

# The Financial Crisis and Credit Unavailability: Cause or Effect?

Steven L. Schwarcz<sup>1</sup>

## Key Points

- Although the causal relationship between credit availability and financial decline leading to the global financial crisis was somewhat interactive, a loss of credit availability appears to have caused the financial crisis more than the reverse.
- The potential for credit unavailability to cause a financial crisis suggests at least three lessons: because credit availability is dependent on financial markets as well as banks, regulation should protect the viability of both credit sources; diversifying sources of credit might increase financial stability if each credit source is robust and does not create a liquidity glut or inappropriately weaken central bank control; and regulators should try to identify and correct system-wide flaws in making credit available.
- These system-wide flaws can include not only financial design flaws but also flaws caused by our inherent human limitations.
- We do not yet (and may never) understand our human limitations well enough to correct the latter flaws. To some extent, therefore, financial crises may be inevitable. Financial regulation should therefore be designed not only to try to prevent crises from occurring but also to work *ex post* to try to stabilize the afflicted financial system after a crisis is triggered.

Was the 2007-2008 global financial crisis the cause of credit unavailability, or was it the effect? The standard story is that the financial crisis resulted in the loss of credit availability.<sup>2</sup> This policy brief argues that story is reversed and examines what lessons that can teach us.

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## Cause and Effect

To best assess cause and effect, consider the timeline of events leading to the financial crisis. As home prices steadily increased in the new century, it became common for lenders to make mortgage loans even to risky, or “subprime,” borrowers. This lending followed a time-tested credit card model, in which credit is made easily available and high interest rates are charged in

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1 This policy brief is based on the author’s keynote address, “The Financial Crisis and Credit Unavailability: Cause or Effect?,” delivered for the University of Durham/Newcastle University’s 2016 symposium, “The Untold Stories of the Financial Crisis: the Challenge of Credit Availability,” sponsored by the Economic and Social Research Council of the United Kingdom.

2 Cf N Orkun Akseli, “Introduction” in N Orkun Akseli, ed, *Availability of Credit and Secured Transactions in a Time of Crisis* (Cambridge, UK: Cambridge University Press, 2013) 1 (referring to “the global financial crisis and ensuing credit crunch” at 2); Ari Aisen & Michael Franken, “Bank Credit During the 2008 Financial Crisis: A Cross-Country Comparison” (2010) International Monetary Fund Working Paper No 10/47, online: <<https://www.imf.org/external/pubs/ft/wp/2010/wp1047.pdf>> (stating that “the crisis was unprecedented in its global scale and severity, hindering credit access to businesses, households and banks” at 3).

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## About the Author

**Steven L. Schwarcz** is a CIGI senior fellow with the International Law Research Program, and the Stanley A. Star Professor of Law and Business at Duke University School of Law, where he is the founding director of the interdisciplinary Global Financial Markets Center. His areas of research and scholarship include insolvency and bankruptcy law; international finance, capital markets and systemic risk; and commercial law. He is a fellow of the American College of Bankruptcy, a founding member of the International Insolvency Institute, a fellow of the American College of Commercial Finance Lawyers and business law adviser to the American Bar Association Section on Business Law.

order to statistically offset losses. The subprime mortgage lending was even regarded by some as more conservative than the credit card model because mortgage lenders have not only one way out — cash flow — but also a second way out — collateral; expected home appreciation meant that collateral values would increase, and borrowers would also be able to repay through refinancing.

This model worked well as long as home prices continued to rise. The model was also consistent with the US government's strong encouragement of lenders to make mortgage loans to low-income — and often disproportionately minority — borrowers. Sometimes, the subprime mortgage lending occurred without full documentation of borrower income, recognizing, at least implicitly, that many seemingly low-income borrowers are actually paid on a cash basis, without officially declaring their income. To that extent, not completely unlike the argument by renowned Peruvian economist Hernando de Soto that *de facto* property rights should be recognized in order to enable the poor to borrow and acquire capital,<sup>3</sup> the model allowed *de facto* income to be recognized to enable the poor to borrow money and acquire homes.

But when home prices began declining, these subprime borrowers could not refinance; and, in many cases, they defaulted. Even borrowers who could afford to pay their mortgage loans were tempted to walk away as mortgage loans exceeded home values. These mortgage defaults in turn caused substantial amounts of low investment-grade mortgage-backed securities to default and some AAA-rated securities to be downgraded.<sup>4</sup> The defaults were especially large for certain highly leveraged securities<sup>5</sup> that were indirectly backed by subprime mortgages; full payment of even the senior classes of these securities was extremely sensitive to cash flow variations and dependent on the (faulty) assumption that housing prices would continue to appreciate.<sup>6</sup>

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3 Hernando de Soto, *The Mystery of Capital: Why Capitalism Triumphs in the West and Fails Everywhere Else* (New York, NY: Basic Books, 2000).

4 For a description of credit ratings and rating agencies, see *infra* notes 35–50 and accompanying text.

5 These were called “asset-backed security collateralized debt obligation” (ABS CDO) securities.

6 Steven L Schwarcz, “Keynote Address: Understanding the Subprime Financial Crisis” (2009) 60 SCL Rev 549 [Schwarcz, “Keynote”], online: <[http://ssrn.com/abstract\\_id=1288687](http://ssrn.com/abstract_id=1288687)>.

These defaults and downgradings of rated securities, in turn, spooked investors who believed that AAA meant ironclad safety and that investment grade meant relative freedom from default. Investors started losing confidence in ratings and avoiding debt securities. Fewer investors meant that the price of debt securities started falling. Falling prices meant that firms using debt securities as collateral had to mark them to market and put up cash<sup>7</sup> — requiring the sale of more securities — which caused market prices to plummet further downward in a death spiral.<sup>8</sup> The market prices of mortgage-backed securities, for example, collapsed substantially below the intrinsic value of the mortgage loan assets underlying those securities.

This collapse in market prices meant that banks and other financial institutions holding mortgage-backed (and other asset-backed) securities had to write down the securities' value. That caused institutions holding lots of these securities — epitomized by Lehman Brothers — to appear more financially risky, in turn, triggering concern over counterparty risk.<sup>9</sup> Afraid these institutions might default on their contractual obligations, many parties stopped dealing with them.

The refusal of the US government to save Lehman Brothers in mid-September 2008, and its resulting bankruptcy, added to the panic. Debt markets became so spooked that even the short-term commercial paper markets virtually shut down. Without debt-market financing, which constitutes approximately 58 percent of all corporate credit availability,<sup>10</sup> companies lacked money to expand and sometimes even to pay current expenses.<sup>11</sup> The economy collapsed.

In short, although the causal relationship between credit availability and financial decline leading to the crisis was somewhat interactive, a loss of credit availability appears to have caused the financial crisis more than the reverse.<sup>12</sup> If that non-standard story is true, what lessons can it teach us?

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## Lessons

There are at least three lessons, all focused on protecting credit availability: because credit availability is dependent on financial markets as well as banks, regulation should be designed to protect the viability of markets as well as banks; more diversified sources of credit availability might increase financial stability; and regulators should try to identify and correct system-wide flaws in making credit available.

### Markets as well as Banks Should Be Protected

In our market-intermediated financial system where, at least in the United States, companies today obtain much of their financing directly through capital markets,<sup>13</sup> credit availability is dependent on financial markets as well as banks. Therefore, regulation should be designed to protect the viability of markets as well as banks.<sup>14</sup> Consider how that could be done.

Government central banks traditionally have used liquidity, such as making emergency loans,

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7 For a discussion of marking to market, see *infra* notes 50–56 and accompanying text.

8 The high leverage of many firms appears to have made this death spiral worse. Encouraged by the earlier liquidity glut, many firms had borrowed excessively because the cost of funds was so cheap.

9 Counterparty risk refers to the risk that a party obligated on a contract may default paying another party to the contract.

10 Silvio Contessi, Li Li & Kathryn Russ, “Bank vs. Bond Financing Over the Business Cycle” (2013) 31 *Econ Synopses* 1 at 1, online: <[https://research.stlouisfed.org/publications/es/13/ES\\_31\\_2013-11-15.pdf](https://research.stlouisfed.org/publications/es/13/ES_31_2013-11-15.pdf)>. By comparison, bank loans make up only about 10 percent of corporate credit availability. These estimates are based on 2003–2013 data. *Ibid.*

11 See e.g. Fiorella De Fiore & Harald Uhlig, “Corporate Debt Structure and the Financial Crisis” (2015) European Central Bank Working Paper Series No 1759, online: <[http://economicdynamics.org/meetpapers/2012/paper\\_429.pdf](http://economicdynamics.org/meetpapers/2012/paper_429.pdf)> (“the implication of the turmoil for economic activity [during the financial crisis] was a drop in investment and output that was unprecedented” at 2).

12 This conclusion appears to be consistent with Friedrich Hayek’s monetary theory that a contraction in bank lending results in declining economic output, unemployment and a recession or even depression. See David Bholat, “Money, Bank Debt, and Business Cycles: Between Economic Development and Financial Crises” in Akseli, ed, *supra* note 2 at 28 (discussing Hayek’s monetary theory).

13 See *supra* notes 10–11 and accompanying text.

14 The efforts being made to protect bank viability are beyond the scope of this policy brief. As a brief summary, though, in the aftermath of the financial crisis, the Basel Committee on Banking Supervision adopted new capital-adequacy rules to better absorb and spread the effects of losses by banks. Federal Deposit Insurance Corporation, *Risk Management Manual of Examination Policies* (Washington, DC: Federal Deposit Insurance Corporation, 2015) at § 2.1–2. Similarly, post-crisis regulation in both the United Kingdom and the United States requires deposit-taking banks to adopt forms of “ring-fencing,” restricting risky activities. See Steven L. Schwarcz, “Ring-Fencing” (2014) 87 *S Cal L Rev* 69 at 78, online: <<http://ssrn.com/abstract=2228742>>. In the United Kingdom, ring-fencing for banks was first proposed by the 2011 Vickers report. *Ibid* at 78–79. In the United States, ring-fencing is enshrined in the Volcker Rule. *Ibid* at 80–81.

to help prevent banks in their countries from defaulting. The Federal Reserve, for example, has had this role of lender of last resort to US banks — although, perversely, the Dodd-Frank Act limited the Fed’s power to engage in this role.<sup>15</sup> The European Central Bank has helped to recapitalize European banks exposed to sovereign-debt risk.<sup>16</sup> Liquidity can also be used to stabilize systemically important financial markets.<sup>17</sup>

For example, in response to the post-Lehman collapse of the commercial paper market, the US Federal Reserve created the Commercial Paper Funding Facility (CPFF) to act as a temporary lender of last resort for that market, with the goal of addressing “temporary liquidity distortions” by purchasing commercial paper from highly rated issuers that could not otherwise sell their paper.<sup>18</sup> The CPFF apparently helped to stabilize the commercial paper market.<sup>19</sup>

Regulators should consider institutionalizing liquidity to stabilize systemically important financial markets. To mitigate moral hazard, at least part of the source of liquidity could be privatized.<sup>20</sup> Flexible pricing approaches used in structured financing transactions could also be adapted to calculate the purchase price of market securities at levels that stabilize markets without

fostering moral hazard.<sup>21</sup> This type of targeted approach to use liquidity to stabilize panicked financial markets is fundamentally different from quantitative easing (QE), which refers to a central bank purchasing government (and sometimes other) securities as a form of monetary policy, in order to hold down interest rates.<sup>22</sup>

## Credit Sources Should Be Diversified

Diversifying sources of credit availability might increase financial stability. The analysis below assumes that each diversified credit source is robust and that it does not create an incentive-distorting liquidity glut<sup>23</sup> or inappropriately weaken central bank control over monetary policy.

Consider, for example, the European Commission’s proposed Capital Markets Union (CMU), which has the goal of reforming the European financial system to help build an integrated European capital market by 2019.<sup>24</sup> Such a capital market is expected to increase business financing and, more relevant to this analysis, to diversify it beyond bank

15 *Dodd-Frank Wall Street Reform and Consumer Protection Act*, Pub L No 111–203, 124 Stat 1376 [*Dodd-Frank Act*]. The *Dodd-Frank Act* sharply limits the power of the Federal Reserve to make emergency loans to individual or insolvent financial firms. That categorical limitation appears somewhat excessive, if not dangerous; a lender of last resort can be an important safeguard if it acts judiciously.

16 See e.g. Marius A Boewe et al, “The European Central Debt Crisis — Paving the Way Towards Financial Stability” *J Bank L* 2012.01–5, online: <[www.lexology.com/library/detail.aspx?g=6c75eab8-4ee8-490b-a37c-4ff9276cf7bb](http://www.lexology.com/library/detail.aspx?g=6c75eab8-4ee8-490b-a37c-4ff9276cf7bb)> (observing that “the European Central Bank (“ECB”) started to purchase sovereign debt [from European banks] and continued to accept sovereign debt as collateral without haircuts”).

17 The author first proposed this in “Systemic Risk” (2008) 97:1 *Geo LJ* 193 at 225–30 [Schwarcz, “Systemic Risk”], online: <[http://ssrn.com/abstract\\_id=1008326](http://ssrn.com/abstract_id=1008326)>.

18 See Tobias Adrian, Karin Kimbrough & Dina Marchioni, “The Federal Reserve’s Commercial Paper Funding Facility” (2010) Federal Reserve Bank of New York Staff Report No 423.

19 *Ibid* (concluding that “[t]he CPFF indeed had a stabilizing effect on the commercial paper market” at 11).

20 See Steven L Schwarcz, “Controlling Financial Chaos: The Power and Limits of Law” (2012) 3 *Wis L Rev* 815 at 829–30, online: <<http://ssrn.com/abstract=2016434>>.

21 *Ibid* at 833. For example, assume that the intrinsic value — effectively the present value of the expected value of the underlying cash flows — of a type of mortgage-backed security is estimated to be in the range of 80 cents on the dollar. If, due to panic, the market price of those securities had fallen significantly below that number to, say, 20 cents on the dollar, a liquidity provider could purchase these securities at, say, 60 cents on the dollar, thereby stabilizing the market and still making a profit. To induce a holder of the mortgage-backed securities to sell at that price, the liquidity provider could, for example, agree to pay a higher deferred purchase price if the securities turn out to be worth more than expected. This is just one (simplified) example of the flexible pricing approaches used in structured financing transactions to buy financial assets of uncertain value that could be adapted to a liquidity provider’s purchases.

22 “The Economist explains: What is quantitative easing?”, *The Economist* (9 March 2015), online: <[www.economist.com/blogs/economist-explains/2015/03/economist-explains-5](http://www.economist.com/blogs/economist-explains/2015/03/economist-explains-5)>; Larry Elliott, “Quantitative easing”, *The Guardian* (8 January 2009), online: <<https://www.theguardian.com/business/2008/oct/14/businessglossary>>. QE has been used extensively by central banks during and after the financial crisis. The logic of QE is simple supply and demand: government purchases of securities increases demand (and price) for those securities, enabling issuers of the securities to hold down the interest rate thereon. See “Quantitative easing — Frequently Asked Questions”, online: Bank of England <[www.bankofengland.co.uk/monetarypolicy/Pages/qe/qe\\_faqs.aspx](http://www.bankofengland.co.uk/monetarypolicy/Pages/qe/qe_faqs.aspx)>.

23 Cf Steven L Schwarcz, “Protecting Financial Markets: Lessons from the Subprime Mortgage Meltdown” (2008) 93:2 *Minn L Rev* 373 at 395, online: <[http://ssrn.com/abstract\\_id=1107444](http://ssrn.com/abstract_id=1107444)> (discussing how excessively easy credit distorted incentives prior to the financial crisis).

24 See EC, Commission, *Action Plan on Building a Capital Markets Union*, SWD(2015) 183 final.

lending<sup>25</sup> — which currently represents around 80 percent of European corporate debt financing.<sup>26</sup>

The CMU focuses on securitization (spelled “securitisation” in Europe) as one of the central sources of diversified credit. In a typical securitization transaction, a sponsor will either originate a pool of loans or other rights to payment, or purchase those types of financial assets from other originators (such as mortgage lenders), and sell them for cash to a special purpose entity (SPE). To raise the cash, the SPE issues securities to investors, repayable from the periodic financial asset payments. Securitization thus enables lenders to multiply their available funding by selling existing loans for cash, which can be used to make new loans. Otherwise, lenders would have to carry the loans on their books and recoup the principal over many years.<sup>27</sup>

Used legitimately, securitization became “one of the dominant means of capital formation” in the United States and abroad.<sup>28</sup> In 2007, for example, the volume of European securitization approximated €595 billion.<sup>29</sup> During that period, the volume of securitization in the United States approximated \$11.2 trillion.<sup>30</sup>

The levels of securitization dropped precipitously, however, with recognition that its abuses contributed to the financial crisis. By 2015, for example, the volume of European securitization was only €214 billion<sup>31</sup> and the volume of US securitization was relatively lower, only

\$1.9 trillion.<sup>32</sup> Securitization’s abuses centred around the highly leveraged securities, already mentioned, which were extremely sensitive to cash flow variations and overly dependent on collateral value assumptions.<sup>33</sup>

The revival of securitization — and thus the CMU’s goal to further facilitate securitization as a source of capital market financing — will depend on preventing future such abuses. To accomplish that, the European Commission is proposing a framework for what it calls simple, transparent and standardized securitization (STS), which is designed to increase reliability and investor confidence.<sup>34</sup>

## System-wide Flaws Should Be Identified and Corrected

Regulators should try to identify and correct system-wide flaws in making credit available. Consider the following potential flaws.

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### Overreliance on Credit Ratings

A credit rating is a formal assessment of a borrower’s ability to pay its debts, expressed by private for-profit companies — known as “rating agencies” — through an ordinal ranking system.<sup>35</sup> In general, the higher the rating, the more likely the borrower is to pay its liabilities.<sup>36</sup> Because of their simplicity and public availability, credit

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25 See EC, Commission, *Green Paper: Building a Capital Markets Union*, COM(2015) 63 final at 4.

26 Kira Brecht, “How U.S. and EU Capital Markets are Different” (29 October 2015), online: <<http://openmarkets.cmegroup.com/10431/how-u-s-and-eu-capital-markets-are-different>>.

27 See generally Steven L Schwarcz, “What is Securitization? And for What Purpose?” (2012) 85:5 S Cal L Rev 1283 at 1295–98 [Schwarcz, “What is Securitization?”]; online: <<http://ssrn.com/abstract=1996670>>.

28 *Investment Company Act Release No 19105*, [1992 Transfer Binder] Fed Sec L Rep P 83,500 (19 November 1992) (in which the US Securities and Exchange Commission described securitization as “becoming one of the dominant means of capital formation in the United States” at para 85,062).

29 Association of Financial Markets in Europe, *Securitisation Data Report: European Structured Finance Q1 2016* at 7 [AFME], online: <[www.afme.eu/globalassets/downloads/data/securitisation/2016/securitisation-data-report-q1-20161-v2.pdf](http://www.afme.eu/globalassets/downloads/data/securitisation/2016/securitisation-data-report-q1-20161-v2.pdf)>.

30 This figure is based on data for 2008 from the Securities Industry and Financial Markets Association (SIFMA) website, <http://www.sifma.org/>.

31 AFME, *supra* note 29.

32 SIFMA, Press Release, “SIFMA Issues 2015 Securitization Year in Review” (7 April 2016), online: <[www.sifma.org/newsroom/2016/sifma-issues-2015-securitization-year-in-review/](http://www.sifma.org/newsroom/2016/sifma-issues-2015-securitization-year-in-review/)>.

33 See Schwarcz, “Keynote”, *supra* note 6 and accompanying text. Cf Schwarcz, “What is Securitization”, *supra* note 27 at 1285 (discussing why these securities defaulted or had their credit ratings downgraded).

34 See EC, Commission, *Capital Markets Union: First Status Report*, SWD(2016) 147 final at 21. The author has elsewhere argued that the United States should adopt a similar securitization framework. See Steven L Schwarcz, “Securitization and Post-Crisis Financial Regulation” (2016) 101 Cornell L Rev Online 115 at 125–26, 138, online: <<http://cornelllawreview.org/clonline/securitization-and-post-crisis-financial-regulation/>>.

35 Pragnan Deb et al, “Whither the Credit Ratings Industry?” (2011) Bank of England Financial Stability Paper No 9, online: <[www.bankofengland.co.uk/financialstability/Documents/fpc/fpapers/fs\\_paper09.pdf](http://www.bankofengland.co.uk/financialstability/Documents/fpc/fpapers/fs_paper09.pdf)>. For example, Moody’s represents the most creditworthy instruments as Aaa, the next most creditworthy as Aa, then A, Baa and so on. Moody’s, “Ratings Definitions”, online: <<https://www.moody.com/Pages/amr002002.aspx>>.

36 Deb et al, *supra* note 35 at 4. The highest rated securities are deemed “investment-grade,” while the lowest rated are called “non-investment grade,” or “junk.” Fidelity, “Bond ratings”, online: <<https://www.fidelity.com/learning-center/investment-products/fixed-income-bonds/bond-ratings>>.

ratings can perform a public good, helping to close the information gap between borrowers and lenders.<sup>37</sup> Further, credit ratings also serve a de facto “certification” function by allowing investors to compare the creditworthiness of debt securities with different risk characteristics.<sup>38</sup>

Investors both in the United States and abroad came to rely on credit ratings as simple tools to assist in making investment decisions.<sup>39</sup> Because of their widespread use,<sup>40</sup> however, many investors overrelied on credit ratings. Prior to the financial crisis, for example, investors often relied exclusively on credit ratings without performing independent credit examinations.<sup>41</sup> Such exclusive reliance reflected a faith “in the accuracy of credit ratings [that] was reinforced by their long record of reliability for assessing the creditworthiness of borrowers under relatively simple debt instruments, such as corporate bonds and basic securitization instruments.”<sup>42</sup>

This faith remained steadfast even as credit ratings were applied to much more complex, highly leveraged and novel instruments, such as ABS CDO securities,<sup>43</sup> without historical performance data.<sup>44</sup> But the faith was badly shaken when “the rating methodologies utilized for...[those] securities produced inaccurate ratings.”<sup>45</sup> The resulting loss of investor confidence caused a collapse of the market for virtually all debt securities and a corresponding collapse of credit.<sup>46</sup>

This overreliance on credit ratings, even when extrapolated far beyond their normal use, and the resulting collapse of credit caused by the loss of faith in ratings, even when normally applied, illustrate a system-

wide flaw in making credit available. How can regulators try to correct this flaw?

One approach might be to require “periodic self-awareness and reporting” from the financial community of the limitations of credit ratings and their potential for failure.<sup>47</sup> This requirement would be especially valuable when extrapolating existing ratings methodologies to novel financial products.<sup>48</sup>

Another approach might be simply to try to demystify credit ratings, reducing the blind faith that can cause overreliance. The Dodd-Frank Act implicitly attempts to do that by requiring the US Securities and Exchange Commission to adopt new rules requiring disclosure of rating methodologies,<sup>49</sup> thereby increasing the transparency of the rating process. This enables investors themselves to better understand the limitations, as well as benefits, of credit ratings.<sup>50</sup>

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### *Marking to Market in Crisis Conditions*

Marking to market is widely considered to protect against declines in market value. In turbulent or panicked markets, however, it can reduce credit availability and exacerbate the panic.

In its simplest form, marking to market refers to the common regulatory requirement that a securities account be adjusted in response to a change in the market value of the securities.<sup>51</sup> An investor,

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37 See Deb et al, *supra* note 35 at 4.

38 *Ibid* at 5–6.

39 Steven L Schwarcz, “Private Ordering of Public Markets: The Rating Agency Paradox” (2002) 1 U Ill L Rev 3.

40 See *ibid*.

41 See Steven L Schwarcz & Lucy Chang, “The Custom to Failure Cycle”, (2012) 62 Duke LJ 767 (“at least until the global financial crisis, financial firms rarely questioned the accuracy of [credit] ratings” at 773).

42 *Ibid*.

43 See *supra* note 5 and accompanying text (defining these securities).

44 Schwarcz & Chang, *supra* note 41 at 773–75.

45 *Ibid* at 777.

46 See *supra* notes 6–8 and accompanying text.

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47 Schwarcz & Chang, *supra* note 41 at 783. A similar requirement was passed as part of the Basel III capital adequacy guidelines, whereby banks are required “to engage in periodic financial ‘stress’ scenarios, in order to motivate them to consider the possibility of, and to better prepare for, future periods when previously adequate liquidity and capital resources might prove inadequate.” *Ibid* at 782–83. Further, the *Dodd-Frank Act* “requires banks and other systemically important financial institutions to plan for the possibility of their liquidation.” *Ibid* at 783.

48 *Ibid*.

49 US Securities and Exchange Commission, “Credit Rating Agencies”, online: <<https://www.sec.gov/spotlight/dodd-frank/creditratingagencies.shtml>>.

50 See Gregory A Fernicola & Joshua B Goldstein, “Credit Rating Agencies”, online: Skadden <[https://www.skadden.com/newsletters/FSR\\_Credit\\_Rating\\_Agencies.pdf](https://www.skadden.com/newsletters/FSR_Credit_Rating_Agencies.pdf)> (“To increase transparency in the ratings process, rating agencies will be required to use a standardized form to publicly disclose their rating methodology, a description of issuer data considered in the rating process and any additional information that the SEC may require” at 1–2).

51 This discussion of marking to market is based on Steven L Schwarcz, “Regulating Complexity in Financial Markets” (2009) 87:2 Wash U L Rev 211 at 232–33 [Schwarcz, “Regulating Complexity”]; online: <[http://ssrn.com/abstract\\_id=1240863](http://ssrn.com/abstract_id=1240863)>.

for example, may buy securities on credit from a securities broker-dealer, securing the purchase price by pledging the securities as collateral. To guard against the price of the securities falling to the point at which their value as collateral is insufficient to repay the purchase price, the broker-dealer requires the investor to maintain a minimum collateral value. If the market value of the securities falls below this minimum, the broker-dealer will issue a “margin call” requiring the investor to deposit additional collateral, usually in the form of money or additional securities, to satisfy this minimum. Failure to do so triggers a default, enabling the broker-dealer to foreclose on the collateral.<sup>52</sup>

Requiring investors to mark to market in this fashion is generally believed to reduce risk.<sup>53</sup> Nonetheless, it can cause “perverse effects on systemic stability” during times of market volatility, when forcing sales of assets to meet margin calls can depress asset prices, requiring more forced sales (which, in turn, will depress asset prices even more), causing a downward spiral.<sup>54</sup> The existence of leverage makes this spiral more likely and amplifies it, if it occurs.<sup>55</sup> At least some portion of the financial crisis appears to have resulted from this downward spiral.<sup>56</sup>

Marking to market’s inadvertent undermining of financial stability is due in part to nonlinear feedback effects and tight coupling.<sup>57</sup> Nonlinearity results when “interactions among components of

a system are not directly proportional.”<sup>58</sup> Similarly, a “tightly coupled system is one that is highly interdependent, so that a disturbance to one part of the system can spread almost instantaneously to other parts of the system.”<sup>59</sup> In a downward spiraling asset market, then, the very fact of forced sale of marked-to-market assets causes the market value of those assets to fall even further, in turn, requiring more marking to market.<sup>60</sup> This can create the type of “anomaly, seen during the [financial] crisis, of securities bearing market values substantially below their intrinsic values.”<sup>61</sup>

Regulators could reduce marking to market’s flaws by addressing the nonlinear feedback effects and tight coupling that cause them. To reduce nonlinear feedback, for example, regulators could “allow firms to substitute other measures of investor comfort for marking-to-market”<sup>62</sup> when marking to market “might distort value, such as when it would require a securities account — especially an account whose securities have long-term maturities — to be adjusted in response to short-term pricing fluctuations.”<sup>63</sup> One such measure of investor comfort might be a firm’s “full disclosure of its underlying asset portfolio.”<sup>64</sup> And to reduce marking to market’s tight coupling, regulators could use liquidity to stabilize systemically important financial markets impacted by a downward spiraling asset market.<sup>65</sup>

52 *Ibid.* See also Zvi Bodie, Alex Kane & Alan J Marcus, *Investments*, 8th ed (New York, NY: McGraw-Hill, 2008) at 71–72.

53 See e.g. Gikas A Hardouvelis & Panayiotis Theodosiou, “The Asymmetric Relationship Between Initial Margin Requirements and Stock Market Volatility Across Bull and Bear Markets” (2002) 15:5 *Rev Fin Stud* 1525 at 1554–55 (finding a correlation between higher margin calls and decreased systemic risk, and speculating that higher margin calls may bleed the irrationality out of the market until only sound bets are left).

54 Rodrigo Cifuentes, Gianluigi Ferrucci & Hyun Song Shin, “Liquidity Risk and Contagion” (2005) Bank of England Working Paper No 264 at 7, online: <[www.bankofengland.co.uk/archive/Documents/historicpubs/workingpapers/2005/wp264.pdf](http://www.bankofengland.co.uk/archive/Documents/historicpubs/workingpapers/2005/wp264.pdf)>; see also Clifford De Souza & Mikhail Smirnov, “Dynamic Leverage: A Contingent Claims Approach to Leverage for Capital Conservation” (2004) 31:1 *J Portfolio Mgmt* 25 at 25, 28 (arguing that, in a bad market, short-term pressure to sell assets to raise cash for margin calls can lead to further mark-to-market losses for remaining assets, which triggers a whole new wave of selling, the process repeating itself until markets improve or the firm is wiped out; and referring to this process as a “Critical Liquidation Cycle”).

55 De Souza & Smirnov, *supra* note 54 at 26–27.

56 See *supra* note 8 and accompanying text. See also Rachel Evans, “Banks Tell of Downward Spiral” (2008) 27 *Intl Fin L Rev* 16.

57 Schwarcz, “Regulating Complexity”, *supra* note 51 at 232–33.

58 Virginia R Burkett et al, “Nonlinear Dynamics in Ecosystem Response to Climactic Change: Case Studies and Policy Implications” (2005) 2:4 *J Ecol Complexity* 357 at 359.

59 Iman Anabtawi & Steven L Schwarcz, “Regulating Ex Post: How Law Can Address the Inevitability of Financial Failure” (2013) 92 *Tex L Rev* 75 at 94 [Anabtawi & Schwarcz, “Regulating Ex Post”].

60 Cf Richard Bookstaber, *A Demon of Our Own Design: Markets, Hedge Funds, and the Perils of Financial Innovation* (Hoboken, NJ: John Wiley & Sons, 2007) (observing that “the natural reaction to [financial] market breakdown is to add layers of protection and regulation. But trying to regulate a market entangled by complexity can lead to unintended consequences, compounding crises rather than extinguishing them because the safeguards add even more complexity, which in turn feeds more failure” at 146).

61 Schwarcz, “Regulating Complexity”, *supra* note 51 at 247.

62 *Ibid* at 246.

63 Anabtawi & Schwarcz, “Regulating Ex Post”, *supra* note 59 at 119.

64 Schwarcz, “Regulating Complexity”, *supra* note 51 at 246–47.

65 See Schwarcz, “Systemic Risk”, *supra* note 17 and accompanying text.

Such liquidity might be provided by the type of market lender of last resort previously discussed.<sup>66</sup>

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### *Inherent Human Limitations*

This policy brief has so far discussed system-wide flaws in making credit available that are part of the design of the financial system. In theory, at least, the system can be redesigned to correct them. Another type of system-wide flaw is much more intractable: our inherent human limitations.<sup>67</sup>

For example, we often implicitly simplify our perception of reality as a psychological coping mechanism, including a tendency to define future events by the recent past. This flaw has particular application to credit availability. In this context, consider certain parallels between the Great Depression and the financial crisis, which illustrate how the flaw might temporarily increase but ultimately destroy credit availability.

In the years preceding the Great Depression, banks lending “on margin” — a practice in which borrowers use proceeds of a loan to purchase shares of stock and then pledge that stock as collateral to the banks — assumed they were adequately protected, even for margin loans made to risky borrowers.<sup>68</sup> Although these loans were not initially overcollateralized — because the value of the pledged stock initially equalled, but did not exceed, the amount of the loan — banks expected the stock market to continue rising, as it had for

decades. That expectation reflects the tendency to define future events by the recent past. An increase in stock prices, and thus a consequent increase in the value of the collateral, would then cause the loans to become overcollateralized.<sup>69</sup> Beginning in October 1929, however, the decline in stock prices caused many of those risky borrowers to default on their now *undercollateralized* margin loans.<sup>70</sup> That, in turn, caused margin-lending banks to begin defaulting, triggering a banking collapse that ultimately wiped out credit.

Similarly, prior to the financial crisis, institutions that made mortgage loans to subprime borrowers assumed, as mentioned, that they were adequately protected.<sup>71</sup> They expected housing prices to continue rising, as had been the case for decades.<sup>72</sup> That expectation again reflects the tendency to define future events by the recent past. An increase in housing prices, and thus a consequent increase in the value of the collateral, would then cause the loans to become overcollateralized.<sup>73</sup> In the fall of 2007, however, the decline in housing prices caused many subprime borrowers to begin defaulting on their now *undercollateralized* mortgage loans.<sup>74</sup> As discussed,<sup>75</sup> that started the timeline of events that caused the shutdown of debt markets and the resulting financial crisis.

We do not yet, and may never, understand our human limitations well enough to correct them. If we cannot correct these limitations,

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<sup>69</sup> *Ibid.*

<sup>70</sup> *Ibid* at 1357.

<sup>71</sup> *Ibid* at 1359–60.

<sup>72</sup> *Ibid.*

<sup>73</sup> Barry Ritholtz, “Case Shiller 100 Year Chart (2011 Update)”, online: The Big Picture <[www.ritholtz.com/blog/2011/04/case-shiller-100-year-chart-2011-update](http://www.ritholtz.com/blog/2011/04/case-shiller-100-year-chart-2011-update)>.

<sup>74</sup> Anabtawi & Schwarcz, “Regulating Systemic Risk”, *supra* note 68 (“When home prices began falling, some of these asset-backed securities began defaulting, requiring financial institutions heavily invested in these securities to write down their value, causing these institutions to appear, if not be, financially risky” at 1360 [citation omitted]).

<sup>75</sup> See *supra* notes 4–11 and accompanying text.

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<sup>66</sup> See Adrian, Kimbrough & Marchioni, *supra* notes 18–19 and accompanying text. Cf Schwarcz, “Regulating Complexity”, *supra* note 51 (discussing using such a market liquidity provider to “more loosely couple the feedback effects” at 246–47 and generally discussing providing liquidity to systemically important financial markets at 247–56).

<sup>67</sup> For a more comprehensive discussion of how human limitations can impair financial regulation, see Steven L Schwarcz, “Regulating Complacency: Human Limitations and Legal Efficacy”, online: <[https://papers.ssrn.com/sol3/papers2.cfm?abstract\\_id=2875030](https://papers.ssrn.com/sol3/papers2.cfm?abstract_id=2875030)>.

<sup>68</sup> Iman Anabtawi & Steven L Schwarcz, “Regulating Systemic Risk: Towards an Analytical Framework” (2011) 86:4 Notre Dame L Rev 1349 at 1356 [Anabtawi & Schwarcz, “Regulating Systemic Risk”], online: <<http://ssrn.com/abstract=1735025>>.

they will continue to threaten credit unavailability and resulting financial crises.

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## Conclusion

Although the standard story is that the financial crisis resulted in the loss of credit availability, this policy brief argues that a loss of credit availability appears to have caused the financial crisis more than the reverse. If that argument is correct, what lessons can it teach us?

There are at least three. First, in our market-intermediated financial system, credit availability is dependent on financial markets as well as banks. Therefore, financial regulation should be designed to protect the viability of markets as well as banks. Second, diversifying credit sources might increase financial stability. Third, we should try to identify and correct system-wide flaws that can undermine credit availability.

One of the most intractable of these flaws is our own inherent human limitations, which we can do little to correct. That suggests an ongoing risk for credit availability, and thus an ongoing potential for new financial crises to arise.<sup>76</sup> Because financial failure is inevitable, financial regulation should be designed not only to prevent failures but also to work *ex post* — after a systemic shock has been triggered and is being transmitted — to try to stabilize the afflicted financial system. This approach takes inspiration from chaos theory, insofar as that theory holds that remedies should also focus on limiting the consequences of failures.

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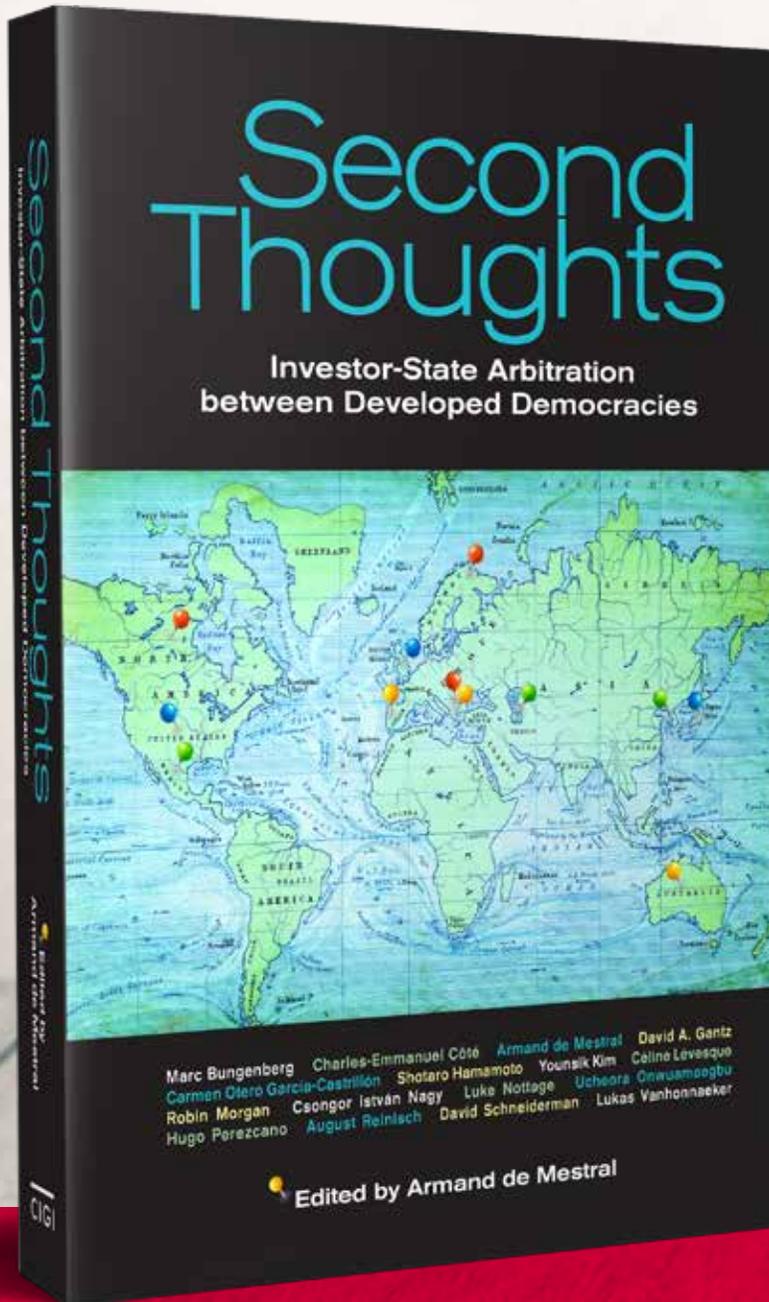
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<sup>76</sup> Although addressing that risk and crisis potential is a story for another day, a separate article with Professor Iman Anabtawi begins to address it. See Anabtawi & Schwarcz, “Regulating *Ex Post*”, *supra* note 59.

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Edited by Armand de Mestral

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