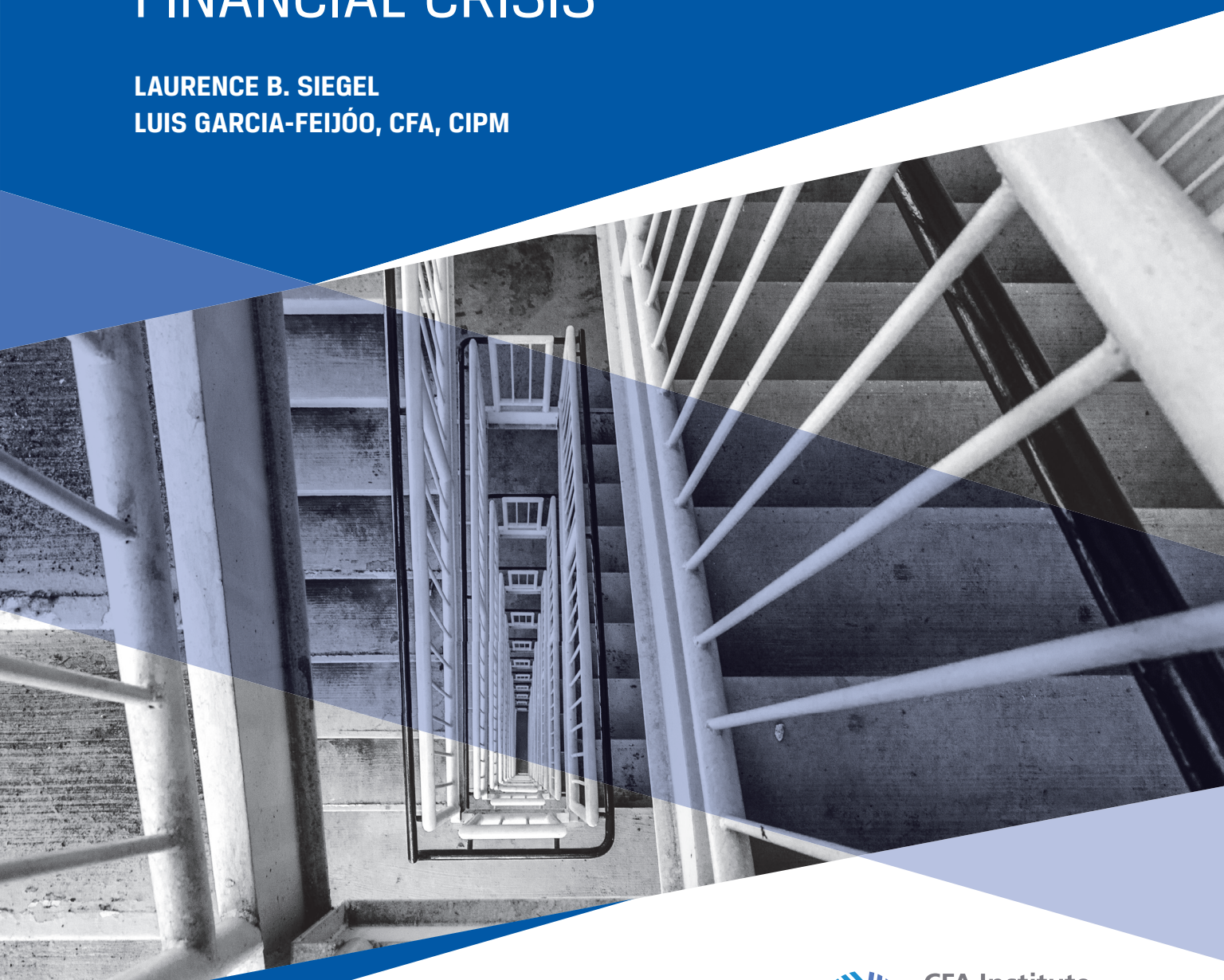


CFA INSTITUTE RESEARCH FOUNDATION / BRIEF

# TEN YEARS AFTER REFLECTIONS ON THE GLOBAL FINANCIAL CRISIS

LAURENCE B. SIEGEL  
LUIS GARCIA-FEIJÓO, CFA, CIPM



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# TEN YEARS AFTER

Reflections on the Global Financial Crisis

Laurence B. Siegel and  
Luis Garcia-Feijóo, CFA, CIPM



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# TEN YEARS AFTER

Reflections on the Global Financial Crisis



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# COMPETING NARRATIVES OF THE CRISIS

## A Welcome and Introduction from Andrew W. Lo

### WELCOME

It is a pleasure and an honor for me to welcome you to this companion volume to the 2008 Financial Crisis: A Ten-Year Review, a conference that took place on 8–9 November 2018 at the NYU Stern School of Business in New York City. All of the key stakeholders related to the 2008 crisis were represented at this historic gathering. To quote Lin-Manuel Miranda, we had all the folks “who were in the room where it happened.” Alas, I was not even in the hallway connected to the room outside the room where it happened, so I was thrilled to be able to hear from these individuals, and in these pages and at [www.annualreviews.org/page/financial-conference-livestream](http://www.annualreviews.org/page/financial-conference-livestream), you can hear from them too.<sup>1</sup>

### ABOUT ANNUAL REVIEWS

I want to begin with some background on what gave us the impetus to create this event and volume and what it has to do with Annual Reviews.

Annual Reviews is an organization that most of you, I suspect, have not heard of. It is a non-profit organization that was started in 1932, originally to provide a summary review of published research in biochemistry. So, the very first Annual Review was the *Annual Review of Biochemistry*, published once a year, as its title suggests. It consisted of review articles that were curated by the editors and the editorial board

<sup>1</sup>Conference videos also available at [www.cfainstitute.org/research/foundation/2008-financial-crisis](http://www.cfainstitute.org/research/foundation/2008-financial-crisis).

to summarize and synthesize all the things that were going on in that field at that time, a very fast-moving field that has only gotten faster, as you can imagine. Since then, Annual Reviews has grown to a family of 51 different titles across a wide range of disciplines, including the *Annual Review of Financial Economics*, which Bob Merton and I co-edit.

The idea behind these reviews is crowdsourcing, but crowdsourcing of a very specific kind—bringing together a variety of research topics and distilling them into more digestible narratives. In particular, the focus is on topics that move very quickly, where it is just not possible for any one individual to keep up with all of the relevant research in that field.

But it is not the intention of Annual Reviews to be a collection of book reports. The reviews do not just summarize research; they also provide interpretation. This is the difference between data and information. The co-editor of the *Annual Review of Psychology*, Susan Fiske, calls this approach “reviews with attitude.” We want authors to use their own perspectives to shape the narratives that are summarized by their reviews.

In this endeavor, the editorial board members play a critical role. Our amazing editorial board helps us to commission the reviews, identifying the key experts in the field to distill the many different research ideas in their areas of expertise and refereeing the contributions to ensure that they meet the highest standards of scholarship as well as relevance. In addition to the

editorial board members, we have the support of the entire Annual Reviews organization, an extremely effective group of professionals that allows us editors and authors to focus solely on ideas and exposition rather than production or administration. They are the heart and soul of Annual Reviews across all 51 disciplines.

Volume 1 of the *Annual Review of Financial Economics* was published in 2009, a decade ago. It was a rather strange period in which to launch a review journal of finance; a few interesting things happened that year and the year before. Our inaugural volume was born in the context of crisis. At that time, we were concerned about what the public reception to an *Annual Review of Financial Economics* would be. Finance was getting dragged through the mud. But we decided that it was the perfect time to launch because what the crisis indicated was the need for more knowledge about finance, not less.

### A TWENTY-ONE-BOOK BOOK REVIEW

Shortly after that first volume was published, I was contacted by the editor of the *Journal of Economic Literature* and invited to write a book review about the crisis, and I was allowed to pick my favorite book on the subject. I initially chose *The Squam Lake Report*, the product of a group of 15 leading finance and macro economists whom I respected greatly, who sequestered themselves in a New Hampshire resort for several days to formulate their own narrative of the crisis.

But I soon realized that this book did not capture a number of aspects of the crisis, including the broader historical context. I then turned to Carmen Reinhart and Ken Rogoff's wonderful book, *This Time Is Different*, an 800-year history of financial crises. After reading that book, I realized that certain institutional features

about the financial system were missing, so I sought out other books about the crisis.

After a couple of years of reading, the journal editor finally ran out of patience and said I had to submit my review at that time or the journal would have to move on to another topic. I relented and submitted my book review: "Reading about the Financial Crisis: A Twenty-One-Book Review." After all that reading, I was unable to uncover the truth; instead, I came upon at least 21 different truths.

### SOME NARRATIVES REGARDING THE CRISIS

Here are some narratives that I came across:

- The crisis was all about subprime mortgage lending. It was the subprime borrowers who really caused the crisis, and it was a combination of government policies—the Community Reinvestment Act and lower lending standards—that ultimately caused these subprime borrowers to start defaulting at massively higher rates than the rest of the population.
- Bankers were at fault, too, because they did not have enough skin in the game. They were playing with house money, and they weren't as involved as they should be in the risk bearing.
- Nobody saw the crisis coming, and if there were any issues regarding the theoretical framework around the crisis, it was the efficient market hypothesis. People had an utter devotion to market efficiency, which is what caused the crisis.
- And finally, changes in SEC regulation allowed huge increases in leverage among the investment banks.

Have you come across at least one of these narratives? Do you believe at least one of these narratives? It turns out that every one of these narratives can be challenged by hard facts and data, as the articles in this volume will show.

### BUSTING A NARRATIVE

To whet the appetite, let me describe one article's contributions as an example of what Annual Reviews is all about. Manuel Adelino, Antoinette Schoar, and Felipe Severino's wonderful contribution exemplifies the key characteristics of an Annual Reviews article and why such reviews are important. The title of their review is "The Role of Housing and Mortgage Markets in the Financial Crisis," and the authors take on the critical question of what was, in fact, at the root of the crisis. Was it the subprime borrowers whom many pundits blame?

The authors begin their review with a question about mortgage leverage. Did mortgage leverage increase during the crisis period? Yes, it did—lots more mortgages, lots more leverage. To reach this conclusion, the authors distill a number of articles from various authors to construct their own particular narrative. How did lending standards change in the boom? Was it true that we lowered our lending standards dramatically? You can learn what the authors discovered by reading their article, but let me just say that you will be quite surprised at what the evidence shows.

What about homeownership expansion among the lower middle class? Did the Community Reinvestment Act really increase homeownership widely in the post-2000 period? And was that the cause of the crisis?

Many articles have been published on this one question, and Adelino, Schoar, and Severino provide a number of citations to that literature.

Once more, they bust another myth. And if you are curious as to what the data show, they provide a number of tables and figures to support their narratives, which can be easily accessed online through the Annual Reviews portal.<sup>2</sup>

And finally, they take on the question of mortgage defaults. Were the defaults concentrated in the lower middle class? Was it the subprime loans that were at fault? And again, the answer that they provide is absolutely shocking. This answer is not just a matter for academics to debate. It has great impact on policy. They show that the popular narrative—a narrative on which policy has been and is currently being based—is *just not true*.

To support their narrative, the authors provide a list of 93 references to the literature. Unlike many other journals in which authors include a large number of references just to pander to referees, Annual Reviews articles contain only those references that are cited in the main body of the text. Moreover, in the online version, there are links to each reference that bring readers to the specific passages of the review in which those citations appear, greatly increasing the efficiency with which readers can link key concepts to their sources.

### THE DARWINIAN PROCESS OF SIFTING IDEAS

The point of Annual Reviews is to bring together the very best thinking, but with an attitude, with specific narratives about how all these pieces fit together. Unlike my book review of 21 books about the crisis that came to no conclusion, the review articles contained in this volume all have conclusions. And plenty of attitude.

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<sup>2</sup>See [www.annualreviews.org/doi/full/10.1146/annurev-financial-110217-023036](http://www.annualreviews.org/doi/full/10.1146/annurev-financial-110217-023036).

## COMPETING NARRATIVES OF THE CRISIS

Are they the correct conclusions? At this point, the jury is still out. But there is no doubt that, in Bob Merton's and my opinion, these articles represent some of the best thinking we have today. But the thinking is constantly changing, which is one of the greatest features of Annual Reviews. It is a Darwinian process where only the very best and most compelling arguments survive.

Does it mean the surviving arguments are always correct? Certainly not. But the interesting thing about academia—for those readers who are not part of our world—is that there are two ways that you can make a name for yourself in academia. You can come up with a brilliant theory, or you can destroy somebody else's brilliant theory. Both are perfectly acceptable paths for career advancement, and that Darwinian process is highlighted and facilitated by Annual Reviews.

So, fast-forward to the 10th volume of the *Annual Review of Financial Economics* in 2018. We now have 10 articles about the financial crisis, each of them as thorough, detailed, and full

of attitude as Adelino, Schoar, and Severino's. There have been a number of conferences marking the 10th anniversary of the 2008 financial crisis, but the gathering on which this volume is based is unique. What we bring to the table, in addition to the people who were in the room where it happened, are the academics with the greatest insights into what happened, how it happened, why it happened—and, maybe, just possibly, what we might be able to do to make sure it doesn't happen again.

Only by understanding narrative in a materially different and substantive way, by pushing aside the politics and polemics, and by focusing instead on the underlying drivers—crowd-sourced through this laborious process of sifting through thousands, if not tens of thousands, of articles—can we learn how to avoid crises in the future.

Andrew Lo  
Cambridge, MA  
May 2019

# DEGLOBALIZATION: THE RISE OF DISEMBEDDED UNILATERALISM

Presented by Harold James

Summarized by Laurence B. Siegel

Although globalization continues to dominate popular discussion, there is evidence of deglobalization—a decrease in international trade, cross-border investing, and so forth—in the wake of the 2008 global financial crisis. Moreover, deglobalization is much more prevalent in political discourse, which has coalesced around nationalism and populism, than in actual economic behavior.

*Embedded globalism* characterizes the set of institutions that arose from and reflect the liberal tendency of the long period from the end of World War II to the global financial crisis. It is marked by international agreements, such as Bretton Woods; government regulations, such as trade law; international public regulatory authorities, such as the International Organization of Securities Commissions; and private standard setters with global reach.

The opposite of embedded globalism can be labeled *disembedded unilateralism*. It is characterized by opposition to free trade, calls for stricter limits on immigration, and an “America First” attitude (or its equivalent in other countries).

The KOF index of global integration, constructed by the Swiss Federal Institute of Technology in Zurich (ETH Zurich), rose for

all five economic superpowers (United States, China, United Kingdom, Germany, and Japan) from 1970 to about 2000, then leveled off in the United States, United Kingdom, and Germany. Japan continued to integrate, and so did China, but less rapidly. The failure of integration to continue to increase does not, in itself, indicate a decline, but it could foreshadow one if current political trends continue.

Empirical evidence of deglobalization includes a decline in cross-border bank claims, a low (but still positive) rate of import growth, an increase in harmful trade measures, and the slowing of international migration.

The current political atmosphere seems to believe, wrongly, that economic life is zero-sum. Trade wars, proposed border walls, and Brexit all point in this direction. The dominant center-right and center-left parties that have ruled much of the world since the end of World War II have become either powerless (Hungary) or unpopular (France), or they have morphed into non-traditional parties (Trump Republicans in the United States, Corbyn Labourites in the United Kingdom).

To quote *Game of Thrones*, “Winter is coming.” Efforts to dismantle globalization, however, may paradoxically lead to its reform and renaissance.



# FINANCIAL CRISES

Presented by Gary Gorton

Summarized by Laurence B. Siegel

We are accustomed to thinking of banks as “taking deposits” and then investing the money at a rate of return higher than the rate paid to the depositors, thus making a profit. But we can turn this around and look at short-term debt as the bank’s *only product*. Moreover, this debt has the special characteristic of being “information insensitive”—that is, no private information is needed to evaluate it. It’s widely understood to be riskless. When you worry whether a check you are cashing is “good,” the concern is about whether the depositor has sufficient funds, not whether the bank does. It does. And, just in case it doesn’t, it is backed by the Federal Deposit Insurance Corporation.

In other words, banks are the *source* of what we loosely call “money.” When owners of money (i.e., depositors, or creditors of banks) grow concerned that they will be unable to access it, depositors engage in a bank run, transactions freeze up, and economic output can plunge. A financial crisis, then, is an *information event* in which holders of short-term debt observe a public signal and, in response, no longer want to lend to banks because they have reason to suspect the backing for the debt. In a financial crisis, the information-insensitive debt becomes information sensitive.

For this reason, financial crises occur even in advanced economies and are caused by virtue of the fact that we have banks at all. (Almost by definition, banks engage in maturity

transformation—that is, they borrow for the short term and lend for the long term. This disparity is the underlying source of the risk of banks.) Thus, financial crises have occurred with some regularity throughout history, with 1940–1975 being the longest exception.

The 2008 global financial crisis can be analyzed in this context. The shadow banking system, in which repos (repurchase agreements) *were* money, had become important by 2007. An instrument can serve as money only if it is perceived as extremely secure, and repos backed by mortgages and other risky assets (that had been repackaged to appear safe) became suspect because of both the decline in real estate prices and increases in mortgage default rates. Thus, the repo market was at the center of the crisis, although one had to be on a trading floor to notice this.

Financial crises tend to coincide with business-cycle peaks. Moreover, they have profound implications for macroeconomics. The crises of 2007–2009 showed that market economies remain susceptible to collapse or near-collapse in a financial crisis. The vulnerability of short-term debt, in all its forms, is an inherent feature of market economies because maturity mismatch is an inherent feature of banks, which are necessary for market economies to function. Thus, financial crises have occurred in market economies throughout history.

# RECENT RESEARCH ON BANKS' FINANCIAL REPORTING AND FINANCIAL STABILITY

Presented by Stephen G. Ryan

Summarized by Luis Garcia-Feijóo, CFA, CIPM

Recent research indicates that banks' financial reporting may affect financial stability through its impact on the following three channels: the likelihood of capital requirement violations, banks' internal discipline over risk management and control systems, and the external discipline of the market and regulators over banks.

Regarding capital requirement violations, recent work has examined US regulators' removal of the accumulated other comprehensive income (AOCI) prudential filter from advanced approaches banks (i.e., very large banks). AOCI is a component of owners' equity that includes cumulative gains and losses on securities classified as available for sale (AFS), but it does not include cumulative gains and losses on securities classified as held to maturity (HTM). With the AOCI filter in place, the definition of regulatory capital excludes AOCI, and so banks have no incentive to classify securities as HTM rather than AFS. Basel III and US regulations, however, removed the AOCI filter beginning January 2014. Recent research has found that inclusion of unrealized gains and losses on AFS securities increases the volatility of regulatory capital and hence the likelihood of violations. Thus, removal of the filter has created an incentive for banks to classify securities as HTM rather than AFS.

Additionally, firms may sell AFS securities without constraint, but they cannot generally sell or reclassify HTM securities without reclassifying the entire portfolio of HTM securities. This dynamic creates accounting frictions, because it limits banks' ability to sell securities to raise funds. Moreover, banks cannot obtain hedge accounting for the interest rate risk of HTM securities, which creates another friction. Research indicates these frictions have economic consequences. Specifically, banks have reduced the risk of both HTM and AFS securities, relied more on borrowing through repurchase agreements that potentially can be collateralized by HTM securities, reduced their loans overall, and increased the risk of their loans. These consequences are unlikely to promote financial stability.

Regarding the banks' internal discipline and the market's external discipline, financial reporting requirements may lead to better modeling of risk exposures and increased transparency, improving discipline. For example, recent work has examined property casualty (PC) insurers' fair value accounting and life insurers' amortized cost accounting for investment securities that are non-investment grade but not yet in default. Researchers found that property and casualty insurers record timelier other-than-temporary

## RECENT RESEARCH ON BANKS' FINANCIAL REPORTING AND FINANCIAL STABILITY

impairments of these securities than do life insurers. This finding and others in the literature reflect the notion that fair value measurement leads insurers to develop risk models and control systems that enhance the companies' internal discipline, thereby promoting financial stability.

Furthermore, researchers have found that banks affected by stronger loan-level disclosure

requirements increase banks' external discipline. In turn, this increase leads to better-quality loans, increased credit supply, and timelier loss provisions.

The recent research has used methods that address issues of causal inference (e.g., differences in differences). Collectively, the research identifies important channels through which financial reporting affects financial stability.



# DEREGULATING WALL STREET

**Presented by Matthew Richardson, Kermit L. Schoenholtz,  
and Lawrence J. White**

Summarized by Luis Garcia-Feijóo, CFA, CIPM

An individual firm's systemic risk relates to how this firm contributes to aggregate capital and liquidity shortfalls in the financial system. A firm's optimal leverage might aggregate to too much leverage for the financial sector, and this negative externality calls for prudential regulation.

The regulator can pull the following three levers: capital (equity funding) requirements, liquidity requirements, and regulation of scope (restrictions on activities or asset holdings).

Although the 2010 Dodd–Frank Wall Street Reform and Consumer Protection Act (Dodd–Frank) uses all three levers, the Financial CHOICE Act, the recent sequence of US Treasury reports, and the Economic Growth, Regulatory Relief, and Consumer Protection (EGRRCP) Act all reduce the strength of financial regulation, which is a concern.

Dodd–Frank addressed systemic risk by increasing capital and liquidity requirements for banks; establishing the Financial Stability Oversight Council to focus on containing systemic risk, including the designation of systemically important financial institutions (SIFIs); introducing stress tests and resolution plans for SIFIs; and creating a resolution authority for failing SIFIs.

The Dodd–Frank approach is more burdensome than necessary, imposing rules that tend to reduce competition and restrict innovation.

As an alternative, the CHOICE Act trades off higher capital requirements against an exemption from much of the Dodd–Frank regulation. If the goal is to reduce systemic risk, higher capital requirements can substitute for other regulatory interventions, such as regulation of scope. Capital regulation, however, requires the regulator to accurately measure the firm's leverage and risk. Large, complex, and highly interconnected intermediaries need to be subject to Dodd–Frank's systemic regulations because accurately measuring these banks' risk and leverage is difficult.

One way to simultaneously capture the banking system's risk and leverage is through stress tests. Rather than reducing the frequency or eliminating stress tests altogether, as CHOICE and EGRRCP do, stress tests should be expanded to cover a larger number of midsize banks.

Importantly, Dodd–Frank specifies a risk-weighted capital requirement to control excessive risk taking. A capital requirement based solely on the leverage ratio motivates a bank to load up on the riskiest assets because these are treated the same as the safest assets. Using both a simple leverage and a risk-weighted capital ratio alleviates this problem.

SIFIs need to be subject to enhanced regulation because they will be treated differently in a financial crisis. That is why it's a bad idea to increase the standard for designating non-bank

## DEREGULATING WALL STREET

SIFIs. It is also crucial that SIFIs supply resolution plans. Unfortunately, EGRRCPC dropped the living will requirement for banks with less than \$250 billion in assets.

Dodd–Frank also introduced regulations of scope. These regulations include the Consumer Financial Protection Bureau, which deals with predatory lending practices; new underwriting standards; rules for clearing of derivatives transactions; and the Volcker Rule (VR). Rather than addressing risk directly, the VR essentially

restricts banks from proprietary trading and limits banks' connections with hedge funds and private equity funds. It is difficult to defend the VR because its prohibitions are not closely aligned with risk. Another concern is cost. A cost–benefit analysis would be useful to compare the VR's efficiency with that of other regulatory tools. The goal should be to select those tools that achieve the biggest bang (systemic risk reduction) for the buck.

# MORTGAGE-DEFAULT RESEARCH AND THE RECENT FORECLOSURE CRISIS

Presented by Christopher L. Foote and Paul S. Willen

Summarized by Luis Garcia-Feijóo, CFA, CIPM

The foreclosure crisis associated with the 2008 financial crisis has led to a surge in academic research on mortgage default. Before the crisis, however, researchers had already made substantial progress to model default. A central concept was equity, because borrowers with negative equity are more likely to default. In the 1990s, option-pricing theory was used to show that, even with negative equity, rational borrowers may still make their payments while they wait for house prices to increase. An alternative model, the double-trigger model of default, emphasized adverse life events, such as job loss, that could make continued payment difficult even in cases of small negative equity amounts. In light of the earlier research, scholars considered the use of loan-level data and the options framework the standard for research on mortgage default.

Subsequent research, however, gave rise to new questions. For example, options-based models can explain why a borrower with negative equity of 10%–20% would continue to make mortgage payments, but they cannot explain why borrowers with large negative equity would choose not to default. In response, researchers improved empirical predictions by imposing transaction costs that would make default less appealing (e.g., moving costs, negative impact on credit score, psychological stigma). The financial crisis confirmed that transaction costs are an

important feature of real-world data, making it particularly important to identify those costs.

A second problem with options models is that individual characteristics matter for default. Borrowers typically attribute default to idiosyncratic shocks that mean loss of income (e.g., death or illness in the family). Double-trigger models attribute defaults to a combination of negative equity and an adverse shock, but these approaches have limitations. Researchers are working on new methods that combine insights of the options framework with the added realism of liquidity constraints.

To design the most effective response during a crisis, policy makers need to know more precisely why defaults rise. Research indicates that the best way to reduce foreclosures is payment forbearance, in which the lender accepts lower payments for a limited period. Forbearance works well to prevent double-trigger defaults caused by liquidity problems because the mortgage holder lends funds to make payments with little reduction in the present value of the payment stream. Another loss-mitigation policy is principal reduction, but this policy does not work as well because of lenders' inability to identify the likely default risks among the pool of negative equity borrowers. Empirical studies support the notion that payment reduction is an effective way to reduce default.

## MORTGAGE-DEFAULT RESEARCH AND THE RECENT FORECLOSURE CRISIS

Policy makers' new rules following the crisis are intended to prevent future problems. The rules are based on the view that the crisis was caused by lenders who originated mortgages that were unaffordable either because of large interest-rate resets from low initial teasers or because of low initial debt-to-income (DTI) ratios. Resets were not a serious problem, but the use of DTI presents its own set of complications. A better approach would be to base lending decisions on variables correlated with the future variance of income, such as credit scores.

Overall, the double-trigger model implies that the affordability of mortgages (and not only negative equity) is critical for borrowers considering default. But the importance of unforecastable income shocks means defaults for any individual borrower are hard to predict and hence hard to prevent with origination-income restrictions. Policy responses focused on relaxing liquidity constraints will likely be more effective than those based on principal reductions.

# THE ROLE OF HOUSING AND MORTGAGE MARKETS IN THE FINANCIAL CRISIS

Presented by Manuel Adelino, Antoinette Schoar, and Felipe Severino

Summarized by Luis Garcia-Feijóo, CFA, CIPM

It is well known that household debt increased in the period leading up to the 2008 crisis. Less understood is that credit expansion, as measured by increasing DTI ratios, affected people at every income level. This expansion was also closely tied to house price appreciation, particularly via equity extraction refinancing. Evidence suggests that lenders did not appropriately take into account the risk of house prices declining, but evidence does not support the contention that lenders loosened lending standards, as measured by average combined loan-to-value (LTV) ratios (the amount of mortgage leverage, including second liens and equity loans). In addition, no evidence indicates that the boom increased the entry of marginal borrowers into the housing market. The evidence points to a financial market that underestimated the risk of defaults and did not anticipate the housing bust.

Evidence shows that the increase in house prices and collateral values, exacerbated by speculative behavior, may have led to increases in mortgage

debt of homeowners who were trading up their homes. Furthermore, research has found that defaults increased the most for prime borrowers and that their defaults were closely tied to house price appreciation. Additionally, it appears the fraction of loans that could have been affected by deterioration of origination practices was too small to have played a significant role in the crisis. Overall, the findings are consistent with overly optimistic homeowners who took out mortgages against inflated house values and defaulted when house prices dropped.

Properly diagnosing the financial crisis's origins is necessary to prevent similar future events. The authors' findings indicate the need for macroprudential regulation that prevents a systemic buildup of leverage and protects against systemic shocks to asset values. Research suggests that appropriate responses include higher or time-varying capital requirements and counter-cyclical LTV requirements.

# MEASURING THE COST OF BAILOUTS

Presented by Deborah Lucas

Summarized by Laurence B. Siegel

We review what economists know about the bailouts surrounding the 2007–2009 global financial crisis, inventorying the costs and beneficiaries to provide useful and correct data to a conversation that has consisted mostly of accusations and conjecture.

The total “direct” cost of the bailouts was about \$500 billion, or 3.9% of the 2009 United States GDP. This finding is in opposition to both the accusation that the bailouts cost trillions and the claim that a profit was made by the government (so that the cost was negative). Direct costs are the government subsidies and guarantees specifically related to the bailout, and they do not include opportunity costs or the cost of any moral hazard created.

We begin by defining a bailout. A bailout is a value transfer from a government to a financially distressed private entity (or, possibly, a government program) for which a fair value insurance premium was not previously collected and is not expected to be collected after the fact. If the government received securities in exchange for the bailout, the cost of the bailout is only the excess of the value transfer over the fair market value of the securities received at the time.

Identifying the beneficiaries of a bailout is also a key ingredient of this study. Beneficiaries can include debt holders, stockholders, employees

and executives, customers, and parties insured by the bailed-out organization.

*Ex post* analysis of a bailout’s cost is flawed. For example, the claim that the bailouts produced a “profit” of \$97 billion mixes information from different periods incorrectly. It is just as bad to claim that all government funds put at risk during the bailout effort were spent or lost; they were not, and a large news organization’s bailout cost estimate of \$16.8 trillion can be safely ignored. Only fair value estimates based on information available at the time of a given bailout are economically acceptable.

The cost of mortgage guarantees, such as those provided by the Federal Housing Administration (FHA), is hard to assess because they are essentially insurance premiums for events that may or may not happen—so one cannot easily tell whether the premium being charged is fair. The fact that deep losses occurred does not mean the premium was too low. For many years, premiums were collected and losses did not occur. It is generally agreed, however, that FHA guarantees are subsidized (underpriced), at a cost to taxpayers and providing a benefit to borrowers and builders.

A similar analysis can be applied to Troubled Asset Relief Program (TARP) loans, student loan guarantees, Federal Deposit Insurance

## MEASURING THE COST OF BAILOUTS

Corporation coverage, and other government guarantees of private financial arrangements. To sum up, the fair value analysis described here results in cost estimates of \$311 billion to bail out Fannie Mae and Freddie Mac, \$60 billion for the FHA, and \$90 billion for the TARP program, as well as a number of miscellaneous items for a total cost of \$498 billion, of which private investors received \$418 billion. A “ballpark estimate” of the cost of all other guarantees is \$60 billion.

# INTERMEDIARY ASSET PRICING AND THE FINANCIAL CRISIS

Presented by Zhiguo He and Arvind Krishnamurthy

Summarized by Luis Garcia-Feijóo, CFA, CIPM

The article provides an introduction to asset pricing based on frictions in financial intermediaries, broadly defined to include commercial banks, investment banks, and hedge funds. The 2008 financial crisis called into question the classical asset pricing assumptions that intermediaries are a veil and that asset prices reflect household preferences.

Theoretically, an intermediary asset pricing model considers a household sector and an intermediary sector. Households delegate investment in some intermediated assets to intermediaries, and contracting frictions (i.e., moral hazard, or shirking) imply such delegation is not a veil. As a result, prices for the intermediated assets will depend on intermediary frictions.

An important assumption is that there is limited participation by households in some assets, and hence there is delegation. This can be motivated by lack of knowledge to invest in complex assets, such as asset-backed securities, or by infrequent assessment of consumption and investment decisions by households (i.e., annual rebalancing), such as in the equity markets. Hence, intermediary asset pricing studies low-frequency price movements and can be distinguished from market microstructure research.

Contracting frictions separate it from models with heterogeneous agents.

Intermediary asset pricing implies that shocks to intermediation should affect asset prices, especially during a financial crisis. Intermediation shocks can be capital reductions caused by losses or investor withdrawals or by increases in asset complexity, which worsen contracting frictions. Additionally, capital shocks have a non-linear impact on asset prices, and the impact depends on whether (regulatory) capital constraints bind (i.e., intermediaries cannot raise equity capital from households).

Theoretically, frictions will affect the prices of assets that are more intermediated, which has implications that can be tested empirically. Specifically, intermediation disruptions should be associated with movement in intermediated asset prices. Furthermore, a number of researchers have constructed an intermediary stochastic discount factor (SDF) to show how this factor can price asset returns. A (sufficient) test of intermediary asset pricing requires showing that the intermediary factor can explain variation in asset returns, whereas the household factor cannot.

Empirically, evidence supports the intermediary asset pricing from research done using data



## INTERMEDIARY ASSET PRICING AND THE FINANCIAL CRISIS

from the financial crisis. Such evidence is based on covered interest rate parity deviations and also comes from insurance markets, especially related to the pricing of long-term life insurance during the crisis. From a different perspective, empirical research using an intermediary factor (SDF) also is based, for example, on the pricing of prepayment risk in mortgage-backed

securities or broker/dealer capital ratios. This research estimates an intermediary price of risk that can be used to improve theoretical models. Further research is needed, however, to better understand which types of intermediaries and financial frictions are most relevant to understanding asset prices.

# LIQUIDITY, LEVERAGE, AND REGULATION 10 YEARS AFTER THE GLOBAL FINANCIAL CRISIS

Presented by Tobias Adrian, John Kiff, and Hyun Song Shin

Summarized by Luis Garcia-Feijóo, CFA, CIPM

Bank leverage has declined around the world since the 2008–2009 global financial crisis. It would be simplistic, however, to attribute deleveraging to increased banking regulation following the crisis.

Because banks are financial intermediaries, bank capital plays a key role for overall lending. Banks that are well capitalized can lend more of their own funds and can also borrow more and on better terms. For better-capitalized banks, the lower funding cost translates into greater intermediation activity.

Currently, for typical levels of bank leverage, evidence suggests that banks could retain more of their profits to build capital, thereby reducing their cost of equity funding.

Additionally, bank leverage is influenced by the combination of perceived creditworthiness of the intermediary as a borrower and how tight overall credit conditions are in the financial system. Bank leverage exhibits cyclical variations. If funding liquidity is ample, even thinly capitalized banks can borrow on easy terms. When conditions tighten, banks are likely to deleverage and shrink lending, with pernicious consequences for the real economy.

Evidence indicates that, rather than having been caused by increased regulation, the leverage

collapse following the crisis reflected a combination of reduced expected returns, conservative risk management, the diminished role of securitization, and the growth of non-bank lending and market making.

Regulatory reforms following the crisis can be grouped around four objectives:

1. Improve financial system resilience in case of stress, including the following areas: capital ratios relative to risk-weighted assets; leverage ratios; liquidity and funding ratios; stress tests; central clearing counterparties for standardized derivatives contracts; and reforms of the shadow banking sector, such as those affecting money market funds, securitization, or interconnectedness between the banking and non-banking sectors
2. Contain risk buildup in the financial system, including the following areas: countercyclical buffers requiring banks to hold additional capital in times of excessive credit growth and risk; development of new tools to assess systemic risk, such as conditional VaR (value at risk); and stronger constraints on interconnectedness between SIBs (systematically important banks)

3. Strengthen policy and supervision of the financial system, including the following: a focus on understanding the financial sector as a system and new institutional macroprudential frameworks to strengthen oversight of systemic risk  
spillovers for financial stability and capital surcharges for SIBs
4. Limit moral hazard and lower failure costs, including the following areas: strong crisis management arrangements for recovery or orderly resolution of failing firms without  
Regulatory reform should be evaluated in terms of overall benefits to the financial system and wider economy rather than only with respect to the narrow interests of financial market participants. Evidence shows that regulations have made the financial system safer, but additional research is needed on their unintended consequences.

# SYSTEMIC RISK 10 YEARS LATER

Presented by Robert Engle

Summarized by Laurence B. Siegel

The 2007–2009 global financial crisis was related to excessive credit growth. Credit growth is excessive if the financial sector has insufficient capital to cover market value losses in a downturn. At the end of a long economic expansion, risky credit is issued increasingly. If the holders of these credits are leveraged, their equity turns negative and a credit boom goes bust.

To understand financial crises, one can study the risks posed by undercapitalization of financial firms. As the business cycle peaks, such firms are progressively more exposed to the risk of holding deteriorating credits with declining collateral quality while also being leveraged. The measure called SRISK (for *systematic risk*), developed by the Volatility Laboratory at New York University, captures this phenomenon. SRISK uses global equity prices (the price of an exchange-traded fund based on the MSCI ACWI) as a proxy for market stress.

This method is used to forecast the betas of financial firms. Interestingly, the firm betas reflect the characteristics of each firm. In the Great Recession, the betas of Bank of America and Citigroup rose to 3 and 4, respectively, whereas the betas of both Goldman Sachs and BNP Paribas did not move much at all. The latter two companies were not involved in the subprime mortgage business.

The risks of undercapitalized firms then are aggregated to the country level, with no netting of fully capitalized firms, because capital from these prudent firms is not immediately available to recapitalize the weak firms. The country risk estimates are aggregated to form a world risk estimate, which is as high now as it was in 2008. We estimate that about \$4 trillion of capital would be needed to recapitalize all the financial firms in the world. European and Asian banks currently pose more risk than US banks.

To ascertain the probability of a financial crisis, one must also measure *risk capacity*—that is, the financial system's ability to withstand risk posed by undercapitalized institutions. Interestingly, despite currently large amounts of risk in some such institutions, the probability of a US financial crisis is as low as at any time in this century, around 2% or 3%, compared with between 85% and 95% (depending on the model) at the time of the global financial crisis. Risk capacity in a country is related to the level of GDP, the market value of financial firms' equity, and the total assets of financial firms. For these reasons, systemic risk has been reduced dramatically from the high levels experienced during the financial crisis.

# REGULATORY REFORM

Presented by Andrew Metrick and June Rhee

Summarized by Luis Garcia-Feijóo, CFA, CIPM

Following the global financial crisis (GFC), major regulatory reforms have ensued around the prevention and management of financial crises (i.e., systemic risk). In 2010, the new Basel III framework addressed three main issues: capital inadequacy, insufficient liquidity, and financial system interconnectedness. In the United States, the 2010 Dodd–Frank Wall Street Reform and Consumer Protection Act included systemic risk elements, such as the establishment of the Financial Stability Oversight Council. The European Union introduced the European System of Financial Supervision in 2011 and the EU banking union in 2012. In the United Kingdom, the 2013 Financial Services Act reformed the regulatory structure.

Post-GFC reforms can be organized into three groups: preventative powers, emergency powers, and restructuring powers. The main effect of reforms has been to shift power from the second group into the first and third groups.

Three important prevention topics are liquidity regulation, central clearing, and shadow banking. Liquidity rules are paradoxical because they target an essential maturity transformation function of banks. Further research is needed to understand the design and impact of these new rules. Central counterparties (CCPs) potentially can remedy the problems of opacity and

bankruptcy inefficiency associated with swaps' OTC activity. Because the industry has no prior experience with a shift of this magnitude from OTC activity into CCPs, many questions remain.

A major concern with liquidity regulation, central clearing, and other prevention topics is that they involve a migration to shadow banking (money market mutual funds, securitization, asset-backed commercial papers, and repos). No effective regulation manages this migration, and further research is needed.

Two major types of emergency measures in which legal authority changed the most in post-GFC reforms include the lender of last resort (LOLR) and broad-based guarantees. Research is needed on key aspects of LOLR measures, such as who can borrow during a panic, under what collateral rules can they borrow, and at what rates. Any appropriate answer must balance the potential short-term stigma of borrowing against long-term moral hazard problems. Regarding guarantees, research on the evaluation of alternative guarantee plans and on changes to guarantee authority is needed.

Rules around the resolution and restructuring process changed significantly after the GFC. For empirical researchers, the challenge is that these rules are complex and untested.

# CENTRAL BANKER ROUNDTABLE

**Moderator: Stanley Fischer**

**Panel: Ben Bernanke, Mervyn King, and Jean-Claude Trichet**

Summarized by Laurence B. Siegel<sup>3</sup>

A remarkable group of central bankers met at New York University on 9 November 2018 to discuss the state of affairs 10 years after the great financial meltdown in the autumn of 2008. In the humble position of moderator was Stanley Fischer, the former vice-chair of the Federal Reserve, who would have been the featured speaker in practically any other gathering on Earth. The principal speakers were Ben Bernanke, who needs no introduction (so he will get none), former Bank of England governor Lord Mervyn King, and former European Central Bank president Jean-Claude Trichet.

## WHAT DID YOU LEARN, AND WHAT WOULD YOU DO DIFFERENTLY?

Fischer began by asking the bankers what they learned from their experience as the head of one of the great central banks and what they would do differently if they faced a similar challenge today.

## Ben Bernanke's Response

Bernanke, the first to respond, made three main points:

1. The thing that he and other central bankers did not see coming was the extent of “run vulnerability” throughout the modern financial system. (An institution is vulnerable to “runs” when depositors, creditors, or other liability holders think they have to be the first to make a claim on an insufficient asset pool or they will not get their share.)
2. “Without the pervasive panic, we would not have had nearly so bad an economic outcome as we did.” In other words, panic during the crisis was one cause of the depth of the economic decline and the failure to recover more quickly.
3. “Where I remain concerned,” Bernanke said, “is in terms of the firefighting tools.”

Let us examine each of these points in more detail.

## Run vulnerability

Central bankers’ lack of ability to forecast the crisis, Bernanke said, can be attributed to several factors. First, the bankers “saw housing prices very high relative to rents” but “had hoped that would correct in a more gradual way.” Second, risk premiums were low, meaning that the

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<sup>3</sup>The author thanks David L. Stanwick, who provided a massive amount of editorial assistance. Without Dave, this piece could not have been written.

reward for taking various kinds of risks—not only equity risk, but the many fixed-income risks that permeate the financial system—was unusually small. Alan Greenspan had previously talked about this dynamic in one of his valedictory speeches, referring to costs that can arise from risk premiums being low.

Furthermore, Bernanke said, central bankers did not have a full picture of how the modern financial system, based on the existence of complex securities (some of them held using large amounts of leverage), created new run vulnerabilities. “We saw the run . . . on commercial paper, a run on money market funds, collateral runs, repo [i.e., repurchase agreement] runs, so [the phenomenon of runs] was really quite generalized. The conceptual problem was that, in almost all these cases, the short-term liability that was being run was collateralized.” It is unusual, and frankly somewhat illogical, for liabilities that are *properly* collateralized to be subject to runs. Of course, this logic presumes that the collateral is good and is being accurately valued.

“Take repo, for example,” Bernanke said. “It’s collateralized and backed by generally liquid securities, so [we thought it unlikely] that we would see runs in those markets. Nevertheless it turned out that, as the crisis worsened and as lenders became worried about the liquidities of secondary markets and their own ability to dispose of financial assets in a timely and efficient way, the easiest thing for them to do was to run”—that is, to sell them at any price.

### ***The panic and the depth of the downturn***

Regarding Bernanke’s claim that the pervasiveness of the panic exacerbated the downturn, he

said, “I’ll give you two pieces of evidence. The first one has to do with the forecasts being made by standard macro models before the crisis. Even in scenarios that assume declines in house prices that were as large or larger than actually happened, the macro models [didn’t forecast] an unemployment rate above 7%.

“Indicators of the panic,” Bernanke continued, “such as the spread between the LIBOR rate and the short-term interest rate or OIS [overnight indexed swap] rate, were much better forecasters of the real economy than were . . . house prices. Because the panic was so central in the United States, I think that we have to evaluate the regulatory changes that have been undertaken since then, at least in part in terms of how they guard us against a future panic.”

Bernanke ended this section of his comments on a hopeful note. He said, “I think that in terms of reducing the risk of a panic occurring and reducing the vulnerability of the system, we’ve made a lot of progress.” Bernanke described work by Andrew Metrick and Robert Engle showing that some of the risks have decreased. The shadow banking sector is smaller, the level of reliance on short-term funding is down, and there is more capital and less leverage at work.

### ***Firefighting tools***

In the United States, Bernanke indicated, “the lending tools—the lender-of-last-resort authorities at the Fed—were constrained after the crisis, and I fear that they are not fully adequate.” These tools continue to be constrained, he said. But he is encouraged by some of the developments “in terms of the resolution authority, the liquidation authority, which I think will be very helpful.”



## **Bernanke summary and discussion questions**

Summing up, Bernanke indicated that central bankers were “late in understanding that this [panic] was going to happen.” It took them a while, in 2007, to see its extent. Once they understood what it was, he said, “we reacted aggressively with lending and ultimately with capital and guarantees to help stabilize the system.” He concluded, “I think we were successful in stabilizing the system.”

Bernanke then tossed out questions for discussion. Recognizing that what he and his colleagues did was unpopular, he asked:

- Was that because of inadequate communication on their part?
- Or, was it because our political system is not set up in a way to appropriately address major financial crises and ways of resolving them?

“Would it have been better,” he wondered, “if we had more pieces in place before the crisis?” He added, “That’s what I actually think . . . that if we had had something more like a Federal Deposit Insurance Corporation for the shadow banking sector, we would have been much better placed both economically and politically.”

Finally, he indicated that “if there could have been differences in terms of response, it would have been in the communication and the politics.” They would have made these aspects “a much bigger part” of their response.

## **Mervyn King's Response**

King began by commenting, “I share Ben’s view that the essence of this was a run on short-term debt liabilities. The impact on the real economy derived from the existence of the run, and [it

was] not just within [one] country. There was a global downturn, and it reflected a change in narrative about how much confidence one could place in the United States and therefore, by extension, other financial systems.”

The question King said he would like to add to Bernanke’s main points is, “Why was there a run in the first place?”

King, like Bernanke, made three main points.

## **Undercapitalization of the banking system**

First, King said, the banking system was undercapitalized. “At the bank we felt pretty early on, by December 2007 or January 2008, that the loss of confidence [that] markets showed in the banking system, as reflected in the waxing and waning of the LIBOR/OIS spread, was never going to be dealt with satisfactorily without a recapitalization of the banking system.

“The difficulty with that, of course,” he continued, “is that there is no objective measure of the amount of capital that you need in order to maintain confidence . . . so that the rest of the system [will] be willing to lend to banks. The lender-of-last-resort framework that we thought we inherited from the past to extend emergency liquidity was inadequate to cope with the modern banking system.”

King reminded us that “we all know Bagehot’s dictum: ‘Lend freely, at a penalty rate against good collateral.’ All three aspects of that failed in 2008. ‘Lend freely’ failed because of stigma, and I think we were not conscious of how important that was.” He reflected, “I think the 1914 episode, the major financial crisis at the beginning of the First World War, was . . . overshadowed by the actual [war] itself, but nevertheless it was a big financial crisis in which, in the run-up to



it, stigma had played a role, and that was rather forgotten.” By “stigma,” King was likely referring to the political undesirability of transferring public funds to institutions that were perceived to have mismanaged their affairs.

According to King, Bagehot’s penalty rate “failed because it was time inconsistent. It’s fine to say in advance you’re going to impose a penalty rate, [but] when you actually get to the crisis and banks need the money, there’s not much incentive to impose the penalty rate.”

The third part of the Bagehot rule, “against good collateral,” failed because “there wasn’t any good collateral.” Ouch.

King then commented about the politics of how to deal with these problems. When it came to recapitalizing the banks, politicians created the biggest obstacle. “Everything that was done where politicians had knowledge of it,” King said, “somehow managed to be leaked to the press, which made actually conducting many of these operations extraordinarily difficult.”

### **Jean-Claude Trichet's Response**

Trichet’s initial response was brief. “The [European Central Bank] didn’t have a lack of tools,” he said. “I have the memory,” he continued, “of a meeting we had confidentially with the banks at the . . . beginning of 2007 where . . . even one of the bankers [Charles Prince, CEO of Citigroup] was saying, ‘I know that what we do is bizarre, but when the music plays, I cannot help but stand up and dance.’”

“With the growing interconnectedness of the markets with IT and globalization,” Trichet said, “the herd was forming in half a day. The same type of run, which has happened before, is happening much faster.” He summed up by saying that in future challenges, “we have to respond

extremely quickly and boldly.” Trichet cautioned that there will be no time to ask politicians to make decisions, because they will be incapable of deciding.

## **CONTAGION**

Stanley Fischer then noted, “One of the most interesting aspects of this crisis in historical terms was the unbelievable speed of transmission to Asia. Within two months, I think exports [by] some of the leading exporters were down about 50%.”

### **Mervyn King's Response**

King was the first to respond. He said, “I was very struck, in the crisis, that our central bank colleagues from not just Asia but also Latin America would ring up and basically say, ‘We haven’t had a banking crisis in our country, but nevertheless we’re seeing a dramatic drop off the cliff in domestic spending—why is this happening?’” King thought there was a major change for the worse in sentiment among all investors and decision makers, but “once you go just six to nine months down the road after that, [people] in most of the emerging market countries realized they hadn’t had a banking crisis. They weren’t so badly affected.” Emerging market countries, King concluded, were the ones that began to lead the world out of recession.

### **Jean-Claude Trichet's Response**

Trichet found it “humiliating” that the advanced economies were “the epicenter of the . . . crisis.” The fact that any large amount of investment in the rich countries was “interrupted because of the uncertainty of the situation,” combined with the fact that everybody wanted to maximize liquidity and minimize risk in a

hurry, created a situation in which “the baton passed from G–7 to the G–20.” This is a striking change. In addition to the G–7 group of traditionally developed countries, the G–20 includes the BRICs (Brazil, Russia, India, and China) as well as Argentina, Indonesia, Mexico, Turkey, Saudi Arabia, South Africa, and South Korea.<sup>4</sup>

## Ben Bernanke's Response

It would have been surprising if Bernanke’s response was brief. It wasn’t particularly.

“You hear this naive comment sometimes,” he said, about “how many firms in a given quarter are actually seeking new credit . . . and [that] those are the ones which were affected by this shock to credit supply. I think that’s exactly the wrong way to think about it.”

Bernanke continued, “I think what happened, as Mervyn and Jean-Claude were both indicating, is that there was this massive surge of fear, liquidity preference, precautionary savings, a desire to husband liquidity—for example, firms that didn’t have an immediate need for credit drew down their credit lines as far as they could just to have as much cash as possible. This created a tremendous impact on the real economy as, for example, firms stopped hiring because they wanted to conserve the costs of employment. . . . [T]his had a global effect.”

He then added that trade was “killed” by the crisis.

The Federal Reserve, Bernanke said, was “disadvantaged,” echoing a theme he developed earlier. “The Federal Reserve has two limited authorities in terms of what it can buy, who it can lend to—we were severely disadvantaged by the fact

<sup>4</sup>The European Union is separately a member of the G–20, and Australia (which is not in the G–7 but is a historically developed country) is also a member, rounding out the list of 20.

that we needed to invoke emergency powers to lend to anybody that wasn’t a commercial bank, whereas the [European Central Bank], you know, could lend to any financial institution.”

Bernanke emphasized that the Fed’s role was “in one way very asymmetric, [in] that we were the producers of dollars. In a period of intense crisis, [the US dollar] is the key currency. One of the first things that we did in 2007 was to set up, ultimately, 14 swap lines with foreign central banks, essentially making sure that the foreign central banks . . . had access to dollars, which they could then on-lend to their domestic financial institutions. We felt that was essential to stabilize dollar funding markets and therefore important for the US economy as well as for the global economy.”

Bernanke said that, as he recalled, the Fed ended up doing swaps with four emerging markets: Brazil, Mexico, Singapore, and South Korea. The choice of markets was based on criteria such as the extent and depth of the market, as well as their economic importance to the United States.

## Mervyn King's Additional Comments

King then added, “The one thing that became very apparent in the crisis was that the major central banks who work together closely on a range of things and meet each other have real trust in each other, which does not depend on formal agreements.”

For example, on 11 September 2001, Alan Greenspan was stuck in Europe, so Roger Ferguson, who was second in command [at the Fed], was in charge. Banks deal with their opposite number, so Ferguson dealt with King, who was then second in command at the Bank of England, instead of then-governor Eddie George. “The only basis on which that could

have been done and worked,” said Bernanke, “was personal trust.”

## CHANGES IN THE REGULATORY SYSTEM

Stanley Fischer then asked: What changes would you like to see in the new regulatory system that emerges from the crisis?

### Jean-Claude Trichet's Response

Trichet began on an optimistic note: “What we did for the banks in general has been quite well done.” What he still finds dangerous is that herd behavior can create runs in public markets just as it can for banks.

“Public and private leverage,” Trichet pointed out, “has continued to augment after the crisis as it did before the crisis. If you [calculate] public debt outstanding plus private debt outstanding as a percentage of global GDP, you see that this indicator had [grown by] something like 25% of global GDP over the period from, say, 2007–2008 to 2016, according to the International Monetary Fund. So this . . . signals something, not necessarily in any particular country but at the global level, that we [have to be aware of].”

### Mervyn King's Response

King initially addressed the question of how the Bank of England functioned as a lender of last resort: “There are no limits on the identity of potential recipients of Bank of England support. We can lend to whomever we want either in the financial sector or outside it. The only thing is that we now have an agreed Memorandum of Understanding between the bank and the Treasury on behalf of the government, which I signed with George Osborne. It sets down the

fact that the Treasury has to give approval to any specific lender-of-last-resort operation. I think that’s sensible because in the end, it’s the Treasury that is going to underwrite the fiscal risk” of such lending.

King then answered Fischer’s question: “You have to have a framework in which the political side . . . gives agreement. You can do it in general terms *ex ante* or . . . by being involved in the particular operations, but in the end, [politicians] have to give indemnity to the central bank for carrying out an operation.”

### Understanding the maturity mismatch of bank balance sheets

King continued, “I think that the system does need to be redesigned, somewhat along the lines of my proposal” in which “maturity transformation, whether in the formal banking system or outside it, is an important part of the credit process.”

Maturity transformation is the process by which banks and other organizations borrow short term and lend long term. This practice is normal, and a source of profit for those institutions, but it is laden with interest rate risk, especially if the process is leveraged—that is, if the institution does not have enough capital to protect it from fluctuations in asset and liability values. King appears to mean that the amount of interest rate risk taken by a financial institution should be crucial in determining the institution’s credit quality.

“If there’s too much maturity transformation,” he said, “then it can cause the risk of a crisis and, just as Ben [Bernanke] said, it’s the panic that can have enormously costly economic repercussions. So you want a positive tax on the degree

of maturity transformation. That means looking at both the asset and the liability side of the balance sheet together. One of the weaknesses of [the] Basel [regulatory framework for banks], all the way through, has been that initially it focused only on the asset side.”

### **Summary of Mervyn King's statement**

To sum up, King said, we need to focus on the aspects of the financial system that can generate a run. “We didn’t have enough capital in the banking system; we didn’t have a resolution process that would deal with bigger banks; and, most important, we didn’t have the political buy-in to say that here’s a crisis we have thought through in advance, we know how we might deal with it, and we’re broadly comfortable with the framework that’s being used.”

### **Ben Bernanke's Response**

Bernanke commented, “One theme I’d like people to take away is that the differences in the powers of different central banks are really substantial. So Mervyn could lend to anybody, presumably, including his gardener.

“It’s a concern to me,” he continued, “that we don’t have in the United States a lender-of-last-resort authority that’s adequate—although, interestingly, there is one part of our system that actually works very well. That is the way the FDIC deals with failing commercial banks. It’s ironic that the United States is the country where the [central bank] has limited lending authority but also the biggest nonbank credit markets.”

### **Jean-Claude Trichet's Response**

To Fischer’s question, Trichet responded, “What worries me most is that macroeconomic

policies are not optimal . . . the world over—certainly not optimal in the advanced economies, but also in the emerging economies.” He said that is likely to be the reason we have the augmentation of leverage that has already been mentioned and that is now understood as one of the major vulnerabilities of the global economy. “I think we have to do something,” Trichet said, “and, in my opinion, it is quite urgent because we have to change the balance between equity and debt in practically all economies, emerging or advanced.”

### **MORAL HAZARD**

Stanley Fischer then asked, “How large should the role of moral hazard be in designing facilities?”

### **Ben Bernanke's Response**

Bernanke replied, “The fear of moral hazard has led Congress to say, ‘We’re not going to make any preparation for this contingency because we don’t want to give the [impression] that we would in fact intervene.’ But, of course, if things get bad enough, some future government *will* intervene.”

So, Bernanke said, we would be better off “setting up an *ex ante* structure [that] lays out the rules and eliminates some of the uncertainty and delay and political costs.” And, second, we must make it clear that “if you’re an individual firm that’s making bad decisions, you’re not going to be protected except in the event of a systemic crisis.” Third, he said it was “a myth that American banks were ‘bailed out’ and held harmless during the crisis. It’s true that the creditors were protected, but the equity holders, the management and so on, were very badly hurt, even when their banks received capital.”

So, Bernanke's recommendation is to design a structure, in advance, in which the conditions for an intervention are made clear. Defining "the rights of individual stakeholders . . . , as we do now with deposit insurance, would *ex ante* limit some of the moral hazard.

"I think it's a solvable problem," he concluded.

## Mervyn King's Response to Ben Bernanke

Reacting to Bernanke's comments, King said that he "never found ambiguity very constructive." It is much better, he said, to "set down a clear *ex ante* framework within which operations can be conducted and the rules that will govern it. You then get political buy-in to [the framework]. The politicians don't have to say we agree with every individual action that's taken, and they can hold people accountable *ex post*."

King concluded, "You've got to have a consideration of moral hazard when you design the scheme, but merely mentioning the word does not mean that you can't do something at all." In other words, he seemed to agree with Bernanke that moral hazard is a design problem to be solved, not an insurmountable obstacle to good policy.

## Jean-Claude Trichet's Response

Trichet said that "the euro area is transforming itself under the pressure of the crisis. We had two new treaties. We had the banking union, which is of course a major structural reform that was totally unexpected before the crisis but that was overdue in light of it."

He also commented that, to stave off future crises, it is necessary to "try to detach the creditworthiness of the bank from the creditworthiness of the nation."

Finally, he said that creating a special entity that is not the central bank for guaranteeing deposits is essential and that the FDIC in the United States is the correct model.

## Audience Question to Bernanke on Moral Hazard

An audience member asked, "Ben, do you still hold the view that, if the crisis had a single lesson, it is that 'too big to fail' must be ended? How much progress do you think we've made in terms of attacking that problem, and why is there such a dearth of interest in the topic from academia?"

## Ben Bernanke's Response

"You have to make it plausible," Bernanke replied, "that you could have a [financial institution] failure that wouldn't bring down the system, right? That's the essence of the orderly liquidation authority, Title 2 of Dodd-Frank, the 'living wills.' I've had a number of briefings from the FDIC and the Fed on progress in that area, and I'm a little more optimistic about it than some.

"It's certainly true," Bernanke continued, "that [this idea] hasn't been tested, and it would not be easy, particularly for a large multinational firm with many overseers. But I do feel that what's there is more credible and that the living wills have . . . put us in a better position relative to where we were with the *ad hoc* weekend rescues of the crisis period."

Stanley Fischer then said that the process of closing a bank is not something he would want to get into.

Bernanke replied, "No; that's what I was saying. That is why the moral hazard concern is somewhat overstated. But, also at the same time, if you really can't allow a large firm to fail, then



you're in a situation where, in a crisis, every large firm is a potential time bomb. You know that extraordinary, politically unpopular, and economically undesirable steps have to be taken to protect them. Free laissez-faire is the right thing, [so failure must be an acceptable outcome for a business], but I think it needs to be a guided and organized failure. I think it can be done in a way that reduces the implications for the broader system."

## ADDITIONAL ISSUES

### Central Bank Independence

An audience member asked to what extent central bank independence can actually be reiterated or preserved in an era of more interventionist politics.

Jean-Claude Trichet replied that "independence must function in both directions."

Ben Bernanke said, "It's important to define what independence means. It doesn't mean, for example, that the central bank can coordinate or cooperate with the fiscal authorities as we [did] during the crisis, which was appropriate. It also doesn't mean that the central bank gets to set its own objectives. Congress tells the Fed to [seek] price stability and maximum employment and, in general, the government will give the powers and the framework [for the Fed to do that], but it seems instrumentally valuable for central banks to have what's called instrument independence ability."

Instrument independence is the authority to decide what monetary instruments to use. It differs from goal independence, which is the authority to decide what to use the monetary

instruments *for*. In the United States, the Fed does not have goal independence.

### Risks Caused by Pension Guarantees

Zvi Bodie, an audience member and Boston University professor of finance, commented, "I'm even willing to go so far as to say what the first warning is going to be, and it will be the bankruptcy of the Pension Benefit Guaranty Corporation."

King responded, "I share your concern that there could be an economic crisis resulting across the world [because of] inadequate pension provision and [the fact that] we've made promises to people [that] the potential suppliers of pensions may not be able to meet. I think this is somewhat different in character from the financial system crises that we've been discussing—the runs—the solution to which has to come from central banks.

"But," King continued, "I think the question of pensions is a much wider issue. It's a very important one, I agree—but . . . it inevitably involves difficult political judgments and decisions, and that goes beyond the remit of central bank governors, independent though we may have been."

## RECAPS AND CLOSING NOTE

Ben Bernanke did not recapitulate his comments.

### Recap from Mervyn King

King closed by saying, "I think we are in a better position. Banks do have more loss-absorbing capacity. A byproduct of quantitative easing is

that the system as a whole has a lot more liquidity than before.

“Resolution,” King continued, “has been improved everywhere; that’s a great help. My big worry would be that the resolution framework, which might work smoothly on paper, might not survive the interest of the White House or Number 10 Downing Street or someone in the European Commission. [In other words,] politicians would try to intervene because they would say, ‘None of us really knows the possible contagion effect of allowing a large institution to go through this resolution process.’

“If we have a proper *ex ante* framework for central banks dealing with that [concern],” he said, “then I think the risk of it is much diminished. What I take away is the complementarity between the efforts that have been made to increase the amount of capital in banks to improve their liquidity position (though, as I said, more needs to be done on that front), on the resolution framework, and on international cooperation between central banks and regulators.”

King concluded, “The trouble is that much of this [improvement] will fade as people age and younger people who don’t remember the crisis come in to run institutions, but that’s why putting things down and having an *ex ante* framework is important.”

## Recap from Jean-Claude Trichet

Trichet remarked, “I said already that it was quite worrying when I look at some indicators of fragility at the global level and at the level of many countries. One major difficulty I see for some central banks, and maybe all central banks of the advanced economies, is that in case we have a recession, or in case we have to cope with [some other] kind of dramatic event, we have to be fully aware that we will have to utilize ammunitions and that they are very meager at the moment.”

## Closing Remark by Stanley Fischer

Stanley Fischer remarked that “the cost of this very difficult crisis was much less than [that of] the Great Depression. [The] unemployment rate reached 10% [in the crisis of 2008]; it reached 25% in the Great Depression. That’s enough to tell you this was a very successful operation.”

This appraisal is valid only if the degree of financial distress that produced the Great Depression was actually replicated in 2007–2009. It is hard to see how one should assess that claim. Fischer and the other central bankers seem to hold that view, however, and perhaps we should take seriously the idea that a second Great Depression was avoided through the actions discussed in this Roundtable.

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