

## Donald L Kohn: Monetary policy research and the financial crisis – strengths and shortcomings

Speech by Mr Donald L Kohn, Vice Chairman of the Board of Governors of the US Federal Reserve System, at the Federal Reserve Conference on Key Developments in Monetary Policy, Washington DC, 9 October 2009.

*The original speech, which contains various links to the documents mentioned, can be found on the US Federal Reserve System's website.*

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The first two volumes of the *Handbook of Monetary Economics* were published in 1990.<sup>1</sup> It is fitting that the Federal Reserve Board should hold a conference showcasing the chapters of the third volume of the *Handbook*. Since 1990, there has been a sharp increase in the degree of interaction between academic economists and central bank economists in the field of monetary analysis. The beginnings of this trend were evident in the author list of volume one of the *Handbook*, which featured two chapters coauthored by economists Athanasios Orphanides and Daniel Sichel, who went on to have long careers at the Federal Reserve Board.<sup>2</sup> It is reflected today in the planned contents for volume three, which feature additional collaborations between central bank and academic economists.

The interaction between researchers at academic and policy institutions is also reflected in the enormous amount of scholarly research on monetary policy that is relevant for policymakers. That subject is the focus of my talk today. I will organize my remarks around the following two questions: First, what aspects of the existing literature in monetary economics have been particularly helpful in formulating the course of monetary policy since the onset of the financial crisis? Second, what are the gaps in this literature that have become particularly evident since the onset of the financial crisis and, therefore, would be fruitful directions for further research that could contribute to the effective design and conduct of monetary policy? Each of these questions is quite broad, so I will be selective and highlight only a few of the most important research issues.<sup>3</sup>

In many respects, central banks, including the Federal Reserve, have drawn heavily on important threads of monetary policy research in responding to the financial crisis over the past two years. For example, many of our efforts have involved the provision of liquidity to financial markets and classes of institutions facing funding pressures – a key prescription for central banks as far back as the classic writings of Thornton and especially Bagehot, whose message was that to avert panics, central banks should lend early and freely to solvent institutions, against good collateral and at high rates.<sup>4</sup>

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<sup>1</sup> See Benjamin M. Friedman and Frank H. Hahn, eds. (1990), *Handbook of Monetary Economics*, vols. 1 and 2 (Amsterdam: North-Holland/Elsevier).

<sup>2</sup> See Athanasios Orphanides and Robert M. Solow (1990), "Money, Inflation and Growth," in Benjamin M. Friedman and Frank H. Hahn, eds., *Handbook of Monetary Economics*, vol. 1 (Amsterdam: North-Holland/Elsevier), pp. 223-61; and Stephen M. Goldfeld and Daniel E. Sichel (1990), "The Demand for Money," in *Handbook of Monetary Economics*, vol. 1, pp. 299-356.

<sup>3</sup> The views presented here are my own and not necessarily those of other members of the Board of Governors of the Federal Reserve System or the Federal Open Market Committee. Michael Kiley, Jesper Lindé, and Edward Nelson of the Board's staff contributed to these remarks.

<sup>4</sup> See Henry Thornton ([1802] 1962), *An Enquiry into the Nature and Effects of the Paper Credit of Great Britain* (New York: A. M. Kelley); and Walter Bagehot ([1873] 1897), *Lombard Street: A Description of the Money Market* (New York: Charles Scribner's Sons). Brian Madigan discusses in detail the Federal Reserve's policy actions during the financial crisis and relates them to the ideas of Bagehot; see Brian F. Madigan (2009), "Bagehot's Dictum in Practice: Formulating and Implementing Policies to Combat the Financial Crisis," speech

Although flight to liquidity and safety may be rational behavior on the part of an individual market participant when uncertainty runs high, there is a danger that, left unchecked, such behavior can spiral into a damaging loss of confidence in solvent firms and in the financial system as a whole. In these circumstances, central banks are in a good position to provide liquidity to solvent firms without taking much, if any, risk.

By lending freely, the central bank can accommodate spikes in demand for liquidity, avert fire sales of assets that weaken other firms' net worth positions, and facilitate continued lending by financial institutions. By lending only to solvent firms with sufficient collateral and at a penalty rate, the central bank mitigates the moral hazard problem and other distortionary effects of its provision of assistance. To be sure, these important central banking principles have needed to be interpreted and applied in the real world, where the line between insolvency and illiquidity may be blurry. But the extraordinary actions taken so far during the financial crisis by the Federal Reserve and other central banks have closely adhered to these basic principles of central banking.

Another body of research that I believe has been valuable for the formulation of monetary policy over the past couple of years is the work that has examined the implications of the zero lower bound on nominal interest rates. The zero lower bound challenged monetary policy in Japan during the late 1990s, triggering a large volume of research. One of the main insights from this literature is that even when policy rates already stand at a relatively low level, central banks should cut rates aggressively in face of large contractionary disturbances.<sup>5</sup> This insight influenced the historically large cuts in the federal funds rate during 2008.

One prerequisite for this type of aggressive policy response is a credible commitment to long-term price stability – an important implication of both standard models and experience. The public's understanding of the central bank's commitment to price stability helps to anchor inflation expectations, thereby contributing to stability in both prices and economic activity. The Federal Reserve has acted to enhance that understanding in the current environment by lengthening the horizon of the economic projections of Federal Open Market Committee (FOMC) participants and by providing additional information about their objectives for inflation. The stability of long-run inflation expectations during the current crisis has facilitated the policy response and should contribute to the recovery.<sup>6</sup>

Our efforts to inform the public better about our expectations for inflation illustrate another strand of research that has informed recent policy actions. This research has focused on the

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delivered at "Financial Stability and Macroeconomic Policy," a symposium sponsored by the Federal Reserve Bank of Kansas City, held in Jackson Hole, Wyo., August 20-22.

Research that is more recent than that of Thornton and Bagehot has also provided formal support for the existence of financial panics and thereby support for the ideas of Bagehot. See, for example, Douglas W. Diamond and Philip H. Dybvig (1983), "Bank Runs, Deposit Insurance, and Liquidity," *Journal of Political Economy*, vol. 91 (3), pp. 401-19.

<sup>5</sup> See, for instance, the analysis in Jeffrey C. Fuhrer and Brian F. Madigan (1997), "Monetary Policy When Interest Rates Are Bounded at Zero," *Review of Economics and Statistics*, vol. 79 (4), 573-85; and the work by David Reifschneider and John C. Williams (2000), "Three Lessons for Monetary Policy in a Low-Inflation Era," *Journal of Money, Credit and Banking*, vol. 32 (4, pt. 2), pp. 936-66. For interesting analysis on the Japanese experience, see Alan Ahearne, Joseph Gagnon, Jane Haltmaier, and Steven Kamin (2002), "Preventing Deflation: Lessons from Japan's Experience in the 1990s," International Finance Discussion Papers 729 (Washington: Board of Governors of the Federal Reserve System, June).

<sup>6</sup> For instance, 10-year inflation expectations, as measured by the survey of professional forecasters, have remained nearly constant during this period. There is also evidence that inflation expectations at shorter horizons are better anchored today relative to a couple of decades ago. See, for example, Refet S. Gürkaynak, Brian Sack, and Eric Swanson (2005), "The Sensitivity of Long-Term Interest Rates to Economic News: Evidence and Implications for Macroeconomic Models," *The American Economic Review*, vol. 95 (1), pp. 425-36.

central role of communication in guiding private-sector expectations in a manner that contributes to stability in economic activity and inflation. Effective communication not only about inflation but also about the possible path of the policy rate may be particularly important at the zero lower bound, when the scope to influence expectations through changes in the policy rate is obviously limited.<sup>7</sup> And, in a historically unusual period, the economic developments motivating central bank actions may be more difficult to interpret and predict than in typical periods, making such communication especially important.<sup>8</sup> Notably, in FOMC statements since our policy interest rate was lowered to about zero, the Committee has provided some guidance about the future path of the federal funds rate.

To be sure, we have not followed the theoretical prescription of promising to keep rates low enough for long enough to create a period of above-normal inflation. The arguments in favor of such a policy hinge on a clear understanding on the part of the public that the central bank will tolerate increased inflation only temporarily – say, for a few years once the economy has recovered – before returning to the original inflation target in the long term. In standard theoretical model environments, long-run inflation expectations are perfectly anchored. In reality, however, the anchoring of inflation expectations has been a hard-won achievement of monetary policy over the past few decades, and we should not take this stability for granted. Models are by their nature only a stylized representation of reality, and a policy of achieving "temporarily" higher inflation over the medium term would run the risk of altering inflation expectations beyond the horizon that is desirable. Were that to happen, the costs of bringing expectations back to their current anchored state might be quite high.

A final strand of literature has contributed to our policy strategy over the past two years by emphasizing the role of credit and financial intermediation for macroeconomic fluctuations and monetary policy transmission, particularly the literature that developed during the 1980s on nonprice aspects of credit restriction and the importance of such factors in severe economic downturns.<sup>9</sup> From the onset of this financial crisis, we were especially alert to the possibility that limits on the availability of credit to financial intermediaries and in the flow of credit between intermediaries and the household and business sectors could exert unusual constraints on spending.

It is fair to say, however, that the core macroeconomic modeling framework used at the Federal Reserve and other central banks around the world has included, at best, only a limited role for the balance sheets of households and firms, credit provision, and financial intermediation. The features suggested by the literature on the role of credit in the transmission of policy have not yet become prominent ingredients in models used at central banks or in much academic research.<sup>10</sup> For example, the standard framework used in

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<sup>7</sup> Research that discusses the role of communication at the zero lower bound includes Taehun Jung, Yuki Teranishi, and Tsutomu Watanabe (2005), "Optimal Monetary Policy at the Zero-Interest-Rate Bound," *Journal of Money, Credit and Banking*, vol. 37 (5), pp. 813-35; Klaus Adam and Roberto M. Billi (2006), "Optimal Monetary Policy under Commitment with a Zero Bound on Nominal Interest Rates," *Journal of Money, Credit and Banking*, vol. 38 (7), pp. 1877-1905; and Gauti B. Eggertsson and Michael Woodford (2003), "The Zero Bound on Interest Rates and Optimal Monetary Policy," *Brookings Papers on Economic Activity*, vol. 2003 (1), pp. 139-211.

<sup>8</sup> See, for instance, the discussion and references in Lars E.O. Svensson (2006), "Social Value of Public Information: Comment: Morris and Shin (2002) Is Actually Pro Transparency, Not Con," *American Economic Review*, vol. 96 (1), pp. 448-52.

<sup>9</sup> See, for example, Ben S. Bernanke (1983), "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *The American Economic Review*, vol. 73 (3), pp. 257-76; and Dwight Jaffee and Joseph Stiglitz (1990), "Credit Rationing," in Benjamin M. Friedman and Frank H. Hahn, eds., *Handbook of Monetary Economics*, vol. 2 (Amsterdam: North-Holland/Elsevier), pp. 837-88.

<sup>10</sup> This circumstance was clear even in 1990 when, in considering the view of the transmission mechanism emerging from monetary policy analysis, I expressed concern that "all the adjustment was propelled through movements along the price axis – a doubtful proposition even for the United States." See Donald L. Kohn

dynamic general equilibrium models, with its simplifying emphasis on a single representative agent, does not lend itself to analysis of financial intermediation.<sup>11</sup>

A large volume of work has emphasized the potential importance of intermediation channels given asymmetric information between borrowers and lenders.<sup>12</sup> But the importance of considering intermediation channels in the aggregate, as opposed to taking them into account for some firms at some times, has remained difficult to quantify.<sup>13</sup>

Moreover, that work has tended to concentrate on the intersection between intermediaries and nonfinancial borrowers. A characteristic of the recent crisis, however, was the critical role of interactions within the financial sector. Although rising defaults on subprime mortgages caused the initial turbulence in financial markets, roadblocks to the flow of credit within the financial sector from heightened uncertainty, increases in the asymmetry of information, and questions about the alignment of incentives helped turn a conventional credit event into a full-blown crisis. Recent research has begun to augment core monetary models with heterogeneous agents, multiple interest rates, and risky lending, but even so, it has become obvious that research on the importance of intermediation and supply constraints on credit provision and thus on spending has lagged significantly.<sup>14</sup> An encouraging sign in this regard is the large number of recent studies that add the banking sector and credit creation to standard monetary policy models.<sup>15</sup> Some of these studies emphasize bank capital as a constraint on financial intermediation, while other studies allow for heterogeneity among banks and thereby interbank borrowing and lending.<sup>16</sup> Future research is likely to feature a

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(1990), "Making Monetary Policy: Adjusting Policy to Achieve Final Objectives," in W.E. Norton and Peter Stebbing, eds., *Monetary Policy and Market Operations* (Sydney: Reserve Bank of Australia), pp.11-26.

<sup>11</sup> See, for example, the models analyzed in Michael Woodford (2003), *Interest and Prices: Foundations of a Theory of Monetary Policy* (Princeton, N.J.: Princeton University Press); and the model advanced in the influential work of Lawrence J. Christiano, Martin Eichenbaum, and Charles L. Evans (2005), "Nominal Rigidities and the Dynamic Effects of a Shock to Monetary Policy," *Journal of Political Economy*, vol. 113 (1), pp. 1-45.

<sup>12</sup> See, for instance, Nobuhiro Kiyotaki and John Moore (1997), "Credit Cycles," *Journal of Political Economy*, vol. 105 (2), pp. 211-48; and Ben S. Bernanke, Mark Gertler, and Simon Gilchrist (1999), "The Financial Accelerator in a Quantitative Business Cycle Framework," in John B. Taylor and Michael Woodford, eds., *Handbook of Macroeconomics*, vol. 1 (Amsterdam, The Netherlands: North-Holland/Elsevier), pp. 1341-93.

<sup>13</sup> For an example of the difficulties of quantifying such channels in a macroeconomic framework, see the discussion of the large-scale macroeconomic models used by the Federal Reserve for the past several decades in Eileen Mauskopf (1990), "The Transmission Channels of Monetary Policy: How Have They Changed?" *Federal Reserve Bulletin*, vol. 76 (12), pp.985-1008; and David Reifschneider, Robert Tetlow, and John C. Williams (1999), "Aggregate Disturbances, Monetary Policy and the Macroeconomy: The FRB/US Perspective," *Federal Reserve Bulletin*, vol. 85 (1), pp. 1-19.

<sup>14</sup> See, for example, Vasco Cúrdia and Michael Woodford (2009), "Credit Frictions and Optimal Monetary Policy," manuscript, Columbia University, May.

<sup>15</sup> See, for example, Marvin Goodfriend and Bennett T. McCallum (2007), "Banking and Interest Rates in Monetary Policy Analysis: A Quantitative Exploration," *Journal of Monetary Economics*, vol. 54 (5), pp.1480-1507; Matthew Canzoneri, Robert Cumby, Behzad Diba, and J. David López-Salido (2008), "Monetary Aggregates and Liquidity in a Neo-Wicksellian Framework," *Journal of Money, Credit and Banking*, vol. 40 (8), pp. 1667-98; and Lawrence J. Christiano, Roberto Motto, and Massimo Rostagno (2009), "Financial Factors in Economic Fluctuations," paper presented at "Financial Markets and Monetary Policy," a conference sponsored by the Federal Reserve Board and the *Journal of Money, Credit and Banking*, Washington, June 4-5.

<sup>16</sup> For examples of studies that emphasize bank capital as a constraint on financial intermediation, see Césaire A. Meh and Kevin Moran (2008), "The Role of Bank Capital in the Propagation of Shocks," Bank of Canada Working Paper 2008-36 (Ottawa, Ontario, Canada: Bank of Canada, October); and Mark Gertler and Peter Karadi (2009), "A Model of Unconventional Monetary Policy," manuscript, New York University, June.

For an example of a study that allows for heterogeneity among banks and thereby interbank borrowing and lending, see Gregory de Walque, Olivier Pierrard, and Abdelaziz Rouabah (2009), "Financial (In)stability, Supervision and Liquidity Injections: A Dynamic General Equilibrium Approach," CEPR Discussion Paper DP7202 (London: Centre for Economic Policy Research, March).

proliferation of macroeconomic models that flesh out the interconnections between risks, liquidity, and capital in the financial system and their implications for the real economy.

Research on the credit channel and developments within the financial sector should be paired with work on asset prices and their role in the transmission of economic shocks and monetary policy. In neoclassical models, asset prices affect spending and investment decisions through substitution and wealth effects. But these channels fail to capture the multiplicity of interactions among asset prices, credit, and real activity that became so important in the current crisis, and in particular, how fluctuations in asset prices can affect the availability and terms of credit to different types of borrowers. This failure to capture all of the elements in play is most apparent by looking back at the course of house prices and their effect on the financial system and economic activity. It is now clear that house prices in the United States became overvalued over some period leading up to 2006. The rise in house prices contributed to an increase in credit availability, and the bursting of the bubble, by affecting financial intermediaries as well as households, had larger adverse effects than anticipated. Lower house prices caused the prices of mortgage-related securities to decline, which weakened the balance sheets of a broad array of financial institutions. Financial institutions' need to rebuild their capital positions led them to adopt more-restrictive lending practices. The restriction on credit supply in turn put downward pressure on asset prices on economic activity, further damaging banks' asset values and setting off another round of credit restriction. The various mechanisms that have tended to amplify asset price movements and the feedback among those movements, credit supply, and economic activity were not well captured by the models used at most central banks.<sup>17</sup>

Our limited knowledge of the determinants of asset prices and their effects on credit has made it more challenging to respond to the crisis and explain our actions to the public. We have had to relax our standard assumptions that financial assets are highly substitutable, and that their rates of return can be readily arbitrated. For example, the degree to which assets of different types and maturities are imperfect substitutes is central to understanding the large-scale asset purchase, or LSAP, program of the Federal Reserve. Our purchases of longer-term Treasury, agency, and agency-guaranteed mortgage-backed securities were undertaken to support aggregate demand. These actions were designed to lower mortgage and other interest rates by exerting downward pressure on yields on assets that are only imperfectly substitutable for very short-term assets, and whose substitutability for those very short-term assets likely has decreased in the crisis period. In addition, discussions of the effects of the buildup in reserves at the Federal Reserve and other central banks often emphasize the imperfect substitutability of reserves for other bank assets, even when those reserves are remunerated at something like a market interest rate. More generally, while most of the literature on the effects of monetary policy assumes that the federal funds rate is the single relevant tool for monetary policy, the financial crisis has shown that a wide array of policy measures, acting on the prices of different assets, may be needed in extreme circumstances. The research literature that could help gauge the potential impact of these measures – and the exit from them – is disappointingly sparse.

A better understanding of asset prices, the credit channel, and their interaction also would seem to be critical for successfully carrying out some of the tasks central banks and other authorities are being urged to take on in the future. Discussions of macroprudential regulation of financial institutions have noted the tendency for financial crises to be preceded by bubbles spurred by financial liberalization or innovations, and how the most pernicious crises have been associated with disruptions to credit provision that resulted from excessive

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<sup>17</sup> See Frederic S. Mishkin (2008), "Monetary Policy Flexibility, Risk Management, and Financial Disruptions," speech delivered at the Federal Reserve Bank of New York, New York, January 11.

leverage.<sup>18</sup> And increasingly, central banks are being encouraged to "lean against the wind" in the face of asset price bubbles. As researchers, we need to be honest about our very limited ability to assess the "fundamental value" of an asset or to predict its price. But the housing and credit bubbles have had a substantial cost – and the final bill is not yet in. Research on asset prices, credit, and intermediation should help to identify risks and inform decisions about the costs and benefits from a possible regulatory or monetary policy decision attempting to deal with a potential asset price bubble.

The research agenda growing out of this crisis is formidable and difficult – and I have covered only a portion of it. For example, I have not touched on the need for models to take much better account of nonlinearities and tail events, which played such a prominent role in the rapid deterioration of the global economy last year. The new agenda will require letting go of a number of the simplifications and assumptions that have made our models tractable and delving into literatures related to – but not necessarily considered traditional – monetary economics. But the developments of the past two years have highlighted both the strengths and weaknesses of the previous research agenda. Policymakers will be making judgments based on what we think we have learned in that time. We need your work to organize our thoughts and guide our judgments about the lessons from this experience. The Handbook of Monetary Economics has played a critical role in this regard in the past, and I am confident that it will continue to do so in the future.

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<sup>18</sup> For a recent discussion of the history of financial crises and their relationship to the evolution of the financial system and leverage, see Michael D. Bordo (2008), "An Historical Perspective on the Crisis of 2007-2008," NBER Working Paper Series 14569 (Cambridge, Mass.: National Bureau of Economic Research, December). A discussion of such issues and their implications for macroprudential regulation can be found, for example, in Markus Brunnermeier, Andrew Crockett, Charles Goodhart, Avinash D. Persaud, and Hyun Shin (2009), "The Fundamental Principles of Financial Regulation," preliminary conference draft, *Geneva Reports on the World Economy* (Geneva, Switzerland: International Center for Monetary and Banking Studies, January). (Note: This paper is a preliminary version of a forthcoming report in the *Geneva Reports on the World Economy* series; the paper was prepared for presentation at a conference in Geneva on January 24, 2009).