Address to the International Monetary Fund
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Connectedness and Contagion: A Global Perspective

By Hal S. Scott

1. Summary

The heart of the U.S. 2008 financial crisis and others in the past, here and worldwide, has been systemic risk in the form of contagion. As detailed in my book, *Connectedness and Contagion* (M.I.T. Press 2016), the U.S. crisis was successfully stemmed with three weapons: (1) lender of last resort; (2) liability guarantees and (3) capital injections. Post crisis, all of these weapons have been limited or eliminated, primarily by the Dodd-Frank Act, as undesirable "bailouts." Dodd-Frank purports to solve the contagion problem with what I call two wings and a prayer: (1) heightened capital and new liquidity requirements as the wings, and (2) new resolution procedures as the prayer. It is questionable how effective these policies have been to decrease the risk of contagion. But you don't abolish the fire department even if you believe you have more fire resistant buildings. . Thus, we need to restore and indeed strengthen the three powers to fight contagion that we weakened or took away. But the chances of doing so in the "anti-bailout" environment are very low, so we are dangerously exposed to future crises. The reality is, as Secretary Geithner recently stated in his Per Jacobsen Lecture (October 8, 2016): "There is no way to protect the economy from a failing financial system without deploying public resources—without temporarily substituting sovereign for private credit."

The strength of U.S. weapons to fight contagion is clearly of great concern to the world, not just the United States. Unchecked, U.S. contagion will swiftly spread abroad through the

primacy of the dollar as a reserve currency, asset fire sales, and the presence of global financial institutions based in the U.S. Moreover, a severe recession, depression or even political unrest in the U.S., the world's leading economic power, would shake global stability to its very foundations.

The ability of major financial powers to deal with contagion should be a major, if not the top, priority of the International Monetary Fund. Issues of the capacity to deal with contagion are not limited to the United States. For example, in the Eurozone, while the ECB provides general liquidity to the banking system through its monetary operations, national central banks are entrusted with providing Emergency Liquidity Assistance (ELA) to a particular institution facing liquidity problems. But the failure of a major Eurozone central bank to act as lender of last resort, whether due to legal or political constraints, would not only affect its Eurozone neighbors but the rest of the world. And while the ECB Governing Council can restrict a national central bank's provision of ELA, under Article 14.4 of the ESCB Statute (as it did in the Greek crisis), the decision to provide ELA lies with the national central bank. While my book and talk here today focuses on the U.S., the concerns extend to all major economies.

2. Elements of Systemic Risk

The main point of financial system regulation is to prevent systemic risk, of which there are three varieties, what I call the three C's: correlation, connectedness and contagion. These types of systemic risk are not mutually exclusive, they may occur together. Correlation refers to the situation where the same external event creates losses for a large number of important financial institutions, e.g. housing price collapse. Connectedness comes in two flavors: (1) asset connectedness where the losses of one financial institution causes losses of other financial institutions, in a chain reaction, or (2) liability connectedness where the failure of one financial

institution endangers funding of others, for example if a bank settling tri-party repos were to fail. The third C is contagion where the actual failure or fear of failure of a financial institution causes short-term creditors-investors to withdraw and withhold funding for financial institutions generally out of lack of information or irrational panic. My distinction between connectedness and contagion is quite similar to that used by the IMF in assessing the possible channels of spillover of a sovereign debt default, when the IMF uses the concepts of direct exposures, on the one hand, and risk aversion and lack of confidence, on the other hand.[1]

3. Contagion not Connectedness was the Systemic Risk Problem in 2008

Correlated losses due to falling housing prices set the scene for the crisis of 2008 but did not by itself lead to a financial panic. Contagion —not asset or liability interconnectedness— was the primary driver of the 2008 U.S. financial crisis. Leading up to Lehman's fall, major banks saw some deposit runs, including National City, Wachovia, IndyMac, and Washington Mutual. But the Lehman Brothers insolvency filing on September 15, 2008 put contagion in overdrive in the non-bank sector. The Reserve Primary Fund "broke the buck" on the next day, owing to massive investor redemptions due to losses from the fund's significant direct exposure to Lehman commercial paper. The run spread quickly across the money market fund industry, including to institutions with no significant exposure to Lehman, and then spread more widely to all short-term financial liabilities. And while I do not deal with the Eurozone crisis in my book, there was a large concern during the crisis that sovereign debt defaults could trigger a contagious run. This was stopped by prompt and firm action by public authorities. EU market conditions improved following Mario Draghi's July 2012 famous declaration that the ECB was prepared to

[1] International Monetary Fund, The Fund's Lending Framework and Sovereign Debt—Further Considerations, April 9, 2015 (Further Considerations).

do "whatever it takes to preserve the euro" and the announcement of the Outright Monetary Transactions program shortly thereafter.

Many believe that asset connectedness, not contagion, was the major problem during the U.S. crisis. My book examines this claim in detail. Investors in the Lehman-connected Reserve Primary Fund lost less than a penny on the dollar, and no financial institution connected to Lehman failed as a result of the failure of Lehman. Moreover, no financial institution exposed to AIG would have failed if AIG had failed. For example, Goldman Sachs would have experienced a maximum 18% loss of capital from its CDS collateralized positions with Lehman, less than the conventional 25% loan loss secured lending limits for banks, and this does not take account of the CDS's Goldman had on AIG. Interestingly, the IMF analysis of the threat of spillovers from a sovereign default finds contagion (a confidence crisis) much more important than connectedness (direct effects). In thinking about our ability to deal with contagion, keep in mind that panics can be set off by causes that have little or nothing to do with financial institution failures. The IMF has focused on this issue in the context of sovereign debt defaults and last June we briefly flirted with possible panic when the unexpected vote in favor of Brexit was announced. Major terrorist events or natural disasters could also set off panics. So limiting contagion weapons across the board out of concern for moral hazard in the financial system is myopic.

4. <u>Dodd-Frank Reforms Were Focused on Asset Connectedness</u>

Nonetheless, the Dodd-Frank reforms and much of the G-20 agenda is focused on asset connectedness. SIFI designation by FSOC is largely built around connectedness, as is central clearing for OTC derivatives, and bilateral exposure limits. While these reforms may be

desirable in any event, if only to alleviate the fear of connectedness, connectedness was not the problem in 2008.

5. Measures to Stop Contagion in 2008

My book describes the three measures that were deployed during the crisis to stop the contagious run on banks and non-banks: (1) lender of last resort; (2) liability guarantees; and (3) capital injections into weak banks.

a. Lender of Last Resort

The Fed was created in 1913 to stop financial panics, the latest of which had been in 1907. Of course, older central banks like the Bank of England and the Banque de France already had experience managing financial crises in their own countries by that time. Interestingly, the 1907 U.S. panic started in the non-bank sector at Knickerbocker Trust Company. Even then the contagion caused by the failure of a non-bank was of concern. During the 2008 crisis, the Fed amply discharged its lender of last resort responsibility, on the run as it were, through a variety of means. A lower penalty rate, wider access for primary dealers, and a Term Auction Facility were major changes in the discount window. And a multitude of new facilities were created for non-banks, including the Commercial Paper Funding Facility (CPFF) to purchase unsecured and ABCP from corporate issuers, and the Money Market Investor Funding Facility (MMIFF) to purchase assets from money market funds to provide them liquidity.

This supply of liquidity to the financial sector doubled the Fed's balance sheet to $2 trillion by 2009. In 2007, 91% of its balance sheet was invested in US Treasuries; by 2009 this was only 25%. Supplying liquidity to the non-bank system was very important. It provided non-banks with $930.6 billion in loans and general market liquidity. More importantly, the very availability of these facilities helped stop the run.

The Fed, and in turn the taxpayer, actually benefited from the new lending. Balance sheet expansion generated Fed profits and thus higher remittances to the Treasury. In 2008, these remittances were over $40 billion. I might add that in 2015, they were $117 billion due to QE expansion.

As I said, a key part of Fed lending was to non-banks where the contagious run was largely centered. I estimate that today there is about $8 trillion in uninsured short-term funding in the U.S. financial system, with 66% of this $8 trillion in non-banks, primarily money market funds and broker-dealers. The ability to lend to non-banks in a crisis is essential. I would expect this percentage to increase as lending and capital market activities, with short-term funding, are increasingly driven out of the intensely-regulated banking system.[2]

The legal authority for this lending to non-banks was the then quite broad Section 13(3) of the Federal Reserve Act. It provided that in "unusual and exigent circumstances," the Board could authorize a Reserve Bank to make loans to a non-bank where such loans were "secured to the satisfaction of the Federal Reserve bank." This authority to loan to non-banks is quite separate from discount window authority.

After-the-fact this authority was and continues to be widely attacked as bailing out Wall Street. This is despite the fact that taxpayers benefited from these loans through additional Fed remittances of profits and, much more importantly, the country avoided what would have been a much more serious crisis. But that counterfactual is difficult to prove. Legitimate moral hazard concerns have been raised about this lending, but the beneficiaries of the lending were largely

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[2] Total short-term funding in 2008 was $9.6 trillion, which then fell to $6.7 trillion by 2012, reflecting a drop in money-market funds, repos and secured lending. But it has bounced back to $8 trillion in 2016. The percentage of short-term funding in the non-banks actually decreased over the period from 78% in 2008 to 66% in 2016. This is because of the growth of uninsured bank deposits. As indicated in the text, I would expect this percentage to increase over time.

victims of a panic; without panicked withdrawals from these institutions, they would have been solvent—the notable exception to this was probably AIG.

This anti-bailout concern triggered radical calls for changes in 13(3) lending authority for non-banks; oddly enough such concerns did not generally translate to the Fed's use of the discount window. As a result, the Dodd-Frank Act placed significant constraints on the Fed's 13(3) lending authority. What are they? First, the Federal Reserve can now only lend to non-banks with the approval of the Secretary of Treasury under procedures adopted in consultation with the Treasury. Interestingly, this requirement for approval was put forward by the Treasury Secretary Timothy Geithner. Perhaps, this was just another chapter in the Fed-Treasury turf war, or maybe Geithner thought this was a way to protect the Fed from even greater restrictions, which indeed were then actively being considered in Congress. In his book Stress Test and in his Per Jacobsen lecture, Geithner fails to even mention this restriction. It is important to note, however, that when the Fed decided to help finance the acquisition by Bear Stearns in March 2008, Geithner, then the President of the New York Fed, asked for Treasury support for "cover," so perhaps he believed that writing this requirement into law would help protect the Fed from criticism. [3]

One can argue with the importance of this restriction, though it is clearly taking independent authority away from the Fed in a way not applicable to banks. Some point correctly to the fact that Paulson was generally Bernanke's cheerleader during the crisis, but it has also been reported that Paulson refused to let the Fed lend to Lehman in September of 2008 because he did not want to be known as Mr. Bailout (even though Lehman had adequate collateral). Of

[3] Laurence Ball, The Fed and Lehman Brothers, Paper prepared for the NBER Monetary Economics Program, July 14, 2016 (Lehman Brothers), p. 184-185.

course, at that time he had no legal right to bar Fed lending.[4] Secretaries of the Treasury are by nature political and may again deny funding in the future to avoid political criticism, particularly when their approval is now formally required. And the markets will know Fed support may not be assured, which itself could trigger or accelerate a run.

The use of Emergency Liquidity Assistance for banks and non-banks by the Bank of England in the U.K. does require Treasury approval; and under certain circumstances the U.K. Treasury can even direct the Bank to provide ELA. However any emergency lending undertaken by the Bank of England at the Treasury's direction is indemnified by the Treasury. Thus, it becomes a government and fiscal decision. Such coordination of fiscal and central bank authority in cases of lending to banks and non-banks that may be experiencing solvency problems (but are not insolvent) offers a possible model for the United States and other countries.

Second, the amendments to 13(3) provide that the Fed can no longer make one-off loans to single beneficiaries, such as it did in 2008 to AIG; it must instead do so under a "broad" program. A Fed regulation implementing this provision provides that at least five institutions must be "eligible" for any Fed program. If this means eligible at the time the Fed provides the first loan, it may make it harder to nip a contagious run in the bud—the Fed would have to wait for five institutions to be under attack. If it means ever eligible, then it is not much a restriction, and its use would generate cries of illegality and congressional scrutiny. No other major central bank has such a "broad" program requirement.

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[4] Id., at 186.

Third, Dodd-Frank requires that all loans must be collateralized, and a lendable value assigned to all collateral. This appears to rein in the Fed's authority to buy unsecured commercial paper, which it did for major non-financial issuers in the crisis, and more generally deprives the Fed of the discretion they previously had to set collateral requirements. These same legislative restraints on collateral do not exist elsewhere.

Fourth, the Fed can now only loan to solvent non-bank institutions, a requirement not imposed on lending to banks. The solvency requirement is a cardinal principle in Bagehot's 19th century formulation of the appropriate role of the lender of last resort, but historically it has often been honored only in the breach. One reason to avoid such a legal requirement is that judging solvency is extremely difficult. Should assets be valued at market value, a price which might already reflect fire sale prices caused by a panic, or at values they might revert to after Fed lending is deployed? Or somewhere in-between? An underlying argument for a solvency requirement is that lending to an insolvent institution should be a fiscal issue, in which the Congress should play the major role through appropriations, as it did with TARP. This is because Fed losses could reduce Fed remittances and thus the general revenue. I wholeheartedly agree with this concern. But we should then establish an ex-ante framework for coordination between the fiscal authority and the lender of last resort, as in the U.K. This would ensure that needed action could be taken promptly.

A fifth provision of Dodd-Frank provides for disclosure. The details of all loans to non-banks must be reported within seven days to the two Chairmen of the House and Senate financial institution committees, and then must be disclosed to the public within a year. On the banking side, the details of all discount window loans must now be publicly reported within two years.

The concern with such disclosure requirements, more stringent than those facing other major central banks, is that the prospect of disclosure, certainly within seven days, and even within two years, will discourage borrowers concerned with stigma from seeking needed support, thus worsening the problem. Indeed, in the crisis, banks in need of funding avoided the discount window out of fear that their borrowing might be leaked or uncovered by analysts, thus leading the Fed to create the Term Auction Facility, where all banks could obtain cheap funding. No other major central bank has such strict disclosure requirements.

Sixth, Dodd-Frank provides that banks can no longer pass on discount window loans to their non-bank affiliates, such as broker-dealers, without being subject to the normal Section 23A limits on inter-affiliate lending. This means that substantial borrowing by bank affiliated broker-dealers would have to occur under the new restrictions of 13(3). This restriction is not relevant to other major central banks, since their LLR authorities are not organized according to a "bank"/"non-bank" distinction.

Some in the Fed, including Governor Powell and ex-Chairman Bernanke, have said they can live with these Dodd-Frank restrictions. But they have taken this position, in my view, to avoid the potential adverse market impact of portraying the Fed as a weak lender of last resort and to stave off yet further restrictions. On November 15 of last year, the House passed the so-called FORM Act, 241-185, along party lines. The bill has not been enacted into law. This Act provided that the Federal Reserve could only loan to non-banks if at least 9 of the 12 Reserve Bank Presidents voted in the affirmative. Further, all federal regulators of the potential borrower, which would often include the SEC or CFPB, would have to certify that the borrower was not insolvent. Chair Yellen correctly said at the time that these provisions would essentially

end Federal Reserve lending to non-banks. The FORM Act has now been incorporated into the House Financial Reform package, the Choice Act.

These concerns with the Fed's role of lender of last resort are not recent. My book recounts how opposition to any role for a "federal" bank, whether lending to commercial or bank borrowers, goes back to the early controversies in our history over the First and Second National Banks. Andrew Jackson vetoed the renewal of the charter of the Second National Bank in 1832. That debate is a major reason it took us until 1913 to establish the Fed.

As I have observed, it is somewhat curious that the U.S. has different standards, unlike other major central banks, for emergency lending to banks and non-banks. Some argue that this is justified to the extent that the Fed does not generally regulate non-banks. But the failure to stem a run in the non-bank sector can be just as devastating as the failure to do so in the banking sector, so support cannot be denied. At the same time, we should, as Secretary Geithner suggests, impose some form of prudential supervision on non-banks that receive government support, if we have not done so already, while being cognizant of the fact that the prospect of such supervision could deter needy borrowers from seeking such support in the first place, thereby making the situation worse.

b. Guarantees

Let me now turn to the second weapon used to fight contagion, deposit insurance and other guarantees. In October of 2008, the FDIC removed any limits on deposit insurance for transaction accounts (key to the payment system), increased the insurance limit on other accounts from $100,000 to $250,000, and guaranteed certain senior debt offerings. While Dodd-Frank

permanently increased deposit insurance limits to $250,000, it removed the existing authority of the FDIC to raise any limits in the future or guarantee senior debt.

In addition, in September 2008, following the breakout of the run on the money market funds, the Treasury used its Exchange Stabilization Fund authority to guarantee the money market funds. This had a major impact in stopping the runs on the funds. This power was taken away before Dodd-Frank, by the TARP legislation in 2008. Again the issue of guarantee power is not unique to the U.S. We need to review the power of other countries to establish or expand needed guarantees in a crisis. This could be of particular concern in the Eurozone which only has common country standards but no unified deposit insurance system.

c. TARP

The final tool used to combat contagion was TARP, which authorized the injection of up to $700 billion in capital into insolvent banks. The Treasury's authority to make new TARP capital commitments expired in 2010. As of September 2016, $204.89 billion of capital injections into banks made (not lost) $16.30 billion. A recent Federal Reserve Bank of Kansas City paper shows these capital injections reduced systemic risk.[5] Unlike the EU and Japan, which have standing authority for capital injections, if the U.S. needs such injections in the future, authority may have to be obtained in the midst of the crisis itself, as it was in 2008. What is needed is the standing capacity to make capital injections if no other private solution exists; the use of this weapon should be rare, particularly if the rest of the system is protected from the contagion that could follow a financial institution default.

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[5] A. Berger, R. Roman and J. Sedunov, Do Bank Bailouts Reduce or Increase Systemic Risk? The Effects of TARP on Financial System Stability, The Federal Reserve Bank of Kansas City Research Working Papers (September 2016).

6. Two Wings and a Prayer

While contagion fighting powers have been curtailed, some defenders of Dodd-Frank point to what I call two wings and a prayer, the wings being capital and liquidity requirements, the prayer being new resolution procedures. The premise is since contagion is much less likely, we need not worry much about fighting it. I might observe that the recent Sarin and Summers Brookings Paper suggests the system is not safer. [6] If so, contagion fighting measures are even more important.

a. Capital Requirements (Wing One)

For the largest banks, based on the work of the Basel Committee, post-crisis capital for U.S. banks has been significantly increased and in the U.S. and elsewhere new stress tests have been devised. But no realistic level of capital can prevent a run on banks. Due to fire sales, capital is quickly eroded where funding is no longer available. AND capital requirements only apply to banking organizations, not to the ever increasingly important non-banks.

b. Liquidity Requirements (Wing Two)

After the 2008 crisis, again based on the work of the Basel Committee, liquidity requirements have been imposed on banks. Thus the Liquidity Coverage Ratio (LCR) requires banks to hold High Quality Liquid Assets (HQLA) to cover expected funding run-offs for 30 days. As with capital requirements, there are significant methodological issues with LCR, largely around run-off assumptions and what counts as HQLA. Fundamentally, the new

[6] Have Banks Gotten Safer (September 15-16, 2016).

adoption of *private* liquidity requirements represents a retreat by the Fed from providing *publi*c liquidity as the LLR. Ironically, the individual private liquidity requirements may actually reduce collective private liquidity because they require each bank to hoard its own liquidity rather than making it available to others when not needed. And again, the LCR only applies to banks.

c. Resolution Procedures (the Prayer)

Dodd-Frank's Orderly Liquidation Authority (OLA) gives the FDIC new powers to resolve non-bank financial firms that, upon a proper finding, pose serious adverse effects to the financial stability of the United States. If such a systemic risk determination is not made, non-bank financial institutions will continue to be resolved in bankruptcy.

Such new procedures are unlikely to deter contagion. At the outset, without the requisite approvals, the procedures may never be used. If OLA is used, the FDIC has designed a single-point-of entry procedure requiring restructuring at the holding company level, a major consequence of which is that short-term funding at the operating subsidiary level (where almost all short-term funding resides), mainly banks and broker-dealers, will be unaffected. Thus, some hope this will stop contagion.

But whether such restructuring will actually work, particularly for major multinational banks, is problematic and the procedure has never been tested. Similar procedures adopted in Europe are open to the same skepticism. Thus, this is a prayer. The reality is that creditors of financial institutions will run if a large financial institution is put into resolution—better safe than sorry, and we need to be prepared to deal with that. Indeed the very weakness of our

contagion fighting weapons may make us more inclined to bail out a major bank. In this context, it is interesting to note that the IMF singles out the importance of contagion limiting actions in countries that face possible spillovers from a sovereign default. [7] Without the ability to limit contagion, it would be more difficult to allow needed sovereign as well as financial institution restructuring. Indeed, not letting an insolvent financial institution fail out of fear of panic raises much more important moral hazard issues than protecting financial institutions that are victims of irrational or uninformed panic.

7. Conclusions from my book

What are my conclusions?

a. Contagion is the major systemic risk concern but Dodd-Frank focused on protecting us from connectedness, while making it much harder to stop contagion. And we will have undoubtedly new contagion episodes in the future.

b. We know how to stop contagion, through the use of LLR, guarantees and capital injections, but due to the fear of "bailouts" these powers won't easily be restored. If these powers exist and are clearly deployed in advance, as they were not in 2008, we very likely would not have contagion in the first place.

c. Capital, liquidity and resolution will not safe proof the system from contagion. And even if homes are better fireproofed, you still need a fire department.

d. Let's just hope we do not have another crisis, before we can move beyond the populist fears of bailing out Wall Street to deal with reality and rectify the situation.

[7] Further Considerations, supra note 1.

8. A Way Forward

While my book and remarks today have been mainly focused on the United States, the ability of all major countries to deal with contagion is important to the world, and the IMF should make this a priority as part of its FSAP and Global Financial Stability assessments. The IMF staff has already laid a foundation for such focus through its excellent IMF Working Paper on the Lender of Last Resort Function after the Global Financial Crisis.[8] And IMF work on issues of systemic risk in the context of sovereign debt defaults is also highly relevant. These efforts should be coordinated with the important work done on the issue of lender of last resort by the BIS.[9]

Focusing on Lender of Last Resort—although the effort must also extend to guarantees and capital injections, I would recommend that the United States and other countries follow these five principles:

a. Have a strong lender of last resort. In the U.S. this means restoring that system to what it was in 2008, and even strengthening it.[10]
b. Enhance disclosure of financial institution exposures to limit contagion based on market uncertainty about what such exposures actually are. . However, one must recognize that disclosures will always be somewhat out of date (conditions can rapidly change) and never complete, and worrisome disclosures could fuel panic. Perhaps someday technology can provide continuous and complete real time

[8] IMF Working Paper, The Lender of Last Resort Function after the Global Financial Crisis, WP/16/10 (January 2016)
[9] Bank for International Settlements, BIS Papers No. 79, Re-thinking the lender of last resort (September 2014).
[10] One point of strengthening, suggested by Geithner, would be to permit the Fed to purchase non-government assets to supply liquidity to financial institutions. The Fed may already effectively have such power—during the crisis the Fed created an SPV through which it effectively purchased commercial paper issued by U.S. companies. The legality of such purchases should be made clear.

disclosure. But creditors will still fear that matters could shortly turn much worse. This is why a floating NAV for money market funds cannot stop panicked withdrawals.

c. Have a coordinated fiscal (Treasury) and lending (Fed) approach clearly established in advance—the U.K. model could be a reference point;

d. Have a rule of law requirement for the central bank—in the sense that the bank articulates its LLR policies in advance on matters including solvency, a broad program, penalty rates, collateral etc. Not only is ambiguity not constructive, it is positively harmful. Critics legitimately criticize the Fed for operating without articulated constraints and doing so in a non-transparent way—this is not tenable if the Fed is to exercise the powers that they need. A rule of law need not unduly confine discretion but should articulate principles for exercising such discretion;

e. And require that those institutions borrowing from the central bank or receiving fiscal support pay a sensible price, where their own losses trigger the need for support. This price might range from penalty rates to enhanced supervision or replacement of management. The failure to impose a cost on institutions benefiting from public support is largely responsible for popular opposition to bailouts.