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"Reflections on Economics, Policy and the Financial Crisis"

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I am deeply honored to accept this award. Although my family left the Bluegrass State and migrated to the northeast early in my life, I have deep family roots here. My Grandfather Sholto Spears grew up around Auburn, for example. So I retain a fond spot in my heart for My Old Kentucky Home, and I know this award would have made my Grandpa Sholto proud.

In my remarks today, I would like to share some reflections on the role of economics in policy making during this financial crisis.[1] Over the last few years, I have had the privilege of witnessing, and at times participating in, some of the most challenging economic policy deliberations imaginable. Be under no illusions about my role, however; mine was a bit part at best. But my position gave me a unique vantage point on the making of policy during this financial crisis, and the fact that my teaching and research had been focused on banking and financial intermediation gave me a special interest in the events. I should note that these reflections are my own, however, and not necessarily shared by any of my colleagues on the Federal Open Market Committee.

When you think about economics and the financial crisis, one of the first things that comes to mind is the claim that economists' inability to predict this crisis represents a failure for the profession. While this notion has led some to lambast mainstream economics for its supposed shortcomings, the claim that economists did not foresee a crisis of this sort is fallacious. As Thomas Sargent has recently pointed out,[2] economists sounded warnings several decades ago about the potential for troubles such as those we've experienced. In 1983, Douglas Diamond and Philip Dybvig published a celebrated paper on bank runs.[3] Their model elegantly captured the economic value of *maturity transformation* – that is, borrowing via short term, demandable liabilities to fund longer term or less liquid assets. They also showed how a financial institution performing this maturity transformation function could be vulnerable to self-fulfilling "runs" in which investors who do not need the immediate return of their investment nonetheless come and seek it, because they conjecture that other such investors will make the same choice.[4] Many historical episodes of financial market turmoil have been interpreted as instances of this type of self-fulfilling run.

Deposit insurance and other forms of government-provided financial safety net protection are often motivated by the possibility of bank runs. Indeed, in the Diamond-Dybvig model, government deposit insurance completely eliminates the run equilibrium. But in a 1978 article, John Kareken and Neil Wallace pointed out that deposit insurance gives insured banks and thrifts an incentive to take on socially excessive amounts of risk and dampens their creditors' incentive to monitor and constrain such risk-taking.[5] Several years later, Kareken wrote about the critical role of regulation and supervision in constraining the excessive risk-taking incentives that result from deposit insurance.[6] He warned of the dangers of deregulating such institutions before commensurately strengthening the supervisory regime to be able to contain the expanded bank and thrift risk-taking capabilities. More recently, former Minneapolis Fed President Gary Stern and his then-colleague Ron Feldman, in a 2004 book, warned about the distorted risk-taking incentives at large financial institutions that were viewed as *Too Big to Fail,* the title of their volume. In 2002, Richmond Fed economists John Walter and John Weinberg estimated that at the end of 1999 about 45 percent of U.S. financial sector liabilities benefited from either explicit or implicit government guarantees.[7] At around the same time William Poole warned specifically about the moral hazard dangers posed by Fannie Mae and Freddie Mac, who were privately owned but widely viewed as implicitly guaranteed by the U.S. government.[8] As Chairman Bernanke has observed, "There is little doubt that excessive risk-taking by too-big-to-fail firms significantly contributed to the crisis, with Fannie Mae and Freddie Mac being prominent examples."[9]

Because the implicit component of the federal financial safety net is discretionary, in contrast to explicitly legislated guarantees such as deposit insurance, policymakers face an acute time consistency problem, which my former colleague Marvin Goodfriend and I wrote about in 1999.[10] Committing ex ante to well-defined limits on government support would enhance market discipline and strengthen private incentives to limit risk-taking. But in the event of financial distress, pressures can emerge to alleviate ex post inefficiency, even if that would be inconsistent with an ex ante optimal plan. Responding to those pressures sets precedents that erode market discipline and contribute to the next crisis.[11] In my experience, this tension between ex post and ex ante perspectives on policy choice – this time consistency problem – is what makes policymaking particularly excruciating in a financial crisis.

These three economic forces – the potential fragility associated with maturity transformation, the moral hazard associated with explicit government guarantees, and the time consistency dilemma associated with ambiguous implicit guarantees – are central to understanding the narrative of the financial crisis. Financial institutions that benefitted from implicit government guarantees – notably Fannie Mae, Freddie Mac, and several European banking institutions – fueled the demand for securities backed by risky subprime mortgages. The implicit support of these government-sponsored entities (GSEs) led them and their creditors to underweight tail risk which in turn distorted incentives for a broad range of participants in the distribution chain, from credit rating agencies to originators to loan brokers. The resulting oversupply of subprime mortgage lending contributed to over appreciation in home prices and overinvestment in new housing. Maturity transformation outside of traditional deposit banking made many financial firms

vulnerable to runs when their exposure to unanticipated mortgage-related losses was suspected. Ambiguity about the extent and likelihood of safety net support meant that declining to rescue would cause investors to pull away from other similar financial firms. Policymakers faced agonizing choices between bad precedents that would weaken market discipline and the financial market fallout of rapidly realigning investor expectations regarding future government support.

The literature on these three ideas provided fair warning, I believe, that the pre-crisis regime of constructive ambiguity was capable of generating consequential risk-taking excesses and significant financial market problems. Nevertheless, economists were unable predict the time and manner in which the crisis would play out, although a few vocal individuals foretold some sort of imminent crisis more or less continuously. The painful process of watching the financial crisis unfold revealed several implications that had not been appreciated beforehand. The U.S. housing GSEs and their low-income credit mandates exerted a larger influence on the subprime mortgage market than was known ex ante. The dollar-denominated intermediation activities of European financial institutions, particularly maturity transformation, were more consequential than expected. The so-called shadow banking system was not a parallel universe unto itself, but instead depended critically on backstop liquidity support, both contractual and reputational, from large banking organizations, whose access to the safety net made them more willing to accept tail risk. That in turn meant that large subprime losses unexpectedly boomeranged back onto the balance sheets of bank holding companies. Perhaps most importantly, the magnitude of the overinvestment in housing collectively generated by these sources of moral hazard was underestimated and emerged only gradually as the fall in residential investment unfolded. As a result, until the fourth quarter of 2008, a range of mainstream macroeconomic forecasts underestimated the depth of the recession.

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I have been discussing the economics of the buildup to the crisis, but what about the unfolding of the crisis itself? The financial market turmoil that began in August of 2007 posed tough challenges for central bank policy economists. The logic of the Diamond-Dybvig fragility result was an ever present and at times urgent concern, and motivated vigilant attention to firms that were vulnerable to run-like behavior because they were engaged in maturity transformation. Because government insurance for the liabilities of a Diamond-Dybvig intermediary can eliminate run equilibria, their model appeared to recommend official intervention to prevent the spread of runs. But as investor confidence in large financial institutions fluctuated, it became clear to supervisors that the extent to which a financial entity was vulnerable to runs was a matter of business strategy choice – that is, it was endogenous. Liquid, short-term borrowings were less costly than longer-term funding that more closely matched the maturity of the borrower's underlying assets. Thus intervention decisions required facing non-trivial trade-offs involving ex ante moral hazard, a feature Diamond and Dybvig deliberately left out of their model.[12] Moreover, the contractual mechanisms that in a Diamond-Dybvig model allows a bank to prevent run equilibria – partial suspension, or ex post trading, for example – seem quite feasible in modern financial markets. In addition, a sizable empirical and theoretical literature

views runs as driven by fluctuating expectations regarding the fundamental value of the intermediary's assets, rather than by arbitrary herd behavior (that is, sunspots), in which case a run may represent an ex ante efficient method of initiating liquidation in the appropriate states of the world. So while the Diamond-Dybvig model provided an illuminating framework for interpreting tumultuous events in financial markets, it did not provide unequivocal guidance for policymakers contemplating intervention, because not all runs represent inefficient instability.

Other models of inherent financial fragility also played a role in policy deliberations. For example, in August 2007 investors began pulling away from asset-backed commercial paper instruments out of concern that the underlying portfolios might be exposed to subprime mortgage losses.[13] Issuance volumes dropped and prices fell, and the notion of "fire sales" or "cash-in-the-market pricing" was invoked as an explanation for financial assets trading at prices well below fundamentals, or not trading at all.[14] Crucial to such models, however, are barriers to market participation that prevent the obvious arbitrage operations. It was hard to find such barriers in the asset-backed securities market, however, given the wide array of institutional investors that had access to those securities and many other markets as well. Moreover, on-balance sheet funding costs for the sponsoring institutions were often lower than that implied by crisis-level market risk premia, which could explain the precipitous drop in issuance. It was difficult to reject the hypothesis that in response to legitimately elevated uncertainty about subprime mortgage loss exposures, a broad range of investors had marked down asset valuations and shifted into cash. Under this hypothesis, depressed asset prices represented reduced fundamentals, and official intervention would impede rather than aid market functioning.

This example illustrates a broader lesson regarding the use of economic models in financial policy. The formal economics of financial fragility is still in its infancy. What the economics literature provides is a collection of intriguing "possibility theorems" showing that a particular financial market phenomenon could potentially occur under a given set of assumptions. Some models of financial fragility rationalize activist intervention policies, while some models with identical price and quantity implications suggest that observed arrangements may be fairly efficient. Policymakers are thus faced with alternative models with very different policy implications. Constructive policy deliberations require that you "lay all your cards on the table" by checking the entire range of model characteristics against real world observations, both qualitative and quantitative.

Financial policy making thus places a premium on careful and objective reporting. I believe that was made more difficult by the type of language often used to describe financial market conditions. At various times we learned that a financial market was "strained," "stressed," "under liquidity pressures," "dysfunctional," "frozen," "clogged," or "had seized up." While this market terminology is certainly vivid and undoubtedly helped convey the discomfort of some market participants, particularly on the sell side, I never found any of these terms all that helpful, because all they really conveyed was that prices and traded quantities were low or even at zero. They could be inefficiently low due to some market imperfection, or they could be efficiently low because buyers'

expectations regarding the asset's fundamentals are depressed. Without a candidate model in hand of how that asset market functions, such colorful slang says nothing about policy questions.

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I'd like to close by focusing on the time consistency problem, which I believe was *the* central tension in the financial crisis. I also believe that shifting investor beliefs about the government's intention to provide or limit support was a leading source of contagion and market volatility in a number of key episodes – especially during the weeks in September, 2008, that saw distinctly different treatments of Lehman Brothers, American International Group Inc. (AIG), Washington Mutual Inc., and the former Wachovia Corp.

The difficult dilemmas that policy makers faced in the fall of 2008 were in part the legacy of a financial safety net policy that ultimately proved unworkable. Often referred to as "constructive ambiguity," this approach encouraged financial firms and their creditors to behave as if they were not protected – by not publicly acknowledging implicit support – while policymakers actually were standing ready to act in a crisis.[15] Constructive ambiguity essentially sought to obtain the ex ante benefits of commitment without giving up the discretion to act freely ex post. While constructive ambiguity was never formally adopted by name as official policy, I believe it is a fair description of the approach to policy followed in the decades since the Continental Illinois bail out.[16]

Ultimately, of course, constructive ambiguity is bound to be defeated by rational expectations. Even if you don't accept rational expectations in its strongest forms, it seems clear that a policy that relies on people being systematically and persistently wrong about how the government will behave in a crisis has little chance of imposing effective market discipline on risk-taking.

The experience of the last three years should finally put an end to the notion of constructive ambiguity as a plausible approach to financial stability. The Dodd-Frank Wall Street Reform and Consumer Protection Act in many ways reflects recognition of this fact. In the debates leading up to the Act's passage, all sides stressed the need to credibly end bailouts of large financial institutions.

Ultimately, there are two ways to achieve the long-term benefits of commitment. One is to impose legal constraints limiting policymakers' actions. The other is for the policymaker to seek, through actions and communications, to establish and maintain a reputation for a particular decision rule. This approach worked well in bringing down inflation in the 1980s, but whether it can work for financial safety net policy – or more precisely, the extent to which it can work – is an open question. My sense is that, combined with improvements to regulation, it *can* and ultimately *must* be part of an effective approach to financial stability.

The Dodd-Frank Act presents a golden opportunity for a regime change that leaves behind the dangers of constructive ambiguity. But the Act embodies two contradictory

approaches to resolving the time consistency dilemma. On one hand, it sharply constrains and strengthens accountability around government funded rescues of financial firms, which would tend to limit instances of intervention.[17] On the other hand, it also provides more discretionary tools to intervene to prevent the ex post distress associated with bankruptcy, which would tend to exacerbate the time consistency problem. Reducing financial instability will require clarity and commitment.

As for economics, my hope is that policymakers can make better use of it next time around. For this it would help if work on models of financial fragility moves beyond possibility theorems and begins to confront models with facts in a systematic way. And for their part, policymakers must confront head-on the tensions of the time consistency problem.

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[1] I am grateful to John Weinberg for help in preparing this speech.
[2] Remarks at the American Economic Association panel discussion titled "Why Did Economists Not Predict the Crisis?" January 5, 2010. See also http://www.minneapolisfed.org/publications_papers/pub_display.cfm?id=4526.
[3] Douglas Diamond and Philip Dybvig, "Bank Runs, Deposit Insurance and Liquidity," *Journal of Political Economy*, June 1983, vol. 91 no. 3, pp. 401-19.
[4] For a summary of the literature since Diamond and Dybvig, see Huberto M. Ennis and Todd Keister, "On the Fundamental Reasons for Bank Fragility," Federal Reserve Bank of Richmond *Economic Quarterly*, First Quarter 2010, vol. 96, no. 1, pp. 33-58.
[5] John H. Kareken and Neil Wallace, "Deposit Insurance and Bank Regulation: A Partial Equilibrium Exposition," *Journal of Business*, July 1978, vol. 51, pp. 413-38.
[6] John H. Kareken, "Deposit Insurance Reform or Deregulation is the Cart, Not the Horse," Federal Reserve Bank of Minneapolis *Quarterly Review*, Spring 1983, vol. 7, no. 2.
[7] John R. Walter and John A. Weinberg, "How Large is the Federal Financial Safety Net?" *Cato Journal*, Winter 2002, vol. 21, no. 3, pp. 369-99. That figure is now 59 percent: see John R. Walter and Nadezhda Malysheva, "How Large Has the Federal Financial Safety Net Become?" Federal Reserve Bank of Richmond *Working Paper* No. 2010-03, March 2010.
[8] William Poole, "Financial Stability," Federal Reserve Bank of St. Louis *Review*, September/October 2002. See http://research.stlouisfed.org/publications/review/02/09/Poole.pdf.
[9] Ben S. Bernanke, Chairman, Board of Governors of the Federal Reserve System, statement before the Financial Crisis Inquiry Commission, Washington, D.C., September 2, 2010.
[10] Marvin Goodfriend and Jeffrey M. Lacker, "Limited Commitment and Central Bank Lending," Federal Reserve Bank of Richmond *Economic Quarterly*, Fall 1999, vol. 85, no. 4, pp. 1-27.
[11] See also Kartik B. Athreya, "Systemic Risk and the Pursuit of Efficiency," Federal Reserve Bank of Richmond *Annual Report, 2009*, pp. 4-18.
[12] Diamond and Dybvig recognized this and warned readers that potentially important moral hazard considerations had been omitted from their framework. Recent work by Huberto Ennis and Todd Keister has extended the Diamond and Dybvig model to capture the intermediary's choice of exposure to runs. Huberto Ennis and Todd Keister, "Bank Runs and Institutions: the Perils of Intervention." *American Economic Review*, September 2009, vol. 99, no. 4, 1588-1607.
[13] Daniel M. Covitz, Nellie Liang, and Gustavo A. Suarez, "The Evolution of a Financial Crisis: Panic in the Asset-Backed Commercial Paper Market," Finance and Economics Discussion Series, Federal Reserve Board, no. 2009-36, August 19, 2009.
[14]Franklin Allen and Douglas Gale, "Understanding Financial Crises." Oxford University Press, Oxford, 2007, Chapter 8.
[15]Gerald E. Corrigan, "Statement before the United States Senate Committee on Banking, Housing and Urban Affairs," Washington D.C., May 3, 1990.
[16] For corroborating evidence of the persistence of constructive ambiguity, see speeches by Chairman Alan Greenspan and Vice Chairman Roger Ferguson at the Chicago Bank Structure Conference in 1999 and

2000, in which they stated that creditors of large institutions *should* expect to experience losses in some states of the world, while carefully avoiding mention of whether they *would*.

[17] For example, it eliminates Federal Reserve's authority under Section 13(3) of the Federal Reserve Act to make emergency loans to individuals, partnerships and corporations (that is, nonbank entities), apart from lending programs with "broad-based eligibility."