

Comment

David R. Skeie: Augusto de la Torre and Alain Ize argue for three policy proposals for financial regulatory reform in the context of four conceptual paradigms for understanding financial crises. They propose that supervisors should (a) regulate all leveraged financial intermediaries, not just those considered systemic, unless a financial intermediary only borrows from other regulated entities; (b) tax not only financial intermediaries' short-term borrowing when mismatched against long-term assets, but also financial intermediaries' short-term lending to other leveraged financial intermediaries; and (c) promote guidance for more rational and well-informed financial markets.

In this discussion, I consider the proposed paradigms and evaluate the proposed policies using a simple analytical framework based on the model in Freixas, Martin, and Skeie, which incorporates some of the standard theoretical concepts that economists have used to study the recent financial crisis.¹ The analytical framework highlights the merits of regulating leveraged financial intermediaries and their short-term borrowing, but questions taxing financial intermediaries' short-term lending and excluding from regulation financial intermediaries that borrow from regulated entities. The framework also illustrates the benefits of considering guidance for financial stability in the formulation of monetary policy in addition to direct supervision of financial intermediaries. Monetary policy has an important effect on macroprudential stability because interest rate policy determines the funding cost of the broad range of leveraged institutions that may escape direct supervision by regulators.

A major point of the paper is that conflicting conceptual paradigms can lead to conflicting policy implications for financial regulation. The asymmetric information paradigm considers informational frictions, including hidden information and hidden actions, such as moral hazard. The authors argue that

1. Freixas, Martin, and Skeie (2011).

asymmetric information is the dominant paradigm currently used by policy-makers, but that the primary systemic risks of the financial system and corresponding policy implications are better understood according to two alternative paradigms. The first alternative is the collective action paradigm, which focuses on coordination frictions. Individuals do not account for the externality that their actions impose on others even in the absence of informational frictions. The second alternative is the collective cognition paradigm, which incorporates costs of information, externalities, and bounded-rational behavior. The authors also briefly discuss the market segmentation paradigm, based on different investor and intermediary classes having different access to various markets and securities.

I consider a simplification of the model in Freixas, Martin, and Skeie, which develops a role for a regulator in short-term funding markets for financial intermediaries.² The model generalizes the problem of systemic liquidity risk propagated through interbank markets as developed by Bhattacharya and Gale and by Allen, Carletti, and Gale, in the context of financial liquidity provision and instability with leveraged financial intermediaries begun in the seminal work of Diamond and Dybvig.³ This framework can capture some of the main frictions of the collective action and collective cognition paradigms in a simple form, providing a method to analyze the policy proposals clearly and consistently.

In the analytical framework, there are a number of financial intermediaries with short-term funding from depositors in the initial period at date 0. These financial intermediaries can be thought of as commercial banks, dealers, hedge funds, money market funds, and others that borrow with short-term funding and hold long-term illiquid assets. At date 1, each depositor has a privately observed liquidity shock with probability $\bar{\lambda}$, which is also the fraction of all depositors having a shock. In normal times, designated by state $i = 0$ and occurring with probability $1 - \rho$, banks have an equal fraction of withdrawals of $\bar{\lambda}$. With probability $\rho \in [0, 1]$, a liquidity crisis occurs, designated by state $i = 1$, in which banks have varying liquidity needs and uncertainty about these needs. Half of the banks have high withdrawals of $\lambda^h = \bar{\lambda} + \varepsilon$ and half have low withdrawals of $\lambda^l = \bar{\lambda} - \varepsilon$, where ε represents the size of the liquidity crisis and $j \in J \equiv \{h, l\}$ represents a bank's shock type.

2. Freixas, Martin, and Skeie (2011).

3. Bhattacharya and Gale (1987); Allen, Carletti, and Gale (2009); Diamond and Dybvig (1983).

Deposits withdrawn at date 1 pay c_1 , and those not withdrawn (or rolled over) are paid an amount of c_2^j at date 2, which is an equal share of the remaining goods at the depositor's bank j . A depositor's expected utility is

$$E[U] = \bar{\lambda}u(c_1) + (1 - \rho)(1 - \bar{\lambda})u(c_2^{0j}) + \rho \left[\frac{1}{2}(1 - \lambda^{1h})u(c_2^{1h}) + \frac{1}{2}(1 - \lambda^{1l})u(c_2^{1l}) \right],$$

where the utility of a depositor's withdrawal $u(c)$ is increasing and concave and has a coefficient of relative risk aversion greater than one, which provides a role for banks to provide risk-decreasing liquidity insurance.

Banks compete for deposits at date 0 by offering debt contracts (c_1, c_2^j) to maximize the expected utility of their depositors. Banks unverifiably invest a fraction α of their assets in long-term illiquid investments paying r at date 2 or zero if liquidated early at date 1, and banks hold an amount $1 - \alpha$ of liquidity that pays a return of one over a period. Bank j chooses to borrow f^{ij} liquidity on the interbank market at date 1 at the market clearing rate, ι^i , and to carry over β^j liquidity at date 1. The bank's budget constraints for dates 1 and 2 are the following:

$$\lambda^j c_1 = 1 - \alpha - \beta^j - f^{ij}, \quad \text{for } i \in I, j \in J;$$

$$(1 - \lambda^j) c_2^j = 1 - \alpha r + \beta^j + f^{ij} \iota^i, \quad \text{for } i \in I, j \in J.$$

Market clearing requires $f^{ih} = -f^{il}$, where $i \in I \equiv \{0, 1\}$ is the crisis state variable.

The first-best allocation is for banks to hold optimal liquidity, $1 - \alpha^*$, and issue deposits providing perfect liquidity insurance by paying depositors with liquidity shocks $c_1^* = (1 - \alpha^*)/\lambda$, such that the marginal rate of substitution for consumption equals the marginal rate of transformation for investment between dates 1 and 2: $u(c_1^*) = ru(c_2^*)$. To implement the first-best allocation, we consider a planner who can observe bank types and choose interbank transfers in the form of quantities and rates on interbank loans. The planner specifies that during a crisis, banks with high shocks borrow $f^{1l} = i\epsilon c_1$ from banks with low shocks on the interbank market at date 1 at an interest rate equal to the optimal implicit return on banks' deposits between dates 1 and 2, which is $\iota^{1*} \equiv c_2^*/c_1^*$.

In a market equilibrium, the results in Freixas, Martin, and Skeie show that a continuum of rates will clear the interbank market at date 1.⁴ During a crisis, banks with high shocks have an inelastic demand for borrowing because their outside option for liquidity is only to liquidate assets. Banks with low shocks have an inelastic demand for lending because their outside option is to store liquidity for a return of one. Expected interbank rates must equal the long-term rate of investment in order for banks to be willing to hold a portfolio of both liquidity and investment at date 0. For a baseline market equilibrium without state-contingent rates, interbank rates are higher during a crisis than in the first-best allocation: $\iota^0 = \iota^1 = r > \iota^{1*}$. In comparison with the first-best solution, banks provide less liquidity to depositors and hold excessive illiquid assets, $\alpha > \alpha^*$. However, in a market equilibrium with optimal state-contingent rates set by a central bank, the central bank can set low interest rates at $\iota^{1*} < r$ during a crisis and high rates $\iota^{0*} > r$ during normal times. Monetary policy can be used to insure banks against liquidity risk during a crisis and to induce banks to hold optimal liquidity α^* . Freixas, Martin, and Skeie show that such monetary policy can also be implemented using nominal interest rates, following Skeie.⁵ If a regulator can require banks to hold optimal liquidity α^* , the central bank can set low rates of ι^{1*} during a crisis without needing to set high rates in normal times to create incentives for banks to hold liquidity.

In de la Torre and Ize's paper, the first policy proposal is to include all leveraged financial intermediaries within the bounds of regulation, with an exception for intermediaries that borrow only from other intermediaries that are regulated. The authors argue that currently, financial reforms are focused on regulating large and systemic financial institutions, which allows for financial firms to be created outside of the regulatory boundaries in order to attempt regulatory arbitrage. Regulation must therefore constantly play a catching-up role. The authors hold that the current policy focus of creating narrow regulatory bounds reflects a past regulatory failure of focusing on commercial banks. This past regulatory scope reflected the asymmetric information paradigm, under which regulation was designed to protect retail depositors who had less information than banks. Sophisticated wholesale lenders were considered not to suffer from asymmetric information problems and thus not to need regulatory protection, which left noncommercial bank intermediaries unregulated. The authors point out, however, that under the collective action

4. Freixas, Martin, and Skeie (2011).

5. Freixas, Martin, and Skeie (2011, appendix); Skeie (2008).

paradigm, there can be liquidity externalities even when there are no information problems. Therefore, all leveraged firms should be regulated, not just those labeled systemic. Otherwise, firms will find ways to arbitrage regulation by gaining access to short-term leverage that does not have the systemic label, but that still produces collective-action-based problems. The authors see an exception from regulation for any financial intermediary that borrows exclusively from regulated financial intermediaries.

The analytical framework above allows for considering the benefits of liquidity regulation for financial intermediaries broadly, in support of the paper's claims. Financial intermediaries can suffer from collective action problems because they tend to hold too little liquidity and to free ride on liquidity provided by the interbank market. Underprovision of liquidity leads to worse financial stability during crises. First, consider the baseline market equilibrium in the model without a central bank or state contingent interest rates. Banks will hold less liquidity than is optimal because they do not consider the positive externalities that liquidity provides in the interbank market during a crisis. In the model, if a banking supervisor could require all banks to hold greater liquidity, then low interest rates support an equilibrium. Low rates during a crisis allow for more optimal redistribution of liquidity, as those banks with large withdrawal shocks can borrow cheaply.

In further support of the paper, the model shows that if a banking supervisor were to mandate liquidity holdings, all banks should be regulated and not just those considered large and systemic. Unregulated banks would not hold additional liquidity and would free ride off of the liquidity in the interbank market. In fact, bank supervision requiring regulated banks to hold greater liquidity would encourage unregulated banks to hold no liquidity at all, as they could always borrow cheaply even during a crisis from those regulated banks that have a relative excess of liquidity.

Contrary to the authors' view, financial intermediaries that only fund themselves from regulated banks should not be an exception. Consider an extension of the model in which there are some banks that have investment opportunities but no source of depositors. It is efficient for them to be funded by regulated banks at date 0 so that they can invest. The authors' policy proposes that these banks be unregulated. However, during a crisis, the regulated banks with large withdrawal shocks from depositors will, in turn, withdraw greater amounts from the unregulated banks. These unregulated banks would face similar liquidity shocks as regulated banks, but they would not hold optimal liquidity. Furthermore, consider the case of unregulated banks that could even be fully diversified against liquidity shocks by borrowing from a range

of regulated banks. The unregulated banks would still not hold liquidity because they would prefer to free ride in the interbank market off of the extra liquidity that regulated banks are required to hold. It may be worse for the supervisor to regulate the liquidity held by only a fraction of banks, whether on the basis of size or funding sources, than to regulate none at all.

The second proposal in the paper supports regulating financial intermediaries' liquidity by taxing the mismatch in banks' borrowing and lending maturities. The authors further claim that short-term lending and borrowing by leveraged financial intermediaries should be taxed. When financial intermediaries borrow short term and hold long-term illiquid assets, they are susceptible to collective action problems. The authors argue that taxing short-term borrowing that finances long-term investment is not sufficient. A financial intermediary that borrows and lends only short term and thus has no liquidity mismatch nevertheless imposes a collective action problem on those to whom it lends. The intermediary will withdraw its short-term lending based on its own liquidity needs and neglect the externality it imposes on the borrower's needs to roll over financing. In the analytical framework, regulating banks' liquidity takes a step toward reducing banks' maturity mismatch from the asset side by reducing the amount of long-term illiquid assets held. Taxing banks according to their maturity mismatch would similarly lead to an increase in liquidity held.

Should even banks' short-term lending be taxed, as well? Consider again a modification of the analytical framework in which some banks have investment opportunities but no natural source of deposits, and furthermore that these banks borrow solely from banks that have depositors but no investment opportunities apart from lending to the borrowing banks.⁶ If short-term funding is regulated for all banks (in order to include all banks in regulation as argued above), then taxing short-term bank lending as well as bank borrowing acts as a double taxation. It would be better if only banks' short-term borrowing were taxed, but at a rate based on how stable the funding is. The paper is correct that short-term borrowing from other financial intermediaries may be less stable because it is not rolled over in a crisis, as occurred when money market funds withdrew their tri-party repurchase agreements with dealer banks after the Bear Stearns and Lehman collapses; and when commercial banks faced a shortage of wholesale funding in the United States after the collapse of bank-supported structured-investment vehicles (SIVs) and asset-

6. See Acharya and Skeie (2010) for a related model.

backed commercial paper (ABCP) and in the United Kingdom after the collapse of Northern Rock.⁷ Instead of trying to control the maturity mismatch and liquidity of leveraged institutions by taxing banks who lend to them, it may be better to focus on the issue raised from the first proposal of including all leveraged financial intermediaries in the regulation, liquidity requirements, and taxing of short-term borrowing. It may well be easier and more consistent to tax all short-term borrowing equivalently, according to the principle of regulating entities by function rather than by institutional type.

The third policy proposal calls for a regulatory supervisor to help correct systemic risk that arises in the financial system because of two primary frictions in the collective cognition paradigm. The authors argue that, first, there are externalities to collecting information on fundamentals. Individuals will not pay the costs for acquiring the optimal amount of information because this will benefit others. The supervisor can internalize the benefits and pay to learn and publicly provide more information about economic and financial conditions. Second, financial markets either have bounded rationality or act irrationally at times. The supervisor can recognize this and act to guide markets. Supervisors should use the information collected and the supervisory role in a process like monetary policy to guide the system.

The third proposal charges financial regulators with ensuring not only that all short-term-funded entities are formally regulated and taxed according to the first two proposals, but also that such entities operate efficiently based on the fundamental state of the economy. While the model above could be used to justify costless liquidity regulation, it also prompts the question of how well supervisors can truly identify and tax all institutions that finance illiquid assets with short-term funding. The term shadow banking demonstrates that such institutions were disguised despite their large size. The third proposal raises the question of how well supervisors can truly guide behavior of financial intermediaries and market players that are individually operating based on private information and incentives.

The analytical framework shows that both challenges to supervisors may, in part, be addressed by considering financial stability in the formulation of monetary policy. Monetary policy has an important effect on macroprudential stability because interest rate policy determines the short-term funding cost of

7. On tri-party repurchase agreements, see Martin, Skeie, and von Thadden (2010) and Copeland, Martin, and Walker (2010). On bank-supported SIVs and ABCP, see Ashcraft, McAndrews, and Skeie (2011). On the Northern Rock episode, see Goldsmith-Pinkham and Yorulmazer (2010).

the broad range of leveraged institutions, including those that may escape direct supervision by regulators. The framework demonstrates how the central bank can set interest rates contingent on information gathered on the state of the financial system. High rates in normal times can incentivize the financial system to hold optimal liquidity before a crisis, and low rates in a crisis can provide optimal liquidity redistribution in the interbank market.

Monetary policy has the power to affect bank funding costs based on the aggregate state of the financial system, while still allowing banks to optimize their liquidity and funding behavior according to private information on their individual shocks. It may be difficult for supervisors to enforce or to tax all institutions completely and directly to accomplish the same outcome. During a crisis, the supervisor needs the weakest banks to be able to borrow cheaply and the strongest banks to lend. Trying to dynamically regulate or tax liquidity holdings and borrowing and lending decisions for individual banks in an optimal manner requires detailed monitoring and sophisticated understanding of banks' various liquidity needs. The analysis highlights the important role that prices play through short-term rates for intermediaries' incentives both to hold liquidity and to transfer liquidity in short-term borrowing and lending in the wholesale funding market. The analytical results show that under a central bank's state-contingent interest rate policy, high expected short-term interest rates provide incentives for banks to hold optimal liquidity, while allowing for rate cuts during a crisis to ensure efficient liquidity sharing.

References

- Abreu, Dilip, and Markus K. Brunnermeier. 2003. "Bubbles and Crashes." *Econometrica* 71(1): 173–204.
- Acharya, Viral V., and Matthew Richardson. 2009. *Restoring Financial Stability*. Hoboken, N.J.: John Wiley and Sons.
- Acharya, Viral V., and David R. Skeie. 2010. "A Model of Liquidity Hoarding and Term Premia in Inter-Bank Markets." New York University, Stern School of Business.
- Adrian, Tobias, and Markus K. Brunnermeier. 2009. "CoVar." Federal Reserve Bank of New York and Princeton University.
- Allen, Franklin, and Douglas Gale. 1998. "Bubbles and Crises." Working Paper 98-01. University of Pennsylvania, Wharton School Center for Financial Institutions.
- . 2005. "Systemic Risk and Regulation." Working Paper 95-24. University of Pennsylvania, Wharton School Center for Financial Institutions.
- Allen, Franklin, Elena Carletti, and Douglas Gale. 2009. "Interbank Market Liquidity and Central Bank Intervention." *Journal of Monetary Economics* 56(5): 639–52.
- Arrow, Kenneth J., and Robert C. Lind. 1970. "Uncertainty and the Evaluation of Public Investment Decisions." *American Economic Review* 60(3): 364–78.
- Ashcraft, Adam B., James McAndrews, and David R. Skeie. 2011. "Precautionary Reserves and the Interbank Market." *Journal of Money, Credit, and Banking* (forthcoming).
- Barberis, Nicholas, and Richard Thaler. 2003. "A Survey of Behavioral Finance." In *Handbook of the Economics of Finance*, edited by George Constantinides, Milton Harris, and Rene Stulz. Amsterdam: Elsevier.
- Berger, Allen, Richard Herring, and Giorgio Szego. 1995. "The Role of Capital in Financial Institutions." Working Paper 95-01. University of Pennsylvania, Wharton School Center for Financial Institutions.
- Bhattacharya, Sudipto, and Douglas Gale. 1987. "Preference Shocks, Liquidity, and Central Bank Policy." In *New Approaches to Monetary Economics*, edited by William A. Barnett and Kenneth J. Singleton, pp. 69–88. New York: Cambridge University Press.
- Brunnermeier, Markus K. 2008. "Deciphering the Liquidity and Credit Crunch, 2007–2008." *Journal of Economic Perspectives* 23(1): 77–100.
- Brunnermeier, Markus K., and Lasse Pedersen. 2009. "Market Liquidity and Funding Liquidity." *Review of Financial Studies* 22(6): 2201–38.
- Brunnermeier, Markus K., and others. 2009. *The Fundamental Principles of Financial Regulation*. Geneva Reports on the World Economy 11. London: Centre for Economic Policy Research.
- Caballero, Ricardo J. 2009. "A Global Perspective on the Great Financial Insurance Run: Causes, Consequences, and Solutions." Notes prepared for the MIT Economics Alumni dinner. New York, 20 January.

- Caballero, Ricardo J., and Arvind Krishnamurthy. 2008. "Collective Risk Management in a Flight to Quality Episode." *Journal of Finance* 63(5): 2195–230.
- Caballero, Ricardo J., and Alp Simsek. 2009. "Complexity and Financial Panics." Working Paper 14997. Cambridge, Mass.: National Bureau of Economic Research.
- Calomiris, Charles W., and Charles M. Kahn. 1991. "The Role of Demandable Debt in Structuring Optimal Banking Arrangements." *American Economic Review* 81(3): 497–513.
- Copeland, Adam, Antoine Martin, and Michael Walker. 2010. "The Tri-Party Repo Market before the 2010 Reforms." Staff Report 477. Federal Reserve Bank of New York.
- Coval, Joshua D., and Anjan V. Thakor. 2005. "Financial Intermediation as a Beliefs-Bridge between Optimists and Pessimists." *Journal of Financial Economics* 75(3): 535–69.
- Danielsson, Jon, and Hyun Song Shin. 2003. "Endogenous Risk." In *Modern Risk Management: A History*, edited by Peter Field, pp. 297–316. London: Risk Books.
- De Grauwe, Paul. 2008. "Animal Spirits and Monetary Policy." Working Paper 2418. Munich: CESifo.
- De la Torre, Augusto, and Alain Ize. 2010. "Regulatory Reform: Integrating Paradigms." *International Finance* 13(1): 109–39.
- Demirgüç-Kunt, Asli, and Luis Servén. 2010. "Are All the Sacred Cows Dead? Implications of the Financial Crisis for Macro- and Financial Policies." *World Bank Research Observer* 25(1): 91–124.
- Dewatripont, Mathias, and Jean Tirole. 1994. *The Prudential Regulation of Banks*. MIT Press.
- Diamond, Douglas W., and Phillip H. Dybvig. 1983. "Bank Runs, Deposit Insurance, and Liquidity." *Journal of Political Economy* 91(3): 401–19.
- Diamond, Douglas W., and Raghuram G. Rajan. 2000. "A Theory of Bank Capital." *Journal of Finance* 55(6): 2431–65.
- Epstein, Larry, and Tan Wang. 1994. "Intertemporal Asset Pricing under Knightian Uncertainty." *Econometrica* 62(2): 283–322.
- Farhi, Emmanuel, and Jean Tirole. 2009. "Bubbly Liquidity." Working Paper 09-101. Toulouse School of Economics.
- Financial Services Authority. 2009. "The Turner Review: A Regulatory Response to the Global Banking Crisis." London.
- Fisher, Irving. 1933. "The Debt Deflation Theory of Great Depressions." *Econometrica* 1: 337–57.
- Fostel, Ana, and John Geneakoplos. 2008. "Leverage Cycles and the Anxious Economy." *American Economic Review* 98(4): 1211–44.
- Freixas, Xavier, Antoine Martin, and David R. Skeie. 2011. "Bank Liquidity, Interbank Markets and Monetary Policy." *Review of Financial Studies* (forthcoming).
- Geanakoplos, John. 2009. "The Leverage Cycle." Discussion Paper 1715. Yale University, Cowles Foundation for Research in Economics.

- Geanakoplos, John, and Heracles Polemarchakis. 1986. "Existence, Regularity, and Constrained Sub-optimality of Competitive Allocations When the Asset Market Is Incomplete." In *Essays in Honour of K. J. Arrow*, vol. 3, edited by W. Heller, D. Starret, and R. Starr. Cambridge University Press.
- Goldsmith-Pinkham, Paul, and Tanju Yorulmazer. 2010. "Liquidity, Bank Runs, and Bailouts: Spillover Effects during the Northern Rock Episode." *Journal of Financial Services Research* 37(2): 83–98.
- Gorton, Gary. 2008. "The Subprime Panic." Working Paper 14398. Cambridge, Mass.: National Bureau of Economic Research.
- Group of Twenty. 2009. "The Global Plan for Recovery and Reform." London Summit Declaration. April.
- Haldane, Andrew G. 2009. "Why Banks Failed the Stress Test." Speech given at the Marcus-Evans Conference on Stress Testing. Bank of England, London, 9–10 February.
- Holmstrom, Bengt, and Jean Tirole. 1998. "Private and Public Supply of Liquidity." Working Paper 5817. Cambridge, Mass.: National Bureau of Economic Research.
- Huang, Rocco, and Lev Ratnovski. 2010. "The Dark Side of Bank Wholesale Funding." Working Paper 1223. Frankfurt: European Central Bank.
- Jeanne, Olivier, and Anton Korinek. 2010. "Managing Credit Booms and Busts: A Pigouvian Taxation Approach." Working Paper 16377. Cambridge, Mass.: National Bureau of Economic Research.
- Keynes, John Maynard. 1936. *The General Theory of Employment, Interest, and Money*. Palgrave-Macmillan.
- Kahn, Charles M., and João A. C. Santos. 2008. "Liquidity, Payment, and Endogenous Financial Fragility." Paper prepared for the Conference on Liquidity: Concepts and Risks. CESifo, Munich, 17–18 October.
- Kim, Deasik, and Anthony M. Santomero. 1988. "Risk in Banking and Capital Regulation." *Journal of Finance* 43(5): 1219–33.
- Kindleberger, Charles P., and Robert Aliber. 1996. *Manias, Panics, and Crashes: A History of Financial Crises*. Hoboken, N.J.: Wiley Investment Classics.
- Korinek, Anton. 2008. "Regulating Capital Flows to Emerging Markets." Paper prepared for the Conference on Risk Analysis and Management. World Bank and International Monetary Fund, Washington, October.
- Leamer, Edgard. 2008. "Housing Is the Business Cycle." Working Paper 13428. Cambridge, Mass.: National Bureau of Economic Research.
- Levine, Ross. 2011. "The Sentinel: Improving the Governance of Financial Policies." In *The International Financial Crisis: Have the Rules of Finance Changed?* edited by Asli Demirgüç-Kunt, Douglas D. Evanoff, and George G. Kaufman. Hackensack, N.J.: World Scientific Publishing Co.
- Lorenzoni, Guido. 2007. "Inefficient Credit Booms." Working Paper 13639. Cambridge, Mass.: National Bureau of Economic Research.
- Majnoni, Giovanni. 2010. "Micro and Macro Prudential Oversight: Are Good Engagements Conducive to Good Marriages?" Washington: World Bank.

- Martin, Antoine, David R. Skeie, and Ernst-Ludwig von Thadden. 2010. "Repo Runs." Staff Report 444. Federal Reserve Bank of New York.
- Martin, Alberto, and Jaume Ventura. 2010. "Theoretical Notes on Bubbles and the Current Crisis." Working Paper 16399. Cambridge, Mass.: National Bureau of Economic Research.
- Minsky, Hyman. 1975. *John Maynard Keynes*. Columbia University Press.
- Routledge, Bryan, and Stanley Zin. 2009. "Model Uncertainty and Liquidity." *Review of Economic Dynamics* 12(4): 543–66.
- Saint-Paul, Gilles. 2005. "Fiscal Policy and Economic Growth: The Role of Financial Intermediation." *Review of International Economics* 13(3): 612–29.
- Shiller, Robert. 2006. *Irrational Exuberance*. Princeton University Press.
- Shleifer, Andre, and Robert W. Vishny. 1997. "The Limits of Arbitrage." *Journal of Finance* 52(1): 35–55.
- Skeie, David R. 2008. "Banking with Nominal Deposits and Inside Money." *Journal of Financial Intermediation* 17(4): 562–84.
- Vives, Xavier. 2008. *Information and Learning in Markets: The Impact of Market Microstructure*. Princeton University Press.
- Warwick Commission on International Financial Reform. 2009. "In Praise of Unlevel Playing Fields: Report of the Second Warwick Commission." University of Warwick.