisis.

None of these observations is new.[9] And, in light of these weaknesses, financial economists have filled the literature with revisions and refinements that seek to improve the model.[10] In offering an alternative,

3. Capital Requirements for Market Risk, 60 Fed. Reg. 38,142 (proposed July 25, 1995) (to be codified at 12 C.F.R. ch. 2) (proposing a "pre-commitment approach," wherein a bank would commit to a maximum trading loss in a given time horizon).

4. *See* SEC Accounting Policies for Certain Derivative Instruments, 17 C.F.R. § 210.4-08(n) (2009); SEC Financial Statements, 17 C.F.R. § 228.310 (2007) (requiring firms to disclose quantitative information regarding their derivatives' positions using VaR-style models). The SEC was the first of any regulator to require VaR-style models, beginning as early as 1980. *See* RICHARD DALE, RISK AND REGULATION IN GLOBAL SECURITIES MARKETS 78 (1996).

5. *See* BASEL COMMITTEE ON BANKING SUPERVISION, AN INTERNAL MODEL-BASED APPROACH TO MARKET RISK CAPITAL REQUIREMENTS 6 (1995).

6. *See* SEC. & FUTURES AUTH., BOARD NOTICE 249: IMPLEMENTATION BY SFA OF THE CAPITAL ADEQUACY DIRECTIVE (1995).

7. This is not to say that each regulator uses an identical model. Indeed, there is significant variation among the various constructions. The point is only that the overarching principle of portfolio theory, which is the core of the VaR model, is present in each case. See Elroy Dimson & Paul Marsh, *Capital Requirements for Securities Firms*, 50 J. FIN. 821, 825–31 (1995), for an explanation of the portfolio-family of models to which VaR belongs.

8. *See* H.L. MENCKEN, *The Divine Afflatus*, *in* PREJUDICES: SECOND SERIES 155, 158 (1920). To be fair, this is a weakness that VaR's leading proponents have predicted. *See* Philippe Jorion, *In Defense of VAR*, DERIVATIVES STRATEGY, Apr. 1997, http://www.derivativesstrategy.com/magazine/archive/1997/0497fea2.asp (conceding that "the purpose of VAR is not to describe the worst possible outcomes").

9. *See* Rick Bookstaber, The Fat-Tailed Straw Man (Mar. 10, 2009), http://rick.bookstaber.com/2009/03/fat-tailed-straw-man.html.

10. *See* Jon Danielsson & Casper G. De Vries, *Value-at-Risk and Extreme Returns*, 60 ANNALES D'ÉCONOMIE ET DE STATISTIQUE 239, 239 (2000) (advocating for the use of "a semi-parametric method for unconditional Value-at-Risk (VaR)" that better captures extreme results); François M. Longin, *From Value at Risk to Stress Testing: The Extreme Value Approach*, 24 J. BANKING & FIN. 1097 (2000) (using univariate extreme value theory to capture financial crises within the VaR model); R. Tyrrell Rockafellar & Stanislav Uryasev, *Optimization of Conditional Value-at-Risk*, 2 J. RISK 21

this Comment makes no attempt to enter that mathematics-intensive fracas. Instead, I propose a lawyer's solution: use a form of mandatory disclosure for off-balance-sheet guarantees and over-the-counter (OTC) derivatives to provide the data necessary to describe the risk of a firm's economic footprint in the unlikely event of catastrophic collapse. With this data, regulators and firms could compute what I preliminarily call a Fat-Tail Risk Metric (FTRM), or a metric for determining the impact of the most financially devastating high-impact, low-probability events. Such a disclosure requirement could have three principal benefits. First, requiring mandatory disclosure of contingent liabilities—namely, derivatives and off-balance-sheet guarantees—will resolve the ongoing difficulties in record keeping that have plagued the industry. Second, a scale that measures the size of a firm's impact upon catastrophic collapse provides a relative measure with which regulators can compare firms of equal market capitalization and/or balance sheet assets that have differing remote-risk profiles. Third, and most importantly, the FTRM will provide a steady stream of data that has, until now, been impossible to gather and could prove essential in understanding risk measurement at the firm level over the coming decades. With that information, defining "too big to fail" may simply become a question of basic econometrics.

VAR–WHAT IT DOES, WHY IT FAILS

VaR is, essentially, an expansion and application of modern portfolio analysis as developed over the last half century by Harry Markowitz and many others.[11] Portfolio analysis uses mathematical models of the covariance between assets within a portfolio to predict the risk inherent to that portfolio.[12] VaR uses these models and historical data to report information in three parts: (1) a specific dollar amount lost, (2) within a fixed time period, and (3) with a specific level of confidence.[13] For example, a risk-management officer in a bank or hedge fund might report to a CEO or board member, with 95% certainty, that market conditions are

(2000) (describing a new approach to VaR that focuses on the conditional VaR as a superior estimate of risk).

11. *See* JUSTIN FOX, THE MYTH OF THE RATIONAL MARKET 238 (2009). I highlight Markowitz, but many others are equally deserving of attention for their contributions. For excellent histories of that revolution, see generally PETER L. BERNSTEIN, CAPITAL IDEAS: THE IMPROBABLE ORIGINS OF MODERN WALL STREET (1992).

12. This is a gross simplification. Any leading corporate finance textbook will provide a fuller explanation. *See, e.g.*, JONATHAN BERK & PETER MARZO, CORPORATE FINANCE 323–62 (2007).

13. PHILIPPE JORION, VALUE AT RISK: THE NEW BENCHMARK FOR CONTROLLING DERIVATIVES RISK 108 (2d ed. 2001).

such that the firm could lose $50 million in a given day. If market volatility increases during the day, that figure could change. VaR therefore gives clear, comprehensible information that is easily operational; it's very easy to conceptualize the prospects of losing $50 million, and if a manager or investor objects to that level of risk, the firm can adjust accordingly. Alternatively, if VaR sinks too low, the firm can make those necessary adjustments as well.[14] The promise of VaR is that risk can be projected, adjusted, and controlled according to an investor's or firm's appetite for risk.

VaR's key assumptions are two: (1) that, for asset-price volatility, past is prologue, and (2) that such variations are normally distributed around a mean; i.e., they follow a "bell curve."[15] Unfortunately, in times of crisis neither assumption is appropriate. The distribution of asset-price volatility has much fatter tails—that is, the likelihood of extreme events in asset-price swings is much higher than the normal distribution models, including VaR, would predict.[16] And, as became painfully apparent in the fall of 2008, volatility today can exceed anything in the history books. These failed assumptions mean that reliance on such models can lead to disastrous consequences.

Goldman Sachs' Chief Financial Officer David Viniar offers an illustrative example of what this means in practice. In August of 2007, after one of the firm's hedge funds lost 27% of its value in a matter of days, Goldman injected the fund with $2 billion of its own capital. In defense of this dramatic action, Viniar explained: "We were seeing things that were 25-standard deviation moves, several days in a row."[17] Viniar makes explicit the assumption that such price swings are normally distributed, and says—whether accurately or for dramatic effect—that these events are 25 times the average variation around the mean change in prices.

---

14. Too conservative of an investment may lead a firm to miss profitable investment opportunities.

15. For more explanation of the normal distribution and its desirable statistical properties in the context of financial modeling, see DAVID RUPPERT, STATISTICS AND FINANCE: AN INTRODUCTION 80–84 (2004). For a more thorough explanation of VaR's assumptions, see *The Risks of Financial Modeling: VaR and the Economic Meltdown: Hearing Before the Subcomm. on Investigations and Oversight of the H. Comm. on Science and Technology*, 111th Cong. (2009) (statement of Richard Bookstaber), *available at* http://democrats.science.house.gov/Media/file/Commdocs/hearings/2009/Oversight/10sep/Bookstaber_Testimony.pdf.

16. *See* Danielsson & De Vries, *supra* note 10, at 242–43.

17. Peter Thal Larsen, *Goldman Pays the Price of Being Big*, FIN. TIMES, Aug. 14, 2007, at 37.

To put this in perspective, a 2-standard deviation loss event should occur only approximately 2.5% of the time, or roughly once every 44 days; a 5-standard deviation event should occur only once every 13,932 years; a 10-standard deviation event only once every 525 quadrillion millennia (the universe, incidentally, is estimated to be between 12 and 14 billion years old);[18] and a 25-standard deviation event should occur roughly once every 1.309×10^{136} years.[19] Thus, the expected time between two 25-standard deviation events has more millennia than the universe has number of particles.[20] And yet, according to Viniar, it occurred day after day, in August of 2007, well before the fire sale of Bear Stearns, the collapse of Lehman Brothers, or the bailout of the financial sector, with all the associated market upheaval that followed.[21] Thus, the VaR models Viniar and others used to explain such 25-standard deviation moves, day after day, were not only wrong; they were catastrophically wrong.

Thus, in addition to the flawed assumptions mentioned above, VaR has two other weaknesses. First, in times of crisis, VaR fails to provide any clear content on risk exposures in the long tail, especially when those tails are fat. When high-impact, low-probability events—what trader and best-selling author Nassim Taleb calls "Black Swans"[22]—occur with such frequency that they dominate a firm or portfolio, VaR loses its utility.[23] Second, VaR's presentation of the risk statistic as a dollar figure has deceptively precise appeal. Any manager, investor, or regulator knows what it means to lose $50 million in a day; adjusting a risk portfolio to

18. Brian Chaboyer et al., *A Lower Limit on the Age of the Universe*, 271 SCI. 957, 960 (1996).

19. *See* Kevin Dowd, John Cotter, Chris Humphrey & Margaret Woods, *How Unlucky is 25-Sigma?*, 34 J. PORTFOLIO MGMT. 76, 77–78 (2008).

20. *See* Bryan Clair, *The Biggest Numbers in the Universe*, STRANGE HORIZONS, Apr. 2, 2001, http://strangehorizons.com/2001/20010402/biggest_numbers.shtml (estimating that the universe has between 10^{72} and 10^{81} particles).

21. *See* FED. RESERVE BANK OF ST. LOUIS, THE FINANCIAL CRISIS: A TIMELINE OF EVENTS AND POLICY ACTIONS (2010), http://timeline.stlouisfed.org/pdf/CrisisTimeline.pdf.

22. NASSIM NICHOLAS TALEB, THE BLACK SWAN: THE IMPACT OF THE HIGHLY IMPROBABLE, at xvii–xviii (2007).

23. In VaR's defense, its practitioners never intended it to make predictions about fat tails. Even the most ardent of VaR proponents have never, on any record the author could locate, made the contrary claim. Indeed, investment textbooks openly note the existence of non-normally-distributed returns. *See The Risks of Financial Modeling: VaR and the Economic Meltdown: Hearing Before the Subcomm. on Investigations and Oversight of the H. Comm. on Science and Technology*, 111th Cong. (2009) (statement of Richard Bookstaber), *available at* http://democrats.science.house.gov/Media/file/Commdocs/hearings/2009/Oversight/10sep/Bookstaber_Testimony.pdf (citing ZVI BODIE, ALEX KANE & ALAN J. MARCUS, INVESTMENTS 148 (8th ed. 2008) (containing section titled "Measurement of Risk with Non-normal Distributions")).

adapt for that kind of risk is a relatively straightforward enterprise. The problem, as seen in the August 2007 example, is that that dollar figure is nearly meaningless in a time of crisis. The VaR statistic masks that reality.

Resolving the VaR problem—and, indeed, the problem with nearly all mathematical models of market behavior—is a tall order, and not one seriously entertained here. Others have documented these concerns more thoroughly and articulately than I can duplicate.[24] For lawyers and regulators, though, the central conclusion is essential: VaR cannot be used, by itself, to measure the potential that a given firm will pose systemic risk to the economy.[25]

THE FAT-TAIL RISK METRIC

In times of crisis, asset-price volatility, almost tautologically, follows no statistically useful probability distribution.[26] To be useful to regulators, investors, and firm management, then, a risk metric must reveal some information about the events that may occur without necessarily providing insight into statistical frequency. That is, the metric should address the question of how much a firm would lose in an apocalyptic, complete blackout scenario where every trade goes against it, every liability comes due, and every off-balance-sheet commitment is called. At that point, the firm could not lose more money. It is the final backstop.[27]

Calculating this kind of doomsday scenario with absolute certainty may be an impossible enterprise in and of itself; many of these losses would necessarily be conjectural. In its place, we need an analytical proxy that captures the fullest extent of risk exposure possible without becoming logistically infeasible to compute. I propose the following proxy: a firm's

24. *See supra* note 15; *The Risks of Financial Modeling: VaR and the Economic Meltdown: Hearing Before the Subcomm. on Investigations and Oversight of the H. Comm. on Science and Technology*, 111th Cong. (2009) (statement of Nassim Taleb), *available at* http://democrats.science.house.gov/Media/file/Commdocs/ hearings/2009/Oversight/10sep/Taleb_Testimony.pdf.

25. Of course, VaR would be perfect at identifying firms that pose systemic risk on VaR's own terms. That is, if a firm or entity took huge, clear risks that even VaR's models would suggest imprudent—such as "there is a 10% chance that this firm will lose $50 billion"—then VaR would be very useful, indeed. Some have argued that this is the very situation that occurred in the trading that precipitated the bankruptcy of Orange County in 1994. *See* PHILIPPE JORION, BIG BETS GONE BAD: DERIVATIVES AND BANKRUPTCY IN ORANGE COUNTY 137, 156 (1995).

26. This is the realm of the unknown, where the specific population distribution function that describes the price movement is being written in real time.

27. Most statisticians will insist, rightly, that this is an impossible standard for most distributions; the distribution curve is an asymptotic function that will never actually attain 0. Thus, capturing the remaining 5% is impossible. This is particularly true for firms that have sold put options or otherwise shorted any asset with a theoretically limitless maximum price. Even so, as with all asymptotic functions, we can use the proxies described in this paper to get arbitrarily close to the limit.

doomsday scenario can be adequately described by the sum of (1) its full, notional derivatives exposure, including both OTC and exchange-traded derivatives;[28] (2) the value of all other contingent liabilities, including guarantees for structured investment vehicles (SIV) and special purpose vehicles (SPV); and (3) the value of a firm's balance-sheet liabilities.[29] I call this standard the Fat-Tail Risk Metric (FTRM).

Much of this information is already available. Most obviously, publicly traded firms disclose their balance-sheet liabilities in their annual 10-K filings with the Securities and Exchange Commission.[30] Also, banks regulated under the Basel I regime—including all banks in the United States—must disclose their off-balance-sheet contingent liabilities, including letters of credit and loans that have yet to be called.[31]

The FTRM extends this already-available data in three primary ways. First, it would be required of all entities that must register with the SEC, including the otherwise anemically regulated hedge-fund industry. Second, and unlike the capital adequacy requirements under Basel I,[32] the FTRM would not discount risks seen as safer than others. Additionally, such off-balance-sheet contingent liabilities would have to be reported by *all* firms, not just banks. Third, the FTRM would require the total disclosure of all derivatives, which, as of this writing, remained almost completely unregulated.

---

28. In using the total "notional" value of derivatives exposure, I am aware of the ongoing debate between calculating derivatives markets by their notional value versus their market value. Under normal-functioning market conditions, the market value of the derivatives exposure—which "nets" out logically conflicting positions—is the relevant figure. However, in the kinds of market conditions that will prevail during times of crisis, the ability to net derivatives exposure depends on the solvency of counterparties—that is, those individuals and companies who sell protection must, in turn, be available to make good on those contracts. This was the problem with AIG; it had led the way on selling CDS for CDOs, and its threatened collapse would have left counter-parties holding the bag for billions of dollars. *See* William K. Sjostrom, Jr., *The AIG Bailout*, 66 WASH. & LEE L. REV. 943, 959, 971–72 (2009). Thus, for purposes of FTRM, the broader picture of counterparty risk is necessary in order to find the size of the absolute losses a firm might experience. For more on that distinction, see Miguel A. Segoviano & Manmohan Singh, *Counterparty Risk in the Over-the-Counter Derivatives Market* (Int'l Monetary Fund, Working Paper No. 08/258, 2008), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1316726.

29. Note that the firm's assets are excluded by inference. In a doomsday scenario, its assets would become valueless either because the market deemed them worthless—as in stock of a bankrupt entity—or because the markets would be frozen and could reflect no value, as in the value of property, plants, and equipment that could not be sold.

30. *See* 17 C.F.R. § 210.4-08 (2009).

31. *See* 12 C.F.R. § 325 app.A (2009) (Statement of Policy of Risk-Based Capital).

32. *See id.*

The FTRM is, to be sure, implausible in some senses: we must envision a world where every piece of financial property, every investment, and every trade cuts against the firm to create a colossal loss. This kind of loss has never occurred. Long-Term Capital Management, the hedge fund that was bailed out by banks on Wall Street in 1998 at the insistence of the New York Fed, did not create this kind of crater.[33] Nor, arguably, have other financial collapses, from Lehman Brothers to AIG to Barings Brothers, created such craters. Government protections—including, of course, bankruptcy protection—will intervene long before this kind of damage is actually done. The point is not that the FTRM would measure *actual* losses, but that it would measure the relative and absolute size of the firm's commitments in the event that each contract or transaction turned against the firm in question. It therefore provides a proxy for extreme risk that other such indicators alone—including a balance sheet, market capitalization, and certainly VaR—cannot match.

The FTRM, unless adjusted, would be expressed in a dollar figure—it is simply the sum of three other dollar figures. But that should be avoided for two reasons. First, as noted with VaR, a dollar figure gives a sense of false precision. Second, and unique to the FTRM, the resulting figure will almost certainly be cartoonishly large. For example, the total notional value of the global-derivatives market in June 2009 was estimated at over $600 trillion, and its market value was estimated at $25 trillion.[34] By comparison, global GDP is roughly $60 trillion.[35] At some point well below $25 trillion, even the most sophisticated of investors lose touch with the meaning of money. For these reasons, the FTRM should not be reported in dollars, but rather as a single figure that provides the ability to make absolute and comparative judgments. Following the well-established Richter scale,[36] transforming these outstanding liabilities into a

33. ROGER LOWENSTEIN, WHEN GENIUS FAILED: THE RISE AND FALL OF LONG-TERM CAPITAL MANAGEMENT 191 (2000) (reporting that, even during the last weeks before the hedge fund was bailed out, some of its trades continued to pay out).

34. BANK FOR INT'L SETTLEMENTS, BIS QUARTERLY REVIEW: DECEMBER 2009, at A103 (2009), *available at* http://www.bis.org/statistics/otcder/dt1920a.pdf.

35. *See* Google, Public Data, http://www.google.com (search "gross domestic product, world;" then follow "Gross Domestic Product, World" hyperlink) (last visited May 14, 2010).

36. One of this Comment's contributions is to highlight the work of scholars who have already proposed using logarithmic models for risk, providing a sort of Richter scale for financial earthquakes. Although their work has been largely about systemic risk rather than individual firm risk, the models may prove useful if applied on hypothesized crises following the implosion of individual firms. *See generally* Bertrand B. Maillet & Thierry L. Michel, *The Impact of the 9/11 Events on the American and French Stock Markets*, 13 REV. INT'L ECON. 597 (2005) (using a model based on the Richter scale to indicate the consequences of 9/11 on stock markets); Bertrand Maillet & Thierry Michel, *An Index*

logarithmic scale would render them more useful. Mathematically:[37]

$$FTRM = log\ (TDE + OBSL + BSL)$$

where TDE is the netted notional value of a firm's *total derivatives exposure*; OBSL is its *off-balance-sheet liabilities*, such as guarantees for a firm's SIVs, sponsored hedge funds,[38] or any other liability that could migrate back to the balance sheet in a time of crisis; and BSL is *balance-sheet liabilities*, traditionally expressed in a firm's corporate filings. Thus, the FTRM would be reported as a non-dollar figure. For example, if a firm's notional derivatives exposure is $10 billion, its balance-sheet liabilities are $5 billion, and its off-balance-sheet guarantees are $1 billion, then its FTRM, under this model, is 10.204—which is the log of $16 billion. The purpose of expressing the figure on a log scale is simply to take risk metrics out of the business of the false precision that plagues VaR models. A logarithmic expression, like the Richter scale measuring earthquakes, gives a scaled sense of risk that is useful for absolute and comparative purposes, without the extra baggage of false precision.[39]

The idea that we should disclose contingent liabilities is not, in and of itself, new. Indeed, the entire apparatus of modern capital adequacy regulation openly acknowledges the role of contingent liabilities. And the House of Representatives has recently passed its version of the financial regulatory reform bill, the Wall Street Reform and Consumer Protection Act of 2009, which includes references to disclosure, however vague.[40] But although disclosure and transparency have been a significant plank in the Obama Administration's proposals[41] and disclosure does figure into

of Market Shocks Based on Multiscale Analysis, 3 QUANTITATIVE FIN. 88 (2003) (using a model based on the Richter scale to indicate the consequences of general shocks on stock markets).

37. I apologize to readers for the somewhat sanctimonious use of LaTeX to provide a simple mathematical illustration of the textual argument. I reiterate that this is a legal proposal, not an economic one. This bit of oversimplified mathematical tinkering is intended for illustration purposes only; financial economists and other empiricists can and should do something far more rigorous than is presented here.

38. Sponsored hedge funds were at the heart of Bear Stearns' ultimate collapse. *See* HENRY PAULSON, ON THE BRINK: INSIDE THE RACE TO STOP THE COLLAPSE OF THE GLOBAL FINANCIAL SYSTEM 94–95 (2010).

39. Again, this logarithmic function is meant only as an illustration. It remains to be seen whether risk exposure becomes interesting only as it increases to certain orders of magnitude. Creating a more robust model must follow the disclosure of the information described above.

40. H.R. 4173, 111th Cong. (2009) (as passed by House, Dec. 12, 2009). *See generally* Carl Hulse, *House Looks at Preventing the Next Collapse*, N.Y. TIMES, Dec. 7, 2009, http://thecaucus.blogs.nytimes.com/2009/12/07/house-looks-at-preventing-the-next-collapse/ (describing the bill).

41. *See The Administration's Proposals for Financial Regulatory Reform, Hearing Before the H. Comm. on Financial Servs.*, 111th Cong. (2009) (statement of Timothy F. Geithner, Secretary, United States Department of the Treasury), *available at* http://www.house.gov/apps/list/hearing/financialsvcs

the present version of the bill,[42] neither the Administration nor the Congress have promoted a form of disclosure that will contribute to our understanding of systemic risk. The data disclosures required by the FTRM would be more precise, and would therefore provide more analytically beneficial content, than the disclosures discussed in current iterations of the regulatory reform bill.

WHAT FTRM WILL DO

The FTRM, however ultimately refined, would have at least three important benefits centrally relevant to the current debate on financial regulatory reform. First, as already mentioned, it will provide a basic sense of the size of the crater that an imploded firm would leave behind. In a world of off-balance-sheet contingent obligations, a balance sheet, designed to provide the same function, fails to capture the full measure of impact. As Congress and the Obama Administration debate how best to measure firms that are either too big or too interconnected to fail, a sticking point has been a definitional one: how big is too big?[43] While the FTRM will initially lack much informational content, a large or small FTRM will eventually be a useful guide in determining whether or not a firm poses a systemic risk to the broader economy.

Second, a regulatory requirement for firms to report the inputs necessary for the FTRM would force these firms to maintain the information themselves. The idea that such regulation would be necessary to force these firms to keep track of their own contracts would strike most proponents of free markets as preposterous; firms have plenty of other incentives in place to keep track of their own business. Arguing otherwise would be akin to arguing that MasterCard should face mandatory disclosure requirements for all of the credit card transactions it clears because without such disclosure, it simply wouldn't record them in a timely or accessible manner.

---

dem/testimony-_sec_geithner.pdf (discussing the need to force any entity with an implicit or explicit governmental guarantee to undergo strict supervision).

42. *See* H.R. 4173 § 3104 (providing for the public recording of aggregate swap data, but limited only to "aggregate data on swap trading volumes and positions").

43. *See The Administration's Proposals for Financial Regulatory Reform, Hearing Before the H. Comm. on Financial Servs.*, 111th Cong. (2009) (statement of Timothy F. Geithner, Secretary, United States Department of the Treasury), *available at* http://www.house.gov/apps/list/hearing/financialsvcs_dem/testimony_-_sec_geithner.pdf. The Bill passed by the House—H.R. 4173, Wall Street Reform and Consumer Protection Act of 2009—would place broad discretion in a Financial Services Oversight Council to determine whether an institution has grown too large or interconnected to continue in its current form. *See* H.R. 4173 §§ 1001–1008, 1105.

As absurd as it may sound, this is precisely the condition that many derivatives-trading firms have faced. In 2005–06, firms engaged in OTC derivatives trading had a dramatic 8- to 9-month backlog of unrecorded derivatives contracts; "for every 100 new trades [executed on the trading floor], there were about 1,000 aged unconfirmed trades."[44] Tim Geithner, then President of the New York Federal Reserve, made resolving that backlog a touchstone of his administration in the years before the financial crisis.[45] And while there has been success reported on that front,[46] the question remains open whether new financial innovations could create a similar problem, especially in more opaque areas of the markets. If reporting the FTRM becomes as basic as filing a 10-K with the Securities and Exchange Commission, with comparable penalties for reporting failures, then firms will—once and for all—get this crucial piece of accounting right.

Last, and most importantly, the FTRM provides data about the aggregate derivatives exposure for each firm, and aggregate exposure to implicit guarantees for off-balance-sheet entities.[47] Such disclosure for OTC derivatives and off-balance-sheet contingent liabilities does not currently exist.[48] Of course, firms may be extremely reluctant to disclose

---

44. DARRELL DUFFIE, ADA LI & THEO LUBKE, FED. RESERVE BANK OF N.Y., POLICY PERSPECTIVES ON OTC DERIVATIVES MARKET INFRASTRUCTURE 2 (2010), *available at* http://www.newyorkfed.org/research/staff_reports/sr424.pdf.

45. *See* Yalman Onaran & Michael McKee, *In Geithner We Trust Eludes Treasury as Market Fails to Recover*, BLOOMBERG, Feb. 25, 2009, http://www.bloomberg.com/apps/news?sid=aLhs5Byln00k&pid=20601109 (describing Geithner's role in "clear[ing] away the backlog").

46. *Id.*

47. Recall that the source of tens of billions of dollars of Citibank's write-downs resulted from guarantees that it had offered on the senior risk for its off-balance-sheet Special Investment Vehicles. *See* GILLIAN TETT, FOOL'S GOLD: HOW THE BOLD DREAM OF A SMALL TRIBE AT J.P. MORGAN WAS CORRUPTED BY WALL STREET GREED AND UNLEASHED A CATASTROPHE 204–06 (2009) (explaining how the guarantees were in the form of essentially risk-free super-senior tranches of CDOs); DAVID WESSEL, IN FED WE TRUST: BEN BERNANKE'S WAR ON THE GREAT PANIC 104–05 (2009) (explaining the relationship between Citigroup and its SIVs).

48. Disclosure in this context has been a rare source of consensus in the conversations on financial reform. *See First Public Hearing, Hearing Before the Financial Crisis Inquiry Comm'n* 8–9 (2010) (statement of Lloyd Blankfein, Chief Executive Officer, Goldman Sachs), *available at* http://www.fcic.gov/hearings/pdfs/2010-0113-Transcript.pdf (citing the need to improve disclosure and risk valuation methods in derivatives markets); *Recent Developments in the U.S. Financial Markets and Regulatory Responses to Them, Hearing Before the S. Comm. on Banking, Housing, and Urban Affairs* (2008) (statement of Christopher Cox, Chairman, United States Securities and Exchange Commission), *available at* http://banking.senate.gov/public/_files/CoxSECtestimony71508FINAL.pdf (calling for increased transparency in bringing "hidden risks to light"); Letter from Ams. for Fin. Reform to Congress (Aug. 2, 2009), *available at* http://ourfinancialsecurity.org/2009/08/afr-urges-congress-to-regulate-the-derivatives-markets/ (urging Congress to impose disclosure requirements for OTC derivatives); Letter from Timothy F. Geithner, Secretary, U.S. Dep't of the Treasury, to Harry Reid, Majority Leader, U.S. Senate (May 13, 2009), *available at* http://www.financialstability.

to the public this kind of exposure, particularly since so much of a firm's profits will be linked to its success at investing in this space. We can table that issue for now by imposing a disclosure requirement only to the systemic risk regulator, and not to the overall market;[49] under the Obama Administration's proposal, this task would fall jointly to a new Financial Services Oversight Council and to the Federal Reserve.[50] The Federal Reserve, in particular, already has a robust tradition of conducting independent econometric research, for both internal and external consumption.[51] Forcing that disclosure will allow government researchers to determine correlative and causal connections between fat-tail risk and any number of other relevant statistics, including bankruptcy rates, default rates, credit default swap spreads,[52] stock price, profitability, counterparty risk, specific industry (where relevant), geographic factors, or any other appropriate variable.

The opportunity to conduct time-series research with this kind of panel data is tremendously valuable. Over the course of ten, twenty, fifty years, or more, researchers could piece together the story of risk exposure as it relates to a number of other variables. Indeed, before we can prevent firms from becoming too big to fail,[53] we must know what that term even means. By generating a constant flow of this failure-oriented data, researchers can begin to tease out relationships between the off-balance-sheet risk measured by FTRM and other factors. And because it will be measured across the economy, the data will be useful both for comparative and absolute purposes. This is the most important contribution of the FTRM. Debates about financial reform are frequently characterized by more heat

gov/docs/OTCletter.pdf (advocating for more disclosure in OTC derivatives markets). Standing up in favor of derivatives disclosure is, however, a little like standing up in favor of democracy. It feels good to say it, but doesn't really mean anything in the abstract.

49. I am not opposed to this move. The burden should be on firms themselves to prove that the disclosure of this information prevents them from engaging in the markets. I simply include this caveat to focus the debate.

50. DEP'T OF THE TREASURY, FINANCIAL REGULATORY REFORM: A NEW FOUNDATION 3 (2009), *available at* http://www.financialstability.gov/docs/regs/FinalReport_web.pdf.

51. *See* Board of Governors of the Federal Reserve System, Research Staff and Resources, http://www.federalreserve.gov/research/default.htm (last updated Jan. 15, 2010).

52. Credit default swap spreads refer to the cost to buy "insurance" against some kind of triggering event, usually a corporate default. If the market thinks that a company is heading toward default, the cost of buying insurance will rise. The amount that one party must pay another to secure this insurance is called the "spread." *See* David Mengle, *Credit Derivatives: An Overview*, FED. RES. BANK ATLANTA: ECON. REV., Fourth Quarter 2007, at 1, 4.

53. This is a newly stated goal of the Federal Reserve. *See* Kevin Warsh, Member, Bd. of Governors of the Fed. Reserve Sys., Remarks to the New York Association for Business Economics: Regulation and Its Discontents 9 (Feb. 3, 2010) (declaring a need for a new "financial architecture" that includes greater regulation, wherein "no firm should be too big to fail").

than light; a call for more data can help resolve some of those perennial debates.

CONCLUSION: WHAT FTRM DOES NOT—AND CANNOT—DO

Initially, the FTRM will not be very helpful in providing a basis for risk-management decisions. A FTRM score of 10.126, for example, does not answer the crucial question of whether a firm is over- or underexposed to risk. Thus, a board member who inquires about her firm's fat-tail risk exposure will have, initially, no idea what to make of the single- or double-digit figure she hears. But the FTRM will prove its use with time and experience. Financial crises are perennial;[54] we will see similar events again. Having these new and important data will be a boon to future researchers and regulators in determining how fat-tail risk relates to future financial crises.

As the sources above indicate, I am not the first to advocate for greater disclosure. The contribution here is to focus that disclosure not just on the workaday risks that firms face, but on the extreme risks that they face. The FTRM addresses that issue not by assuming that such backstop failure will ever occur, but by using the size of that economic footprint as a proxy—and test variable—for the systemic risk that a given firm may carry.

The FTRM proposed here raises far more questions than I have answered: Who will determine what constitutes off-balance-sheet exposure? Who will enforce disclosure? What institutions will be affected? What about the inevitable attempts to perform regulatory arbitrage around such disclosure? What will happen if firms move their derivatives trading overseas to avoid this disclosure? In so short a space, it is impossible to respond to the many concerns that might be raised before a mandatory disclosure of this data could occur. Ultimately, very few of the details highlighted here are essential to the concept that I propose. Even the proxies discussed here could be challenged as insufficiently related to fat-tail risk. But these details are of secondary importance. The general architecture of the proposal is the key: we must mandate disclosure of contingent liabilities (especially OTC derivatives), reported in such an accessible way that individual firms' data can be collected and

54. *See* CARMEN M. REINHART & KENNETH S. ROGOFF, THIS TIME IS DIFFERENT: EIGHT CENTURIES OF FINANCIAL FOLLY 3–20 (2009) (describing the familiar trajectory that financial crises have taken over eight centuries of experience); *see also* CHARLES P. KINDLEBERGER, MANIAS, PANICS, AND CRASHES: A HISTORY OF FINANCIAL CRISES 1 (4th ed. 2000) (setting out a literary version of the history of financial crises).

systematically researched over time. In that way, the FTRM is a modest step in getting closer to understanding how risk is measured, and how to use that measurement to understand catastrophic financial collapses that undermine our entire economic system.