

**CLEARING THE NEXT CRISIS: RESILIENCE,
RECOVERY, AND RESOLUTION OF
DERIVATIVE CLEARINGHOUSES**

HEARING
BEFORE THE
COMMITTEE ON AGRICULTURE
HOUSE OF REPRESENTATIVES
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CLEARING THE NEXT CRISIS: RESILIENCE, RECOVERY, AND RESOLUTION OF DERIVATIVE CLEARINGHOUSES

TUESDAY, JUNE 27, 2017

HOUSE OF REPRESENTATIVES,
COMMITTEE ON AGRICULTURE,
Washington, D.C.

The Committee met, pursuant to call, at 10:00 a.m., in Room 1300 of the Longworth House Office Building, Hon. K. Michael Conaway [Chairman of the Committee] presiding.

Members present: Representatives Conaway, Thompson, Goodlatte, Lucas, King, Austin Scott of Georgia, Hartzler, Allen, Rouzer, Abraham, Kelly, Comer, Marshall, Bacon, Dunn, Arrington, Peterson, David Scott of Georgia, Costa, Fudge, McGovern, Vela, Lujan Grisham, Kuster, Bustos, Plaskett, Adams, Evans, Lawson, O'Halleran, Soto, and Blunt Rochester.

Staff present: Darryl Blakey, Jackie Barber, Paul Balzano, Rachel Millard, Stephanie Addison, Liz Friedlander, Matthew MacKenzie, Troy Phillips, Nicole Scott, and Carly Reedholm.

OPENING STATEMENT OF HON. K. MICHAEL CONAWAY, A REPRESENTATIVE IN CONGRESS FROM TEXAS

The CHAIRMAN. Well, good morning. Before we call this hearing to order, I have asked Ralph Abraham to open us with a prayer. Ralph.

Mr. ABRAHAM. Let's pray. Our Father, we certainly appreciate your presence in this Committee meeting. We pray for your wisdom, your discernment, your understanding, your knowledge, everything that we lack. Go with us through this day, guide us, direct us, lead us, have us do the best thing for you. We pray these things in your name. Amen.

The CHAIRMAN. Thank you, Ralph.

This hearing of the Committee on Agriculture entitled, *Clearing the Next Crisis: Resilience, Recovery, and Resolution of Derivative Clearinghouses*, will come to order.

I thank everyone for being here this morning. Before I get to my statement, I would like to acknowledge that Commissioner Sharon Bowen has announced her intent to resign from the CFTC last week. I personally want to thank her for the great work she did chairing the Market Risk Advisory Committee, she did some eight hearings over the last couple of years, and she, as a part of her announcement, called for a full Commission, all five, and I certainly second her call for that issue. Ms. Bowen has been a consistent

voice, reminding the Commission that markets exist to serve people, and I want to thank her for her service and wish her well in whatever her next challenge is.

We would have also had a panel today with somebody from the CFTC on the panel; Chris Giancarlo is over at the Senate today, so just physically, mechanically we couldn't make that welcome. And probably the most important thing we will announce the entire day, is that today is David Scott's birthday. Happy birthday, David Scott.

Mr. DAVID SCOTT of Georgia. Well, thank you, my friend. I appreciate it. Thank you.

The CHAIRMAN. He is sweet 16 and never been kissed. All right.

Well, good morning, and thank you for being here today. Today's hearing builds on the important work done by the CEEC Subcommittee, chaired by Austin Scott, and Ranking Member David Scott. And I want to thank them for their work in examining how well our regulators responded to the financial crisis. While those hearings were focused on past performance, today's hearing examines the possibility, and again, just the possibility, for a future financial crisis and how our cleared markets may respond.

Failure of a major clearinghouse would be an unprecedented event. Such an event would mean that there would be a cataclysmic breakdown of the interlocking risk management schemes, despite their highly regulated system to prevent its collapse. While this probability is remote, and I repeat, *remote*, recent history demonstrates that the words *improbable* and *implausible* do not necessarily mean *impossible*.

To be clear, I don't know if or when another financial crisis might hit. What I do know is that markets are comprised of millions of people interacting and responding to incentives; regulated by thousands of able civil servants applying the best knowledge they can; overseen by hundreds of lawmakers trying to recognize and prioritize the tradeoffs in regulatory goals. There are many smart but fallible people involved in our markets, offering numerous opportunities for mistakes. That is why we have gathered here today to discuss what happens when the best-laid plans of men go awry.

Today's hearing is important for two reasons. First, to provide this Committee with an understanding of the work that has been done to prepare for and prevent a crisis; and second, to consider how we want regulators to respond in the unlikely, implausible event of a failure.

Recovery from a default is not an automatic process. While substantial planning has gone into preparing for a crisis, there are wider factors outside a clearinghouse's control that might impact the recovery process. Things like the availability of liquidity, the impact of regulations like the Supplemental Leverage Ratio, and even the stability of the broader economy will all impact the implementation of recovery plans.

Finally, if a clearinghouse cannot be recovered, Congress needs to identify the ultimate goal of any government intervention. Today, the Dodd-Frank Act generally assigns the FDIC the power to resolve failed, systemically important institutions, but it is largely silent on clearinghouses. We must fully consider what the resolu-

tion process might look like and understand its impact on broader financial markets before putting it to use.

We should consider as clearly as we can the expectations of our regulators and the potential consequences of the limits of their actions. Absent a plan, I fear regulators will respond to a crisis with the only tool in their arsenal, and that would be a bazooka of money.

Thank you to our witnesses for coming in today. We have a panel with deep knowledge of the derivatives industry who have spent a career wrestling with these challenging issues, and we certainly appreciate your willingness to share your views with us today.

[The prepared statement of Mr. Conaway follows:]

PREPARED STATEMENT OF HON. K. MICHAEL CONAWAY, A REPRESENTATIVE IN
CONGRESS FROM TEXAS

Good morning. Thank you for being here today. Today's hearing builds on the important work done by the CEEC Subcommittee last year, under the helm of Chairman Austin Scott and Ranking Member David Scott. I want to thank them for their work examining how well our regulators responded to the financial crisis. While those hearings were focused on past performance, today's hearing examines the possibility for a future financial crisis and how our cleared markets may respond.

Failure of a major clearinghouse would be an unprecedented event. Such an event would mean there was a cataclysmic breakdown of interlocking risk management schemes, despite our highly-regulated system to prevent its collapse. While this probability is remote, recent history demonstrates that words like "improbable" and "implausible" do not necessarily mean "impossible."

To be clear, I don't know if or when another financial crisis might hit. What I do know is that markets are comprised of millions of people interacting and responding to incentives; regulated by thousands of able civil servants applying the best knowledge they can; overseen by hundreds of lawmakers trying to recognize and prioritize the tradeoffs in regulatory goals. There are many smart but fallible people involved in our markets, offering numerous opportunities for mistakes. That is what we've gathered today to discuss—what happens when the best laid plans of men go awry.

Today's hearing is important for two reasons—first to provide this Committee with an understanding of the work that has been done to prepare for a crisis, and second to consider how we want regulators to respond in the event our planning has failed.

Recovery from a default is not an automatic process. While substantial planning has gone into preparing for a crisis, there are wider factors outside a clearinghouse's control that may impact the recovery process. Things like the availability of liquidity, the impact of regulations like the Supplemental Leverage Ratio, and even the stability of the broader economy will all impact the implementation of recovery plans.

Finally, if a clearinghouse cannot be recovered, Congress needs to identify the ultimate goal of any government intervention. Today, Dodd-Frank generally assigns the FDIC the power to resolve failed, systemically-important institutions, but it is largely silent on the clearinghouses. We must fully consider what the resolution process might look like and understand its impact on broader financial markets before putting it to use.

We should consider—as clearly as we can—the expectations of our regulators and the potential consequences of the limits on their actions. Absent a plan, I fear regulators will respond to a crisis with the only tool in their arsenal—a bazooka of money.

Thank you to our witnesses for coming in today. We have a panel with deep knowledge of the derivatives industry who have spent time wrestling with these challenging issues and we appreciate your willingness to share your views with us today.

With that, I'll turn to Mr. Peterson, for his opening remarks.

The CHAIRMAN. With that, I will turn to Mr. Peterson, for his opening remarks.

**STATEMENT OF HON. COLLIN PETERSON, A REPRESENTATIVE
IN CONGRESS FROM THE STATE OF MINNESOTA**

Mr. PETERSON. Thank you, Mr. Chairman. I am pleased to welcome today's witnesses to the Agriculture Committee. It has been a while since we have reviewed these issues, and I look forward to hearing your testimony.

Central clearing is the backbone of the futures industry, and when we wrote title VII of the Dodd-Frank Act, we anticipated that clearing could also become a central component of the swaps industry. Now, nearly 10 years after the financial crisis, that change is taking place. We can all agree that making our market safer is a good thing.

Today we will discuss current policies that are in place to manage a future crisis, and how the clearinghouses are prepared if we find ourselves in a crisis situation again.

It is important to note that the issues we will discuss today would only happen under extreme circumstances, and this is why reviewing these issues now, rather than in the midst of a financial collapse, is important.

The CHAIRMAN. I thank the gentleman.

The chair would request that other Members submit their opening statements for the record so that our witnesses may begin their testimony, and to ensure there is ample time for questions.

And I would like to welcome our witnesses today. We have Mr. Robert Steigerwald, who is the Senior Policy Advisor, Financial Markets Group, Federal Reserve Bank in Chicago. Robert, was I close on your last name?

Mr. STEIGERWALD. Very good.

The CHAIRMAN. All right. Scott Hill is the Chief Financial Officer, Intercontinental Exchange, in Atlanta. Mr. Jerrold Salzman, Of Counsel, Skadden, Arps, Slate, Meagher, and Flom, Chicago, Illinois, on behalf of CME. And please pass on our best wishes to Terry's quick recovery, otherwise he would have been in that seat. Mr. John Dabbs, the Global Head of Prime Derivatives, Credit Suisse, here in Washington, D.C. And Mr. Amias Gerety, Special Advisor to QED Investors, former Acting Assistant Secretary of Financial Institutions, U.S. Treasury Department, Washington, D.C.

With that, Robert, you are recognized for 5 minutes.

**STATEMENT OF ROBERT S. STEIGERWALD, J.D., SENIOR
POLICY ADVISOR, FINANCIAL MARKETS GROUP, ECONOMIC
RESEARCH DEPARTMENT, FEDERAL RESERVE BANK OF
CHICAGO, CHICAGO, IL**

Mr. STEIGERWALD. Chairman Conaway, Ranking Member Peterson, and Members of the Committee, I very much appreciate the opportunity to testify today concerning some important public policy issues relating to central counterparty clearing. Specifically, I will explain why I support the provision of central bank account services, and if necessary, emergency liquidity support, not solvency support, to clearinghouses.

Before I go further, it is incumbent upon me to tell you that my remarks today are solely my own, and not those of the Federal Reserve Bank of Chicago, the Board of Governors, or any other person.

I will briefly discuss the role that central banks have traditionally played, both as depositories and as liquidity providers, and make some observations regarding what I and my colleagues at the Chicago Fed have come to call time-critical liquidity. I will explain that in just a moment.

Since I believe the clearinghouses are uniquely dependent on the immediate availability of liquidity in circumstances where private-sector liquidity arrangements may prove to be inadequate, I believe that it is crucial for central banks to be prepared to provide emergency liquidity assistance in such circumstances.

Central banks have long provided accounts used to settle bank-to-bank obligations, and in this respect they play a prominent role in large value payment systems around the world. Central banks also play a critical role in the modern financial system as providers of liquidity. In particular, central banks commonly play the role known as lender of last resort. This function involves the provision of emergency liquidity assistance to solvent but illiquid institutions. These functions are not new, but the environment in which central banks provide both account services and liquidity has change profoundly in the past several decades. Modern financial systems are critically dependent on large-scale flows of intraday liquidity in payment, clearing, and settlement systems; this is the concept of time-critical liquidity that I referenced.

Time-critical liquidity reflects the transformation of credit risk to liquidity risk. This is a positive trade-off. We compress credit risk, we manage it appropriately, but because of the tight interdependence associated with transfers of collateral, settlement payments, variation margin payments, which the other speakers will also address, this conversion of credit risk to liquidity risk means that we must have appropriate institutions available to provide liquidity as needed on an immediate basis. This is, in effect, a reflection of the increasing interconnectedness of our financial system, which the Chairman made reference to in his opening remarks.

Central counterparty clearinghouses, or CCPs, are particularly vulnerable to liquidity risk in connection with the daily and sometimes intraday exchange of settlements on a mark-to-market basis. This process may be impaired in unusual, extreme market conditions, such as the failure of one or more large clearing members of the CCP. The liquidity stresses that the CCP may experience in connection with these transfers do not necessarily imply that the CCP is insolvent or is likely to become insolvent. CCPs, unlike banks, have extraordinary recovery powers to deal with such circumstances. However, private-sector liquidity arrangements on which the CCPs rely may become unreliable precisely in those circumstances where immediate provision of liquidity is necessary. As a result, I believe that central banks can provide a useful and effective backstop to the private-sector system.

If the financial resources on which the CCPs rely are also held in custody at the central bank, in central bank accounts, as I believe should be allowed, I believe that will facilitate the immediate provision of liquidity under those circumstances where it may be necessary.

With that, I will end my remarks.

[The prepared statement of Mr. Steigerwald follows:]

PREPARED STATEMENT OF ROBERT S. STEIGERWALD, J.D., SENIOR POLICY ADVISOR,
FINANCIAL MARKETS GROUP, ECONOMIC RESEARCH DEPARTMENT, FEDERAL
RESERVE BANK OF CHICAGO, CHICAGO, IL ¹

Chairman Conaway, Ranking Member Peterson, and Members of the Committee, I appreciate the opportunity to testify today concerning some important public policy issues relating to central counterparty clearing. Specifically, my testimony will explain why I support the provision of central bank account services and, if necessary, emergency liquidity support—not solvency support—to clearinghouses.

I will briefly discuss the role that central banks have traditionally played both as depositories and liquidity providers and make some observations regarding “time-critical” liquidity in the modern financial system. Since I believe that clearinghouses are uniquely dependent on the immediate availability of liquidity in situations where private-sector resources may prove to be inadequate, I believe that it is crucial for central banks to be prepared to provide emergency liquidity assistance in such circumstances.

Central Bank Account Services and Lender of Last Resort Function

Central banks have long played a critical role in the financial system as depositories and payment intermediaries.² Green and Todd (2001), for example, note that central banks historically were chartered to perform two primary functions:

One is to be an intermediary between the government and its lenders, enabling the government to obtain credit by ensuring that implicit default through inflation will occur only in genuine national emergencies. The other is to serve broad public interests as the *trustworthy and neutral apex of a hierarchy of banks that, in turn, provide the nonbank public with accounts used to settle financial, business, and personal payments by transfer of balances*. [Green & Todd (2001), p. 5 (emphasis added)]

They conclude that “[t]he role as the apex of the banking hierarchy puts the central bank in a unique and distinguished position in the payments business.” [Green & Todd (2001), p. 5 (emphasis added)] Reflecting that special position, central banks today play a prominent role in large-value payment systems—including the provision of accounts and related services necessary for those systems to function properly.

Central banks also play a critical role in the modern financial system as providers of liquidity to the banking system. In particular, central banks today commonly play the role of “lender of last resort.” This function involves the provision of emergency liquidity assistance necessary to *solvent*, but *illiquid*, institutions that might fail without immediate central bank assistance.³

The Development of “Time-Critical” Liquidity Dependence

These functions are not new—but the environment in which central banks provide both account services and emergency liquidity assistance has changed profoundly over the past several decades. As Marshall & Steigerwald (2013) note, “modern financial markets are critically dependent on large-scale flows of intraday (within 1 day) liquidity in payment, clearing, and settlement systems.” They call this phenomenon “time-critical” liquidity:

[T]he processes for settling financial contracts, and related settlement-risk-management operations, increasingly make use of *time-critical liquidity* to address the problem of counterparty credit risk. Under conditions of time-critical liquidity, a settlement payment, delivery of securities, or transfer of collateral must be made *at a particular location, in a particular currency (or securities issue), and in a precise time frame* measured not in days, but in hours or even minutes. [Marshall & Steigerwald (2013), p. 30]

¹The views expressed in this statement are solely those of the author and do not necessarily reflect the views of the Federal Reserve Bank of Chicago, the Board of Governors of the Federal Reserve System or any other person. This statement draws in significant part upon previous work with Robert T. Cox, Christian A. Johnson, and David A. Marshall. The author is solely responsible for the current form of the statement and any errors that may be present therein.

²See, e.g., Johnson & Steigerwald (2008); Millard & Saporta (2005); Green & Todd (2001); McAndrews & Roberds (1999) (examining the important role banks have historically played as payments intermediaries).

³There is an extensive literature on the lender of last resort function, which we do not attempt to summarize herein. See, e.g., Freixas, Parigi & Rochet (2003); Freixas, Giannini, Hoggarth and Soussa (2000); Oganesyan (2013).

The authors conclude that this phenomenon is the cumulative result of public and private-sector efforts to mitigate credit risk in financial markets over the past several decades, including:

- the proliferation of real-time gross settlement (RTGS) (such as Fedwire[®], which is operated by the Federal Reserve Banks);
- the implementation of delivery-versus-payment (DvP) systems for securities and analogous payment-versus-payment (PvP) systems for foreign exchange to mitigate settlement risks; and
- the increasing use of collateral to mitigate counterparty credit risk in its various forms, both in payment systems and financial market clearing arrangements, such as central counterparties. [Marshall & Steigerwald (2013), p. 31]

Central counterparty clearinghouses are particularly vulnerable to liquidity risk in connection with the daily (and sometimes intraday) process of receiving and making mark-to-market settlements (or variation margin) with clearing members on a timely basis. [Peirce (2016), p. 622] These settlements are necessary in order to mitigate credit risk and are essential to the operation of a CCP. Peirce (2016) notes, for example, that “CCPs function by making and receiving payments according to a strict timeline” and that, above all else, “[a]dherence to a strict timeline of payments is important to keep the system working.” In addition, “during a crisis, CCPs likely would face significant liquidity strains” in connection with the daily exchange of variation settlements. [Peirce (2016), p. 622] While these strains maybe severe under such conditions, there is no reason why they must lead to disaster.

Support for Liquidity, Not Solvency

The liquidity stresses that a CCP may experience in connection with the time-critical exchange of settlement payments do not necessarily imply that the CCP is insolvent or likely to become insolvent. CCPs, unlike banks, have extraordinary default management and recovery powers to manage the consequences of a member default. [Cox & Steigerwald (2017), p. 13] The solvency of a CCP is **not** automatically called into question as a result of its default management and recovery efforts.

However, the CCP’s private-sector liquidity arrangements may become unreliable as a result of severe market stress precisely when the immediate provision of immediate liquidity is essential. Accordingly, Marshall & Steigerwald (2013) conclude that “[i]f private liquidity provision may be inadequate in certain extreme conditions, it may be useful to create a framework in which central bank liquidity can act as a backstop.” [p. 32].

If the financial resources that clearinghouses depend on for default management and recovery purposes are held at the central bank, as I believe should be allowed, those resources will be immediately available when needed, without impairment as a result of the crisis. This, in turn, may facilitate the provision of emergency liquidity support by the central bank.

Conclusion

This is only a brief description of the consequences of time critical liquidity for the financial system. Nevertheless, for the reasons suggested herein, I believe that the provision of central bank account services and emergency liquidity support—**not** solvency support—to financial market infrastructures such as CCPs is warranted.

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⁴This article originally appeared as an essay in the Federal Reserve Bank of Minneapolis 2000 Annual Report issue of *The Region* (April 2001, vol. 15, no. 1, pp. 5–27), available at: <https://minneapolisfed.org/publications/the-region/thoughts-on-the-feds-role-in-the-payments-system>.

Economic Perspectives, 2Q/2013

The Role of Time-Critical Liquidity in Financial Markets

David Marshall and Robert Steigerwald

Introduction and Summary

Modern financial markets are critically dependent on large-scale flows of intraday (within 1 day) liquidity in payment, clearing, and settlement systems. As noted by the Payments Risk Committee, “On a routine day, over \$14 trillion worth of payments to and from individuals, institutions, corporations, governments and other enterprises are settled in U.S. dollars worldwide. To complete these transactions, more than \$9 trillion flows throughout the financial system.”¹

Table 1 provides a more detailed breakdown of these payment flows. As can be seen, the largest funding flows by dollar value are associated with large-value funds transfer systems and government security clearing, but there are also large flows associated with central securities depositories and retail payments systems. Flows associated with foreign exchange (FX) settlements and central counterparty clearinghouses (CCPs) are somewhat smaller in magnitude, but these flows are critical to financial stability—a fact recognized by the Financial Stability Oversight Council in July 2012, when it designated the main FX settlement engine (CLS Bank), the two major securities CCPs (Fixed Income Clearing Corporation [FICC] and National Securities Clearing Corporation [NSCC]), and the three largest derivatives CCPs (CME Group, Options Clearing Corporation [OCC], and ICE Clear Credit) as systemically important financial market utilities.

This article discusses an important feature of this intraday liquidity usage in payment, clearing, and settlement systems. Specifically, we examine how the processes for settling financial contracts, and related settlement-risk-management operations, increasingly make use of *time-critical liquidity* to address the problem of counterparty credit risk. Under conditions of time-critical liquidity, a settlement payment, delivery of securities, or transfer of collateral must be made *at a particular location, in a particular currency (or securities issue), and in a precise time frame* measured not in days, but in hours or even minutes.² Examples of time-critical liquidity requirements (which we discuss below) include the settlement process

David Marshall is a senior vice president, associate director of research, and director of the financial markets group in the Economic Research Department at the Federal Reserve Bank of Chicago. Robert Steigerwald is a senior policy advisor in the financial markets group of the Economic Research Department at the Federal Reserve Bank of Chicago. The authors would like to thank Caroline Echols, Tom Ferlazzo, Richard Heckinger, Bill Johnson, John McPartland, Ann Miner, and Jeff Stehm for helpful comments. All errors remain the responsibility of the authors.

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¹See Federal Reserve Bank of New York, Payments Risk Committee (2012, p. 9). The Payments Risk Committee is a private-sector group of senior managers from U.S. banks that is sponsored by the Federal Reserve Bank of New York. The Committee's primary goal is to foster enhancements to the safety and resiliency of financial market infrastructure, including steps to strengthen the clearing and settlement of financial transactions, and to inform the Federal Reserve Bank of New York about developments, conditions, and practices in payments, clearing, and settlement systems (see www.newyorkfed.org/prc/).

²See Heckinger, Marshall, and Steigerwald (2009). For purposes of a payment through a funds transfer system, “location” refers to an account specified by the recipient into which a payment or securities transfer must be made. Thus, a payment made in the right currency at or before the time settlement is due would not meet the requirements of time-critical liquidity if it is not placed at the disposal of the intended recipient in the account specified by the recipient.

at the Depository Trust Company (DTC), the funding time frame for CLS Bank, and the tight restrictions on the timing of required variation settlements in derivatives clearinghouses.

We use the term “time critical” to denote more than merely the existence of a temporal framework for payment obligations. All contracts calling for future performance, and all payment obligations arising from such contracts, specify *some* temporal framework within which performance of the payment obligation is due. For the purposes of this article, however, a time-critical payment has a number of specific characteristics. First, the payment must be made by a specific point in time, rather than merely by a certain date. Second, failure to make a time-critical payment within the predetermined time-certain deadline typically carries immediate consequences for the defaulting party. For example, a CCP member who fails to make a required variation margin payment by the time-certain deadline is subject to being declared in default to the CCP, with immediate suspension of membership privileges and consequent liquidation of the member’s positions. This treatment of default is markedly different from non-time-critical obligations, such as routine accounts payable, where failure to discharge a payment obligation when due merely puts the defaulting party in breach of contract.³

Table 1
Gross Daily Activity Value Versus Amount Needed for Settlement

Sector	Estimated gross value of payment transactions	Funding transactions ^a	Funding flows ^b
	(\$ billions)		
Large value transfer systems	3,953.0	2,426.1	^c 2,378.2
Foreign exchange settlements	2,067.9	11.6	23.5
Central counterparties (CCPs) ^d	5.8	7.4	12.5
Central securities depositories (CSDs) ^d	1,101.7	^c 55.8	129.5
Government securities clearing ^f	7,646.0	6,408.4	6,408.4
Retail systems	159.8	159.8	159.8
Total for participating firms	14,934.2	9,069.1	9,111.8

^a Funding may occur through a Fedwire transaction or on the books of a commercial bank.

^b Includes funding and defunding flows.

^c Excludes known double counts of funding transactions for other financial market utility sectors.

^d Information on gross value of payments settled was not collected for some CCPs and some CSDs.

^e One CSD provided net values of flows.

^f Includes settlements on the books of the clearing banks, including tri-party repo and internal Fixed Income Clearing Corporation settlements.

Source: Federal Reserve Bank of New York, Payments Risk Committee (2012, p. 17).

Third, time-critical payments have a systemic aspect not present for most other payment obligations. In particular, what makes a settlement time critical is that all the participants in a payment, clearing, or settlement system agree to meet their obligations according to protocols (including cutoff times) that are calculated to mitigate settlement risk and result in final intraday settlement. For this reason, the deadlines governing time-critical payments typically are “hard,” with little room for flexibility and with no possibility of renegotiating the settlement obligation. In one way or another—ways that differ depending upon the nature of the system involved—the participants are interdependent. Time-critical liquidity obligations reflect this interdependence among system participants who must meet strict risk-management protocols in order to benefit from the reduction of settlement risk and the certainty associated with final, intraday payment or settlement. This systemic interdependence is unlike anything that exists in simple bilateral contracts calling for future performance.

Dependence on time-critical liquidity has developed in response to the adoption over the past 30 years of innovative risk-management practices designed to manage *settlement risk*—the risk that one or more parties to a financial transaction may fail to satisfy the terms of the transaction in a timely fashion. Noteworthy innovations to address settlement risk include:

³ The remedy for such a breach of contract typically involves the payment of damages intended to compensate the nondefaulting party for loss. Consequential damages are generally disallowed.

- The proliferation of real-time gross settlement (RTGS) (such as Fedwire®, which is operated by the Federal Reserve Banks), or equivalent payment mechanisms, to achieve intraday finality of settlement;
- The implementation of delivery-versus-payment (DvP) systems for securities and analogous payment-versus-payment (PvP) systems for foreign exchange to mitigate settlement risks in those markets; and
- The increasing use of collateral to mitigate counterparty credit risk in its various forms, both in payment systems and financial market clearing arrangements, such as CCP mechanisms.

These institutional and risk-management innovations have become standard practice throughout the world. By establishing a framework within which financial market participants can more closely manage settlement and related risks arising from trading in financial markets, these practices have made an important contribution to financial stability.

However, the dependence of these institutional and risk-management practices on time-critical liquidity also increases the risk and cost of illiquidity in financial markets. Financial market participants must be able to make payments, deliver securities, or arrange for the transfer of collateral with a high degree of precision if they are to meet the settlement requirements of the systems in which they participate. Moreover, a failure of timely liquidity provision in one system can hold up settlement completion in other systems. Hence, the growing dependence on time-critical liquidity has important implications for the stability of the financial system.

Financial market participants are well aware of the increasing importance of time-critical liquidity. For example, the Payments Risk Committee highlights the growing importance of time-critical, large-value payments and concludes that

payment liquidity (also known as intraday liquidity) is critical . . . because it is at the core of a bank's capacity to make payments. The recent transformation of the global financial environment has created a heightened reliance upon such liquidity, which in a financial, operational or political crisis, is the first to be affected in the financial markets.⁴

In this article, we analyze the benefits and drawbacks of this increased reliance on time-critical liquidity to manage settlement risk. As we explain in the next section, settlement risk comprises both *credit risk* and *liquidity risk*. Time-critical liquidity is designed to mitigate credit risk, but in doing so it might inadvertently exacerbate liquidity risk. Thus, the notable success of modern payments, clearing, and settlement arrangements at reducing the credit component of settlement risk can have the unintended consequence of increasing the vulnerability of such arrangements to systemic liquidity disruptions.

The potential trade-offs between credit risk and liquidity risk in the settlement process have important consequences for public policy. They raise the question of whether certain arrangements to mitigate credit risk work, in part, by transforming one type of risk (credit risk) into another (liquidity risk). They focus renewed attention on developing processes that reduce liquidity risk without exacerbating credit risk. Examples of such processes could include further exploitation of netting opportunities (*e.g.*, through portfolio margining) or liquidity-saving mechanisms in payment systems (such as so-called hybrid RTGS systems). They motivate an inquiry into potential adverse consequences should liquidity shortages in a future financial crisis interact adversely with time-critical liquidity constraints. And they lead to an inquiry into the appropriate role of central bank liquidity provision in times of unusual liquidity stress.

In the remainder of this article, we explore these questions in detail. In the next section, we characterize more fully the problem of settlement risk. Then we provide an overview of the procedures that are typically used to manage the credit component of settlement risk and the implications of those practices for the management of liquidity. We apply these insights to the management of settlement risk in payment systems, securities and foreign exchange markets, and central clearing arrangements, respectively. Finally, we discuss some related public policy issues.

The Problem of Settlement Risk

Settlement is the process whereby all elements of a trade are completed as expected. Cash-settled financial contracts, such as certain derivatives transactions,

⁴See Federal Reserve Bank of New York, Payments Risk Committee, Cross-border Collateral Pool Task Force (2003, p. 7). There is an important and growing literature discussing the many aspects of liquidity more generally. See, for example, Brunnermeier and Pedersen (2009); Nikolaou (2009); and Garleanu and Pedersen (2007).

typically are settled by means of funds transfers, usually through the interbank payment system. Transactions involving delivery of a financial asset typically are settled through a two-part process involving both a funds transfer and a transfer of the asset itself, a process that may involve other systems and institutions, such as securities depositories, CCPs, and other clearing and settlement arrangements.

A fundamental risk of such financial contracts is that settlement—either by means of a funds transfer or the transfer of a financial asset—may not occur. In most theoretical models, such as the standard Arrow-Debreu framework used by many economists, there is no need to distinguish between trade execution and trade settlement, since these models typically assume full commitment. In reality, however, it has long been recognized that *agreeing* to a trade (the execution phase) does not ensure that settlement will occur.⁵ Hence, there is a need to adopt risk-management practices to mitigate this settlement risk.

Settlement risk comprises both credit risk and liquidity risk.⁶ According to the Bank for International Settlements' Committee on Payment and Settlement Systems (CPSS), credit risk is “the risk that a counterparty will not settle an obligation for full value, either when due or at any time thereafter” (CPSS, 2003b, p. 17); and liquidity risk is “the risk that a counterparty (or participant in a settlement system) will not settle an obligation for full value when due. Liquidity risk does not imply that a counterparty or participant is insolvent since it may be able to settle the required debit obligations at some unspecified time thereafter” (CPSS, 2003b, p. 29).

An alternative characterization of credit risk *versus* liquidity risk describes counterparty credit risk as the risk that a party involved in a transaction might not have assets of sufficient value to meet their obligations (or may be unwilling to make this value available). In contrast, liquidity risk is the risk that the party cannot access assets of the particular *form* required to settle the transaction at the time settlement is due. In most cases, the form needed is cash of a particular denomination. However, there are cases in which a particular security must be delivered to settle the transaction. In such a case, the notion of liquidity risk can be extended to include the risk that the needed security cannot be obtained.

Managing Credit Risk Associated with Financial Settlements

In this article, we argue that dependence on time-critical liquidity follows logically from the basic needs of risk management. It is a fundamental principle of modern risk management that risks should be *identified*, *quantified*, and *controlled or mitigated*.⁷ Such methods are critical if counterparties are to take on only those risks they choose to take on and appropriately manage those risks. Of course, such quantification and mitigation can never be perfect, since risk management is not an exact science. But the conditions of identifiability, quantifiability, and controllability of risk should be met within reasonable tolerances.

While this principle is intuitive, it is often violated in simple counterparty exposures. Consider, for example, a simple loan to a counterparty whose solvency is not well known to the creditor and where collateral or other measures to mitigate credit risk are not implemented. The creditor is exposed not only to the direct risk of the counterparty, but also to the indirect risk of defaults by second-order counterparties (the counterparty's counterparties), third-order counterparties, and so forth. The distribution of these higher-order risks, taken together, may be irredeemably opaque. There may be no meaningful way in which such risks can be identified, much less quantified.

If-and-Only-If Conditionality

The solution to this problem of risk management for financial transactions is to develop robust risk-management protocols that do not rely on precise identification of these higher-order risks. In practice, this is done by structuring transactions with some form of *if-and-only-if conditionality*.⁸ Specifically, once a transaction is initiated, there is a sequence of steps leading to its completion via final settlement. If-and-only-if conditionality arises because certain of these steps will be executed *if*

⁵See, for example, Nosal and Steigerwald (2010).

⁶For a comprehensive discussion of credit and associated risk associated with financial transactions, see Duffie and Singleton (2003). For the purposes of this article, we focus on credit and liquidity risks associated with settlement and rely principally upon risk definitions drawn from the payment, clearing, and settlement context.

⁷This principle is stated both explicitly and implicitly in the risk-management literature, including in a standard recently promulgated by the International Organization for Standardization (2009).

⁸Our use of the term “if-and-only-if conditionality” is consistent with the way some of the risk-management practices described in this article have been described by policymakers. See CPSS (1992, 1995) and Group of Thirty (2003).

and only if certain conditions are met. These conditions are designed to ensure that any additional counterparty credit risks associated with that step can be identified, quantified, and mitigated *to the extent consistent with the system design*. In particular, these conditions would typically move exposures from more opaque risks (difficult to quantify) toward more transparent risks that are easier to quantify and at least partially mitigate.

The specific conditions incorporated into this if-and-only-if conditionality can be one of two types (Garner, 1995, p. 197):

- *Condition precedent*—a required payment or asset transfer is required *before or at the same time* that some related performance by a counterparty is expected. An example is the requirement in many RTGS payments systems that funding be available at the time a payment is to be transferred.
- *Condition subsequent*—a required payment or asset transfer is required to maintain an existing position. An example is the daily variation margin that must be paid to maintain an open derivatives position that is centrally cleared through a CCP.

Later in the article, we give specific examples of if-and-only-if conditions that are used in payments systems, DvP and Pvp settlement systems, and CCPs.

Finality

A payment or security transfer is said to be *final* if the sender cannot unilaterally retrieve or revoke the transfer without additional legal processes. The concept of finality is critical for settlement risk management: If a payment associated with a given transaction is settled without finality, the payment can be unilaterally reversed, and the possibility of such a reversal is itself another form of settlement risk. Therefore, the types of if-and-only-if conditionality implemented to mitigate settlement risk generally require transfers to be made with finality.

Finality is a composite concept involving both legal rules—a payment or asset transfer cannot unilaterally be reversed by the sender (subject to special rules where fraud, mistake, or duress is involved); and economic consequences—a “final” payment or asset transfer may be relied upon by the recipient to support other transactions (for example, funds received may be paid out in settlement of the recipient’s other payment obligations).

As we will discuss later, payment systems that guarantee finality (preferably intraday finality) are fundamental to more-complex forms of risk management (for example, securities settlement).

Implications for Time-Critical Liquidity

There is an intimate connection between if-and-only-if conditionality for mitigating settlement risk, finality, and the use of time-critical liquidity. This connection arises because the risk-management conditions typically require delivery of liquid assets. There are examples of conditionalities that require the counterparty merely to promise performance by some future date. An example would be a Fedwire payment by a bank eligible for daylight overdraft credit. However, possession of a low-risk, highly liquid asset provides a higher degree of risk mitigation than any such promise, even by a highly creditworthy agent. As a result, we should not be surprised that the gold standard for risk management is to require counterparties to actually deliver funds and/or securities before the given transaction settles with finality.

Furthermore, risk-management practices in payments, clearing, and settlement systems that incorporate if-and-only-if conditionality generally require that this delivery of liquid assets be made on a time-critical basis. The reason is that finality has a temporal component: It is determined as of a particular time. It would be inherently contradictory to “guarantee finality” without specifying the date and time by which the finality becomes effective. Timing is critical because deferral of finality to the future expands the temporal window within which credit risk remains a problem.

The term “liquidity” is often reserved for cash and near-cash instruments. For our purposes, however, it is useful to expand our notion of liquidity to include, in addition, access to specific securities that may be needed to complete a transaction. Such securities may be needed to collateralize a position, or may be required to complete the delivery leg in a DvP settlement.

Risk management under if-and-only-if conditionality thus implies the need to closely manage time-critical liquidity, both in terms of available funding and access to particular securities. This scrutiny is particularly important where funding is dependent upon credit arrangements (as in most intermediated payment arrangements) or when access to particular securities is dependent upon market dynamics

(for example, the willingness of a seller to sell the needed security at the time it is needed). In a crisis, credit provision can contract and markets can hoard the sorts of securities needed to satisfy if-and-only-if conditions. For example, during the fall 2008 financial crisis, there were reports of shortages of Treasury securities that were the most commonly used forms of collateral. This insight has broad ramifications, because if-and-only-if conditionality only addresses credit risk. Liquidity risk (and the corresponding need to manage liquidity) remains an inherent feature of settlement in payments, clearing, and settlement systems.

Interconnectedness

The dependence of financial markets on time-critical liquidity goes beyond the individual risk-mitigation processes described here. In practice, these processes are combined to allow for highly sophisticated risk-management strategies. For example, one can start with an RTGS payment system as the foundation for immediate, intraday finality of payment. An RTGS system can be combined with central securities depository (CSD) functionality to make possible DvP securities settlement. That is, the ability to make final intraday transfers of both funds and securities is a necessary condition to the establishment of effective DvP arrangements. Similarly, a domestic RTGS system combined with a foreign RTGS system makes possible Pvp in foreign exchange settlements.

The upshot of these interdependencies is that the failure to meet time-critical liquidity constraints within one system can propagate rapidly to other systems. Thus, the dependence of multiple interconnected systems on time-critical liquidity can increase the fragility of the system as a whole.

Settlement Risk in Payments Systems

Our discussion thus far of settlement risk management and the role of time-critical liquidity has been rather abstract. Next, we provide an extended example of how the logic works in the context of payments systems.

Failure of Bankhaus Herstatt

The risk considerations associated with financial settlements were dramatically illustrated by the market disruption that followed the failure of a German bank, Bankhaus Herstatt, in June 1974. Specifically, the Herstatt incident illustrates how structures that allow participants broad latitude with respect to the timing of liquidity provision can actually exacerbate credit risk.

The facts are as follows. Bankhaus I.D. Herstatt KGaA, a small commercial bank based in Cologne, was closed by the German banking supervisory authorities at about 3:30 p.m. central European time on Wednesday, June 26, 1974,⁹ after the interbank system for making deutsche mark payments had closed and Herstatt had received irrevocable payments in deutsche marks and other currencies for settlement of foreign exchange trades. Herstatt's correspondent bank in New York, Chase Manhattan, responded to the news by withholding \$620 million in dollar payments that were to be made on behalf of Herstatt. At the time, most interbank payments were made through the Clearing House Interbank Payment System (CHIPS), which was operated as a deferred net settlement payment system. As such, interbank payments made through CHIPS were only provisional, not final, at the time instructions were processed.¹⁰ Banks exploited this lack of finality in CHIPS by reversing their U.S. dollar payments through CHIPS. The result of these actions was gridlock in the U.S. dollar payment system, triggering systemic "dislocations in the international interbank sector of the Eurocurrency market" (Herring and Litan, 1995, p. 96).

The Herstatt incident demonstrated that any system attempting to control the credit component of settlement risk requires *intraday finality of settlement* (IFS). IFS guarantees that no party can unilaterally unwind a given transaction. Without IFS or some similar finality guarantee, the risk is always present that such an unwinding could lead to an unexpected failure of settlement. In the aftermath of the Herstatt incident, central banks recognized that IFS could not be achieved with the deferred net settlement payment systems that existed at that time. Given the available technology, the only practical method for achieving IFS was to implement an RTGS system. In a gross settlement system, transfers are settled individually without netting debits against credits. In a real-time settlement system, final settlement occurs continuously rather than periodically at prespecified times, provided that a

⁹See Koleva (2011).

¹⁰For example, according to Bech and Hobijn (2007, p. 4), "until 1981, final settlement occurred on the morning of the next business day through the transfer of balances across the books of the Federal Reserve." See also Federal Reserve Bank of New York, Payments Risk Committee, Intraday Liquidity Management Task Force (2000).

sending bank has sufficient covering balances or credit.¹¹ As a result, final settlement in an RTGS system is both immediate and continuous.

If-and-Only-If Conditionality in RTGS Payment Systems

Simply adopting an RTGS system does not completely fix the problem of providing IFS. While an RTGS system does ensure finality, many such systems do so by having the RTGS system take on credit risk. This credit risk must then be controlled by implementing risk-management practices incorporating if-and-only-if conditionality.

Let us consider how this is done. A payment is settled with finality in a simple RTGS system if and only if sufficient funds are in the payer's account or sufficient overdraft credit is available. Without such conditions, the payment system might guarantee finality to a payment that the payer cannot cover, exposing the system to a degree of payer credit risk that may be extremely difficult to quantify. (That is, it may be difficult to assign a probability to the event that the payer cannot discharge its obligations.) Under the RTGS conditions, this risk can be at least partially controlled by specifying overdraft credit limits. This if-and-only-if conditionality for an RTGS system could be expressed as follows:

Conditionality 1: Payment will be made (funds will be transferred) with finality if and only if the sender has adequate funds on account or immediately available credit in the amount needed to complete the payment transfer.

Conditionality 1 implies a dependence on time-critical liquidity, because any payments beyond those financed by immediately available credit will only be completed if the requisite liquidity is on deposit on or before the time of the transaction. Note that conditionality 1 would not generally result in complete elimination of risk, or even in perfect quantification of risk. Nevertheless, the conditionality that we see so frequently in payment and settlement systems goes a long way to reducing the uncertainty associated with these risks. For example, the risk associated with uncollateralized daylight overdraft credit in the Fedwire RTGS system is mitigated by the supervisory process, since typically such credit is only provided to regulated institutions known to be creditworthy within the tolerances of the overdraft credit limits.

There are other ways of implementing RTGS. Some payment systems that allow for intraday extensions of credit require all such credit to be fully collateralized. The if-and-only-if conditionality for real-time gross settlement payments incorporating collateralized credit would modify conditionality 1 as follows:

Conditionality 2: Payment will be made (funds will be transferred) with finality if and only if conditionality 1 is satisfied and the amount of collateral necessary to fully collateralize the required credit has been posted at the time the payment is to be made.

This arrangement contributes to a time-critical liquidity environment because the payment will not be made if the collateral requirement has not been satisfied. As mentioned earlier, we regard securities used as collateral as a form of liquidity, so a requirement that collateral be positioned in a particular location before a payment is executed represents a time-critical liquidity constraint. This is an example of a *condition precedent*, as discussed previously.

The introduction of collateral presents additional systemic considerations. Collateral is generally thought of as a means of mitigating credit risk. But the need to move collateral dynamically, according to precise rules, makes collateral a liquidity phenomenon as well. In particular, the types of securities that are generally eligible for use as collateral are traded in markets like other securities, and because trading in those securities may be liquid or illiquid depending upon the circumstances, the collateralization of financial transactions introduces another dimension of liquidity management into the system. (*Box 1* provides a further discussion of how time-critical liquidity is used in Fedwire and other RTGS payments systems.)

¹¹See, for example, CPSS (1997, 2005); Mills and Nesmith (2008); and Bech and Hobijn (2007).

Box 1**Time-Critical Liquidity in Fedwire and Other RTGS Payments Systems**

The Fedwire Funds Service, which is owned and operated by the Federal Reserve System, is a classic RTGS system, generally used to make large-value, time-critical, U.S. dollar payments in central bank money.¹ Fedwire payment instructions are processed immediately upon receipt if and only if the account holder issuing the instructions has “sufficient funds, either in the form of account balances held at the Federal Reserve or overdraft capacity” (CPSS, 2003a, p. 443). Unless that condition is satisfied, the payment instruction will be rejected. In accordance with applicable law, a Fedwire payment “is final and irrevocable when the amount of the payment . . . is credited to the receiving participant’s account or when notice is sent to the receiving participant, whichever is earlier” (Board of Governors of the Federal Reserve System, 2009, p. 7). The Federal Reserve also provides intraday credit, in the form of “daylight overdrafts,” to most Fedwire participants. The extension of central bank credit facilitates the smooth and efficient operation of the funds transfer service, but also “converts the liquidity risk otherwise borne by participating institutions to credit risk borne by the Reserve Banks” (Board of Governors of the Federal Reserve System, 2009, pp. 15–16). Any daylight overdrafts must be repaid by the end of the Fedwire operating day, in accordance with the Federal Reserve’s payment system risk policy.

The RTGS design has been adopted in many other jurisdictions. A recent World Bank survey documented that 112 systems also employ the individual, payment-by-payment processing logic of the Fedwire system (World Bank, Payment Systems Development Group, 2008). According to the CPSS (2005), this prevalence of RTGS payment structures is due in part to an increasing demand for time-critical payments linked to foreign exchange settlement systems, securities settlement systems, and other financial market utilities. As the CPSS (2005, p. 2) states, “More linkages imply short time frames to make time-critical payments from one system to another, hence the need to achieve finality within that time frame.”

¹For more details, see www.federalreserve.gov/paymentsystems/fedfunds_about.htm; also, Board of Governors of the Federal Reserve System (2009).

Settlement Risk in Securities and Foreign Exchange Markets

The introduction of RTGS systems and improved net settlement arrangements made it possible to make large-value payments with greater assurance of intraday finality, but it did not by itself eliminate Herstatt risk—the principal risk that arises from unsynchronized transfers of financial assets.¹² As Hills and Rule (1999, p. 101) observe: “Where financial transactions involve an exchange of financial assets, any party to the transaction can be exposed to principal risk if the two legs do not settle at the same time.” To eliminate that risk, some means must exist to synchronize the settlements—a process that has become known as DvP (which stands for *delivery-versus-payment*) for securities settlements and PvP (which stands for *payment-versus-payment*) for foreign currency settlements.

In the United States, securities settlement typically occurs 1 or more days after trade execution. For example, equities settle on the third day after the trade date. On the date when settlement is scheduled to occur, the seller or its agent must deliver a security to the buyer, and the buyer must deliver payment to the seller. If these two operations are not closely coordinated, one or both parties will incur settlement risk. For example, if the seller delivers the security before receiving funds from the buyer, the seller could lose the full principal value of the transaction if the buyer were to default after delivery of the security was completed.

To mitigate that risk, central securities depositories (CSDs) typically settle securities using *delivery-versus-payment* or DvP. While the details of this process can be somewhat intricate, the key point is that delivery of securities to the purchaser and payment of funds to the seller occur if and only if the CSD is satisfied that each party has met its obligations. Once the CSD is satisfied that payment has been re-

¹²CPSS (1992) defines principal risk as “the risk of loss of the full value of securities or funds that [a nondefaulting party] has transferred to the defaulting counterparty” (p. 13). See also CPSS (1995).

ceived and that the securities are available for transfer, title to the securities passes to the buyer on the books of the CSD¹³ and cash is released to the seller.

The if-and-only-if conditionality characterizing a DvP system can be expressed as follows:

Conditionality 3: A securities transfer will take place if and only if the buyer has immediately available funds to pay for the delivery of securities and the seller has immediately available securities to be delivered to the buyer, and both the funds transfer and delivery of securities can take place with finality.

Conditionality 3 implies a dependence on time-critical liquidity because the buyer must have the full amount of liquid funds available within the time frame mandated by the DvP settlement schedule. Similarly, the seller must make the securities available within the relevant time frame. If such funds are not made available by the relevant deadline, the buyer is in default and the transaction will not go through. (Box 2 provides more details about the use of time-critical liquidity in DvP securities settlement systems.)

Box 2

Time-critical liquidity in DvP securities settlement

The most liquidity-intensive implementation of DvP is a so-called Model 1 system, in which both securities and funds settle on a gross basis, trade by trade, with funds transfer and securities transfer occurring simultaneously (CPSS, 1992). As noted in Payments Risk Committee (2003, pp. 21–22), “Participation in such systems requires participants to maintain substantial money balances during the business day.” Examples of Model 1 DvP systems include the Federal Reserve’s system for settling transfers of U.S. government and agency securities (the Fedwire Securities Transfer System) and the TARGET2-Securities service currently under development by the European Central Bank (ECB).

An alternative, less liquidity-intensive implementation of DvP is the so-called Model 2 system, in which securities settle on a gross basis throughout the day, but funds are settled on a net basis at the end of the processing cycle. An example of a Model 2 system is the Depository Trust Company (DTC), which is the primary securities settlement system for U.S. corporate equities and fixed-income securities.

The netting feature of Model 2 systems makes them somewhat less reliant on time-critical intraday liquidity provision than Model 1 systems. Even so, Model 2 systems typically rely on if-and-only-if conditionality to appropriately control settlement risk. This is clear in the following description of the DTC’s settlement system from the International Monetary Fund’s financial sector assessment report for the United States:

During the day, participants [in DTC] receive incoming securities *to the extent their payment settlement account has sufficient net payment credits or sufficient net payment debit capacity and subject to DTC’s net debit cap and collateral controls*. (International Monetary Fund, Financial Sector Assessment Program, 2010, pp. 12–13, italics added).

Foreign currency settlements use a payment *versus* payment, or Pvp, process. Like DvP, the Pvp process requires both legs of a transaction to be settled either simultaneously or with equivalent assurances that one leg will be settled if and only if the other leg is settled with finality. The conditionality for such a Pvp arrangement can be expressed as follows:

Conditionality 4: Payment in one currency will take place if-and-only-if immediate payment in the other currency (or possibly currencies) can take place with finality.

The key institution implementing Pvp in foreign exchange markets is CLS Bank, a special-purpose institution designed to handle the settlement of foreign currency transactions. CLS Bank began operations in September 2002 and currently provides services for 17 actively traded currencies (CPSS, 2003a). (Box 3 discusses how time-

¹³ Our description of this process is, of course, highly simplified. In practice, further interfaces exist between CSDs and registrars, transfer agents, custodial institutions, and the like.

critical liquidity is used in CLS Bank's PvP settlement system.) In addition, the large-value payment system in Hong Kong (known as the Clearing House Automated Transfer System, or CHATS) has been linked to other payment systems to facilitate settlements on a PvP basis between the Hong Kong dollar and the U.S. dollar, euro, renminbi, and ringgit (CPSS, 2003a, and Hong Kong Monetary Authority, 2013).

Box 3

Time-critical liquidity in DvP securities settlement

The PvP system for foreign currency settlement operated by CLS Bank depends on precise coordination of foreign currency settlements to eliminate settlement risk. Specifically, each CLS member has an account with CLS Bank that is divided into subaccounts, one for each currency being traded. Settlement instructions must be submitted by 12 midnight central European time (CET).¹ Settlement starts at 7:00 a.m. CET of the settlement date (continuing throughout the settlement period until 9:00 a.m. CET) by debiting the subaccounts of currencies being sold and simultaneously crediting accounts of currencies being bought.

Settlement occurs when CLS Bank simultaneously debits and credits the accounts of two settlement members in accordance with eligible instructions that were submitted, and is final, irrevocable, and binding upon (1) the submitting members of such instructions; (2) the settlement members through whose accounts such instructions are settled; and (3) CLS Bank. However, the settlement for a matched pair of instructions may only occur if the settlement of such instruction would not cause the settlement member's account to fail any of three risk management tests—positive adjusted account balance, short position limit (per currency), and aggregate short position limit. To ensure that there are sufficient balances in the settlement member accounts to meet these risk tests, members must provide funding in the needed currencies. This funding must be provided according to a tight time schedule. In this way, CLS Bank relies on time-critical liquidity provision. As described in CPSS (2003a, p. 462):

Members must submit payments to CLS Bank to provide funds in the correct currencies to cover projected net debit positions. They can do so by making a single payment for the full amount at 8 a.m. CET or a series of payments in hourly installments. CLS Bank makes payouts throughout the settlement day to members in currencies in which they have a net credit position, subject to the constraint that the sum of all currency balances (positive and negative) in a member's account, converted into U.S. dollars, is not negative. . . . In normal circumstances, settlement members will have zero balances in their CLS Bank accounts at the end of each day, and CLS Bank will have zero balances in its central bank accounts at the end of each day.²

As with DvP, policymakers and industry participants clearly recognize the liquidity implications of CLS Bank's system for PvP settlement of foreign currency transactions. As the Payments Risk Committee (2003, p. 26) has noted: "The key liquidity issue the market faces is the requirement to make large timed payments, in non-domestic currencies, during a small time window and in some cases outside normal domestic banking hours."

¹Instructions can also be submitted for same-day settlement between midnight and 6:30 a.m. before the revised pay-in schedule is issued.

²Actually, payouts are made only during the settlement and funding period from 7:00 a.m. to 12:00 p.m. CET.

Since both legs of a DvP or PvP transaction must be made with finality, it follows that the associated payments must also be made with finality. More generally, these types of FX or securities settlement systems depend critically on a payments infrastructure that can reliably transmit funds subject to tight deadlines, which, in prac-

tice, means an RTGS system. For example, this is why neither DTC nor CLS accepts payments through CHIPS, which is not an RTGS system.¹⁴

Finally, it should be noted that settlement systems incorporating DvP or PvP may allow for a form of settlement failure when the if-and-only-if conditionality is not met. To give an example, if the seller of a security fails to deliver the security into a DvP settlement system, the buyer simply retains funds equal to the purchase price of the security. This principal is not at risk, since it will be paid if and only if the security is available for delivery. The only risk is that the security price may have changed before the transaction is eventually completed or a substitute transaction is undertaken to replace the failed transaction.

Settlement Risk in CCPs

Central clearing via CCPs is a standard feature of exchange-traded securities and derivatives markets and is increasingly used to settle and guarantee contracts that are traded over the counter (OTC). For both securities and derivatives contracts, the CCP mitigates credit risk by becoming the legal buyer to every seller and the legal seller to every buyer, a process known as *novation*. Thus, the need to manage counterparty credit risk associated with bilateral trades is replaced by the CCP's need to manage the creditworthiness of its clearing members. Of course, all participants in the market now depend on the CCP's own creditworthiness.

CCPs typically mitigate the credit risk they incur under novation by requiring all of their counterparties to post initial margin (or performance bond). That is, CCP members and their customers can open new positions only under the condition that the necessary margin is posted to the CCP within a prespecified time. Such arrangements illustrate a type of if-and-only-if conditionality that incorporates a condition subsequent (as defined earlier). That is, the condition becomes binding only *after* the trade to which it applies has been initiated. The CCP retains the power to terminate the open position if the trader fails to post the required margin or bond at the future time specified.

As a (simplified) example, we can look at the case of a trader taking a long position on a futures contract traded on an organized exchange. An if-and-only-if conditionality relevant to this trade may be expressed as follows:

*Conditionality 5: The clearinghouse will novate the trade (that is, agree to act as the substituted legal counterparty to the trade) if and only if the clearing member posts initial margin within the time frame specified by the CCP's rules.*¹⁵

The initial margin requirement induces a need for time-critical liquidity, because failure to post margin by the time it is due would constitute a default to the clearinghouse. Notice how conditionality 5 converts the CCP's exposure to an opaque set of risks (risk that the trader might default, or one of the trader's higher-order counterparties might default) into a more transparent set of risks associated with the clearing member's solvency and ability to post acceptable initial margin. Monitoring the clearing members rather than monitoring the entire body of traders is advantageous, because clearinghouses intensively vet potential members and impose financial, credit, and other standards for membership. In addition, clearing members' financial resources (including capital and liquidity), activities, and creditworthiness are audited by the CCP on an ongoing basis, with the clearinghouse often empowered to impose restrictions on member activities if warranted.

In practice, clearinghouses typically impose multiple mechanisms to control financial risks. The cumulative effect of this multiplicity can create a chain of if-and-only-if conditionalities. Often, this chain is the key factor in generating time-critical liquidity constraints. To illustrate, let us return to the futures contract example. Posting initial margin in and of itself would eliminate risk to the CCP only if the margin requirement were sufficiently high to cover (with high probability) the cumulative exposure of the CCP to clearing member default risk over the entire life of the contract—from the trade date to the delivery date. To economize on performance-bond

¹⁴Special considerations apply where CLS Bank is not a direct member of the payment system for making final payments in a currency settled through CLS Bank on a PvP basis. For example, CLS Bank is not a member of the Canadian Payment Association and, therefore, is not a direct participant in the Large Value Transfer System (LVTS) for Canadian dollar payments. Furthermore, LVTS has aspects of both an RTGS system and a so-called continuous net settlement system. As a consequence, the Bank of Canada, which is a direct participant in LVTS, provides CLS Bank with an account and processes payments through LVTS on CLS Bank's behalf. (See Bank of Canada, www.bankofcanada.ca/wp-content/uploads/2012/02/fsr-1202-miller.pdf.) All Canadian dollar payments made or received by CLS Bank are final when posted to its account by the Bank of Canada.

¹⁵This stylized example simplifies the actual conditions. In reality, additional conditions would typically be imposed, such as that the trade is within the applicable position limits, that the clearing member has sufficient capital, and so on.

collateral, the CCP typically marks participants' positions to market on a daily basis,¹⁶ and requires participants to settle the day's accumulated gains and losses via exchange of variation margin.¹⁷ Thus, the CCP compounds conditionality 5 with another if-and-only-if conditionality, as follows:

Conditionality 6: The clearinghouse will novate the trade if and only if conditionality 5 holds and the clearing member agrees to post daily variation margin, incorporating marking to market, as demanded by the CCP within the precise time frame specified.

This compounded if-and-only-if conditionality dramatically reduces the needed initial margin. By introducing payment of daily variation margin as a condition subsequent, the initial margin need only be sufficient to cover a possible clearing member default over a single day forward. Clearly, conditionality 6 induces a requirement for additional time-critical liquidity, since a position at the clearinghouse will be kept open only if daily variation margin is paid promptly, according to the deadlines specified by the clearinghouse.

This requirement of timely variation margin is an integral component of the CCP's risk-management structure. That means that the receipt of variation margin when due is compulsory (not simply desirable or beneficial). The reason is that initial margin requirements are set in relation to expected receipt of variation margin within a precise time frame, day in and day out, as variation margin falls due. Therefore, the CCP's default rules mandate consequences for a failure to comply with variation margin requirements when due (that is, forfeiture of initial margin and recourse to other CCP financial safeguards).

Moreover, variation margin payments must be made with finality. In particular, if a clearing member were to default, the CCP must have certainty that any margin payments previously made by the defaulting entity can be used to satisfy any liquidity shortfalls resulting from the default. For this reason, variation margin payments must be made using a system that supports intraday or even real-time finality. Typically, this would require use of an RTGS payments system.¹⁸ (Box 4 gives a further discussion of time-critical liquidity requirements in two important derivative CCPs, the Chicago Mercantile Exchange and the Options Clearing Corporation.)

Box 4

Time-critical liquidity in derivatives CCPs

Two major derivatives CCPs in the United States are the CME Clearing House (CME Clearing) and the Options Clearing Corporation (OCC). CME Clearing is an unincorporated division of the Chicago Mercantile Exchange Inc. that provides central counterparty clearing and settlement services for exchange-traded futures contracts, as well as certain options and OTC derivatives contracts. The OCC is a clearinghouse for exchange-traded equity options as well as certain futures contracts. It currently provides central counterparty clearing and settlement services to nine options exchanges and five futures markets.¹

¹⁶In this stylized example, variation margin is posted daily. In fact, many CCPs require variation margin to be posted two or even three times each day.

¹⁷We follow common practice in using the term "variation margin" to denote the exchange of funds for mark-to-market settlements. However, these daily settlements serve a role rather different from that served by initial margin (performance bond). In particular, the latter constitutes collateral whose function is to mitigate risk, while the former constitutes payment of market gains and losses.

¹⁸In the *Principles for Financial Market Infrastructures*, released in April 2012, the Bank for International Settlements' Committee on Payment and Settlement Systems and the Technical Committee of the International Organization of Securities Commissions (CPSS-IOSCO) do not rule out net settlement systems, but note that any system relying on batch settlement "may expose participants to credit and liquidity risks for the period during which settlement is deferred" (CPSS-IOSCO, 2012, p. 66).

Box 4—Continued

CME Clearing marks open contracts to market twice daily and settles payment obligations once in the morning and once in the afternoon of each business day. The OCC normally marks open contracts to market once daily and settles payment obligations incurred in the morning of each business day. (They have the authority to conduct additional intraday marking-to-market if warranted.) For both of these CCPs, settlement occurs through designated settlement banks that act as settlement intermediaries between the CCP and its clearing members. Each CCP and its clearing members grant settlement banks the authority to credit or debit their respective accounts for daily market activity based on clearing instructions sent by the CCP.

Both CCPs rely on time-critical payments that must be completed according to tight deadlines. Specifically, CME Clearing sends settlement information for CME clearing members to the settlement banks before 7:30 a.m. CT and again at approximately 12:30 p.m. CT. Clearing members must complete the settlement amounts (or have their settlement bank irrevocably commit to making the required payment on the clearing member's behalf) before the 7:30 a.m. deadline for the morning settlement cycle and within about 1 hour from receiving settlement information for the afternoon cycle. For the OCC, settlement information for each clearing member is sent to the settlement banks before 9:00 a.m. CT. Payment of the settlement amounts must be made (or irrevocable commitment from the clearing member's settlement bank must be obtained) before the 9:00 a.m. deadline. Failure to meet these deadlines constitutes default under the OCC's rules. The OCC also commits to initiate payments to its clearing members by 10:00 a.m. CT.

¹Currently, these exchanges and markets include: BATS; Boston Options Exchange; C2 Options Exchange Inc.; Chicago Board Options Exchange Inc.; International Securities Exchange LLC; NASDAQ OMX PHLX; NASDAQ Options Market; NYSE Amex Options; NYSE Arca Options; CBOE Futures Exchange LLC; ELX Futures LP; NASDAQ OMX Futures Exchange; NYSE Liffe U.S.; and OneChicago Exchange.

Public Policy Implications

We have argued that the imperative to mitigate credit risk associated with financial market settlements leads logically to increased use of time-critical liquidity. The benefits of credit risk mitigation are sufficiently great that we are likely to see continued movement in this direction. Recent developments pointing toward increased use of time-critical liquidity include the following:

- The commitment of the Group of Twenty (G20) leaders in October 2009 that all standardized OTC derivatives be centrally cleared clearly goes in this direction, as does the mandate in title VII of the Dodd-Frank Act for increased use of centralized clearing and the expanded development of CCPs in emerging markets (G20, 2009; Financial Stability Board, 2010).
- Title VII of the Dodd-Frank Act mandates increased use of collateral for swaps not centrally cleared. As we have discussed, collateral requirements typically carry with them time-critical deadlines for delivery of collateral. In addition, proposed regulations to implement this provision of Dodd-Frank would forbid or attenuate the practice of rehypothecation, whereby the recipient of collateral can sell or otherwise use the collateral as if it were the recipient's property. Such restrictions could, in effect, decrease the supply of acceptable collateral precisely when requirements for collateral are increasing.
- Finally, recent proposed revisions to the international standards for financial market infrastructures include a proposal to increase financial resources dedicated to mitigating counterparty credit risk. In particular, the international standards in effect prior to April 2012 recommend financial resources sufficient "to withstand, at a minimum, a default by the participant to which it has the largest exposure in extreme but plausible market conditions."¹⁹ These standards were replaced by the Bank for International Settlements' Committee on Payment and Settlement Systems and the Technical Committee of the International Organization of Securities Commissions (CPSS-IOSCO), which recommend strengthening these standards to enable institutions "involved in activities with a more-complex risk profile" or "systemically important in multiple

¹⁹See CPSS-IOSCO (2004, p. 23). Similar wording is found in CPSS (2001) and CPSS-IOSCO (2001).

jurisdictions” to withstand the default of the two participants generating the largest credit exposure (CPSS–IOSCO, 2012, p. 37).

All of these efforts to mitigate credit risk have clear value. However, the trend toward increased dependence on time-critical liquidity raises an important question, in our view: To what extent does this settlement risk mitigation merely *transform* credit risk into liquidity risk? In other words, once the more straightforward steps to reduce credit risk have been taken (for example, through netting), might further actions to mitigate credit risk have the unintended consequence of increasing liquidity risk?

The main concern with this increased dependence on time-critical liquidity, from a public policy standpoint, is that it may exacerbate the effect of periodic liquidity crises. More specifically, as payment, clearing, and settlement (PCS) systems create increased demand for time-critical liquidity, participant institutions need to take steps to ensure the flow of funding needed to meet these time-critical liquidity constraints. These efforts may drive increasingly tight and interdependent payment flows as system participants attempt to meet time-critical liquidity demands across PCS systems. This process can make the PCS infrastructure more sensitive to systemic perturbations during a crisis episode.

An alternative way to think about this increased sensitivity to systemic perturbations is in terms of demand and supply dynamics. The *demand* for time-critical liquidity is unlikely to decrease during such a crisis.²⁰ Indeed, the need for time-critical liquidity may tend to increase during a crisis, as collateral haircuts expand and margin requirements adjust upward in light of increased market volatility and declining asset valuations. But the *sources* of time-critical liquidity may well attenuate in a crisis environment, as pervasive uncertainty induces institutions and individuals to hoard liquid assets.

Let us consider in detail three examples that illustrate how time-critical liquidity requirements can interact adversely with the diminished willingness of intermediaries to provide liquidity during a crisis.

1987 Market Break

On Monday, October 19, 1987 (Black Monday), stock markets around the world crashed, shedding a huge value in a very short time.²¹ As a result of the market price declines and increased volatility on Black Monday, intraday and end-of-day margin requirements at derivatives clearinghouses rose to record levels. For example, clearing members of the CME faced margin calls (reflecting both mark-to-market variations and increased initial margin requirements) around ten times the previous average margins (Carlson, 2006). At the same time, banks became less willing to advance credit to clearing members. Bernanke (1990) and Carlson (2006) argue that aggregate liquidity provision could have been insufficient without Federal Reserve action. As Bernanke (1990, p. 148) states, “The Fed ‘persuaded’ the banks, particularly the big New York banks, to lend freely, promising whatever support was necessary.”

Just as serious was the problem of *gridlock* in the flow of mark-to-market variation settlements and initial margin requirements. This disruption was manifested in various ways. Payments on behalf of clearing members that had received margin calls from a clearinghouse were significantly delayed.²² In addition, clearing members that were expecting margin payments from a clearinghouse found it necessary to meet the payment expectations of significant customers before receiving payment from the clearinghouse. Notably, two major clearing members, Kidder Peabody and

²⁰ As a practical matter, operators of payment, clearing, and settlement systems have little discretion to forbear on time deadlines for liquidity provision, because forbearance fundamentally undermines the if-and-only-if conditionalities that underlie their risk-management methodologies.

²¹ For more details of this event, see [http://en.wikipedia.org/wiki/Black_Monday_\(1987\)](http://en.wikipedia.org/wiki/Black_Monday_(1987)).

²² See U.S. General Accounting Office (1990, p. 41), which summarizes the evidence of persistent delays in the completion of settlement payments:

According to the SEC February 1988 Report, between October 19 and October 30, 1987, clearing members made late payments to stock clearing organizations approximately 60 times. . . . On October 19, 20, and 21, CME received late payments from several of its members. According to CME, clearing banks were late in confirming member payment for 26 of CME’s 90 clearing members. Thirteen of those payment confirmations were between ½ hour and an hour late on October 20. These late payment confirmations violated clearing organization rules and increased clearing organization risk. CFTC officials said that although some payment confirmations from clearing banks to the CME House Division were late, by the time of the opening of the S&P 600 contract for trading, all payment confirmations were received by CME.

Goldman Sachs, advanced funds for customer margin calls only to find themselves short by over \$1.5 billion when payments due to them were delayed.²³

The situation was exacerbated by an operational failure that shut down the Fedwire system for 2½ hours on the morning of October 20, 1987. This service interruption occurred just when large funds transfers needed to be made to complete margin settlements on Chicago's futures and options clearinghouses.

Sentinel

A second example of how markets that depend on time-critical liquidity can be disrupted during a financial crisis is the case of Sentinel Management Group Inc. Sentinel was a registered futures commission merchant (FCM) that specialized in investing funds of futures market participants (including some clearing members of the CME) in the money markets. In effect, it functioned analogously to a money market mutual fund for other FCMs. Sentinel had experienced heavy customer demand for redemptions during the onset of market volatility in mid-August 2007, causing a “run” on the firm and impairing its ability to meet its customer obligations. As a result, Sentinel announced on Monday, August 13, 2007, that it would not allow further redemptions from at least one of the portfolios it managed. Four days later, Sentinel filed for bankruptcy (see Lamson and Allen, 2011). The effect of these actions was to impede disbursement of customer funds to a number of CCP clearing members that were relying on these funds to meet their obligations to the clearinghouse. In a court appearance involving Sentinel on August 20, counsel for the U.S. Commodity Futures Trading Commission (CFTC) argued that “eleven FCMs will fail if the money is not distributed . . . and there will be reverberations throughout the economy” (Lamson and Allen, 2011, pp. 7–8). Presumably, the CFTC’s concern was that these FCMs may have had payments owing to the clearinghouses and had no source of readily available funds other than their Sentinel investments. As it turned out, the bankruptcy court did permit sufficient disbursements to avoid any FCM defaults.

Tri-Party Repo Market

A third example of how sources of time-critical liquidity can attenuate during a crisis is the potential instability of the tri-party repurchase (or repo) market under certain conditions (Gorton, 2009). The tri-party repo market is a short-term credit market that is used as an important source of time-critical liquidity in payments, clearing, and settlement mechanisms. In this market, users of short-term credit borrow from providers of short-term credit (typically money market mutual funds) by selling securities to the lender with a simultaneous agreement to repurchase the securities on a specified future date at a prespecified price. The “third party” is a clearing bank that facilitates funds transfer and acts as collateral custodian.

Under the operating procedures that prevailed during the financial crisis of 2007–09, the clearing banks at the heart of the tri-party repo market would each day provide large amounts of intraday credit, in effect providing bridge financing between the time when funds are returned to the lenders (typically between 8:00 and 8:30 a.m. eastern standard time, or EST) and when new loans are executed (typically between 3:00 and 6:00 p.m. EST) (see Copeland, *et al.*, 2011). This practice could lead to greater instability during a crisis. As explained in Federal Reserve Bank of New York (2010, p. 13):

The daily hand-off of credit extensions between overnight cash lenders and clearing banks creates an incentive for each to reduce its exposure quickly by pulling away from a potentially troubled dealer before the other one does. Indeed, as dealers came under severe stress, clearing banks reconsidered their longstanding practice of routinely extending intraday credit, as they recognized the potential risk it posed to them.

During the recent financial crisis, there was a risk that, recognizing this inherent vulnerability of the tri-party repo market, lenders would withdraw liquidity, with damaging consequences both for the market as a whole and for weakened market participants that were critically dependent upon funding ordinarily available through short-term funding markets.

²³ Bernanke (1990); see also, Brimmer (1989). There has been some confusion in the literature regarding the liquidity problems Goldman Sachs and Kidder Peabody faced in connection with this incident. See Tamarkin (1993).

Discussion

All of these examples illustrate how dependence on time-critical liquidity can exacerbate financial market turmoil during a financial crisis. This is a problem that clearly needs to be addressed, but the solution is not obvious.

One way of addressing this problem would be to reduce the use of time-critical liquidity. But, as we have stressed in this article, time-critical liquidity is a key component of mechanisms to reduce settlement risk in financial transactions. In practice, efforts to reduce use of time-critical liquidity would weaken financial markets' commitment to ensuring same-day settlement, a goal that has been enshrined in 39 years of post-Herstatt practice.

Furthermore, the goal of guaranteeing same-day (or even intraday) settlement is explicitly incorporated in the current international standards, the *Principles for Financial Market Infrastructure* (PFMI), adopted in April 2012 under the auspices of the CPSS-IOSCO.²⁴ Specifically, a major focus of the PFMI is the problem of liquidity risk, and in particular the need to carefully manage intraday liquidity to achieve prompt settlement of financial transactions. For example, principle 7 of the PFMI states explicitly that

an FMI should maintain sufficient liquid resources in all relevant currencies to effect *same-day* and, where appropriate, *intraday* . . . settlement of payment obligations with a high degree of confidence under a wide range of potential stress scenarios . . . in extreme but plausible market conditions. (CPSS-IOSCO, 2012, p. 57, italics added)

Recent developments in FMI design and academic thinking about the liquidity demands associated with settlements in FMIs might be interpreted as reflecting a reduced commitment to same-day assured settlement under certain conditions, such as the default of one or more FMI participants (see, for example, Hull, 2012). These developments are worth following as the PFMI are implemented in the coming months and years.

A consequence of PFMI principle 7 is that the liquidity risks undertaken to mitigate credit risk should be well contained by mandating robust minimum liquidity resources for payments, clearing, and settlement institutions. These resources would typically take the form of cash on hand, dedicated same-day liquidity facilities provided by a consortium of banks, and arrangements in advance to facilitate repurchase agreements. Such regulatory mandates are clearly warranted. An implication of the arguments in this article is that robust liquidity risk management is of crucial importance to modern PCS systems, and this importance is likely to increase over time.

Ensuring that liquidity resources are adequate to withstand a crisis requires constant vigilance. Financial crises are times when market participants tend to hoard liquidity. For example, in the midst of a crisis, a party that had committed to provide time-critical liquidity may be incapable or unwilling to fulfill on that contractual obligation. In addition, same-day liquidity facilities typically must be renewed every 364 days. If the renewal date occurs during a financial crisis, it may be difficult to renew the facility to obtain the desired capacity. Furthermore, for some financial market utilities (such as large, global swaps CCPs), the only institutions with sufficient financial capacity to participate in these liquidity facilities may be the utilities' own members. This state of affairs would raise the uncomfortable problem of *wrong-way risk*, wherein part of the resources used to protect a utility against the default of one of its members is the capital of that very member.

In addition, repo markets could become less reliable sources of liquidity during a crisis if money market mutual funds and other providers of liquidity to the repo markets move their resources into Treasury securities and other ultra-safe vehicles. Even cash can be a less reliable source of liquidity in a crisis if the cash is in the form of commercial bank deposits, since commercial banks themselves are more likely to fail in a crisis situation. Finally, there may be a level of liquidity risk beyond which a financial market utility cannot self-insure and remain viable as an economic entity. That is, the costs of such self-insurance may exceed the economic value of the utility itself.

If private liquidity provision may be inadequate in certain extreme conditions, it may be useful to create a framework in which central bank liquidity can act as a backstop. The principles in CPSS-IOSCO (2012) explicitly permit financial market utilities to count central bank credit toward their liquidity resources, provided the

²⁴ See CPSS-IOSCO (2012). As used in the PFMI, the term "financial market infrastructure" (FMI) refers to any of a number of institutions that support financial transactions, including payments systems, CSDs, securities settlement systems, and CCPs.

utility has routine access to such credit. Certain jurisdictions provide such routine access to central bank liquidity.²⁵ However, CPSS–IOSCO (2012) also recognizes the obvious moral hazard problem of having a payments, clearing, or settlement utility count emergency (that is, nonroutine) central bank liquidity as part of its liquidity resources for the purposes of meeting the standards mandated by the PFMI.

In conclusion, we note that the trade-offs we have discussed between credit risk management and liquidity requirements appear to be fundamental to modern financial markets. It is likely that future policy developments will continue to grapple with optimal institutional design in light of these concerns.

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²⁵ The availability to FMIs of routine access to central bank credit is dependent upon many factors, including whether the FMI is chartered as a banking institution (a requirement in some jurisdictions), the type of FMI (for example, whether it functions as a CSD, a CCP, or some other kind of market infrastructure), the type of credit (for example, intraday, overnight, or emergency), and the statutory authority of the relevant central banks to exercise discretion in extending such credit. Broad generalizations in this area are difficult to make and are subject to change as legislation and central bank credit policies are amended from time to time. Although a complete typology of credit policies for FMIs is outside the scope of this article, our research based on publicly available sources indicates that Belgium, France, Germany, Japan, and Switzerland are jurisdictions in which some form of routine access to central bank credit may be afforded certain FMIs. U.S. law and Federal Reserve policy do not currently permit non-depository institutions (including certain FMIs) routine access to central bank credit.

The CHAIRMAN. Thank you, sir.
Mr. Hill.

**STATEMENT OF SCOTT A. HILL, CHIEF FINANCIAL OFFICER,
INTERCONTINENTAL EXCHANGE, INC., ATLANTA, GA**

Mr. HILL. Chairman Conaway and Ranking Member Peterson, I am Scott Hill, Chief Financial Officer of Intercontinental Exchange, and I appreciate the opportunity to appear before the Committee today to discuss the important role of clearing.

Since launching an electronic over-the-counter energy marketplace in 2000 in Atlanta, Georgia, ICE has expended both in the U.S. and internationally. Over the past 17 years we have acquired or built derivative exchanges and clearinghouses in the U.S., Europe, Singapore, and Canada. ICE has a successful and innovative history clearing exchange traded and over-the-counter, or OTC, derivatives across a spectrum of asset classes, including many energy, agricultural, and financial products.

We began operating our first clearinghouse a decade ago, and today we are the third largest global clearing operator, with six clearinghouses in operation around the world. The risk-reducing benefits of central clearing have long been recognized by users of exchange-traded derivatives. The efficacy of the clearing model throughout even the most challenging financial situations made it the natural foundation of the global financial reforms put forward over the past decade for OTC derivatives. Clearing has consistently proven to be a fundamentally safe and sound process for managing systemic risk. Global regulators recognize that a clearinghouse, by acting as a central counterparty to transactions, minimizes bilateral risk. As a result of increased clearing, market participants are realizing that moving uncleared positions into clearing creates both operational and capital efficiencies.

Over the past decade, ICE has invested heavily in our clearinghouse technology and risk-management practices. ICE has kept pace with, and often preceded, regulatory reforms, new global rules, and international standards that have been established with respect to risk controls, levels of protection, and proper functioning of clearinghouses. We have worked closely with regulators, clearing members, and end-users to implement clearing models that meet or exceed modern regulatory reforms and international standards.

Our clearinghouses are subject to extensive regulatory oversight and strong corporate governance requirements, exercised largely through risk and advisory committees, and independent boards of directors. The committees include representatives from our clearing member firms, and in some cases clients. ICE clearinghouses regularly conduct margin back-testing, default fund stress testing, and liquidity stress testing, the results of which are publicly available and reviewed by clearing members and regulators. The rules, practices, and procedures of ICE's clearinghouses are fully transparent and publicly disclosed in a consistent manner.

ICE clearinghouses have also established robust recovery plans that are clear and transparent, and provide sufficient detail for members and regulators to anticipate the likely actions and tools that may be used during a default. ICE has been working with regulators and clearing members to implement changes to its recovery

rules to further enhance the recovery process, and incentivize clearing members, clearinghouses, and market participants to work together during a crisis situation to maintain the viability of a market.

ICE's clearinghouses manage a significant amount of collateral, largely in the form of cash and U.S. Government securities. The management of these large collateral balances, and the need to facilitate daily variation margining requires the mitigation of custodial and depository risk and collateral liquidity risk.

While clearinghouses have successfully managed these risks in the past through commercial arrangements, such arrangements are frequently with institutions that are also large clearing members. Central banks, including the Federal Reserve, can eliminate custodial and depository risk by allowing clearinghouses to access to deposit U.S. dollars in a Federal Reserve system account, and eliminate any liquidity risk by granting clearinghouses access to the discount window for the limited purpose of transforming U.S. treasuries into U.S. dollars. It is important to note that such access creates no additional risk to the taxpayer.

Ironically, despite the growth in the volume of cleared contracts, the number of futures commission merchants, or FCMs, available to provide clearing services for end-users has dropped from nearly 200, to fewer than 60 in recent years. Unfortunately, the term *offboarding* of end-users has become more prevalent in the industry than onboarding.

One of the biggest contributors to this troubling trend is the proposed requirements under Basel III. Basel III requires a bank to hold regulatory capital against clearing customer margin on its balance sheet, notwithstanding the fact that the customer margin is posted to a clearinghouse and segregated at that clearinghouse. Said differently, risk-reducing margins collected from customers and segregated on banks' balance sheets are considered risk-increasing for capital requirement purposes. In addition, these increased capital costs may impede customer porting from a failing clearing firm to a healthy clearing firm in a time of stress. Under current rules, FCMs accepting new customer positions from a defaulted FCM must immediately be willing and able to sustain large capital charges to absorb these new positions. These rules introduce a substantial impediment and disincentive for FCMs to take positions from a defaulting clearing member's books.

Thank you for the opportunity to share our views with you. I would be happy to answer any questions from the Members of the Subcommittee.

[The prepared statement of Mr. Hill follows:]

PREPARED STATEMENT OF SCOTT A. HILL, CHIEF FINANCIAL OFFICER,
INTERCONTINENTAL EXCHANGE, INC., ATLANTA, GA

Introduction

Chairman Scott, Ranking Member Scott, I am Scott Hill, Chief Financial Officer for Intercontinental Exchange, or ICE. I appreciate the opportunity to appear before you today to discuss the role of clearing.

Background

Since launching an electronic over-the-counter (OTC) energy marketplace in 2000 in Atlanta, Georgia, ICE has expanded both in the U.S. and internationally. Over the past seventeen years, we have acquired or founded derivatives exchanges and

clearing houses in the U.S., Europe, Singapore and Canada. In 2013, ICE acquired the New York Stock Exchange, which added equity and equity options exchanges to our business. Through our global operations, ICE's exchanges and clearing houses are directly regulated by the U.S. Commodity Futures Trading Commission (CFTC), the Securities and Exchange Commission (SEC), the Bank of England, the UK Financial Conduct Authority (FCA), the European Securities and Markets Authority (ESMA) and the Monetary Authority of Singapore, among others.

ICE has a successful and innovative history clearing exchange traded and over-the-counter (OTC) derivatives across a spectrum of asset classes including many energy, agriculture and financial products. ICE acquired its first clearing house, ICE Clear U.S. (ICUS), as a part of the 2007 purchase of the New York Board of Trade. ICUS clears a variety of agricultural and financial derivatives. In 2008, ICE launched ICE Clear Europe (ICEU), the first new clearing house in the UK in over a century. ICEU clears derivatives in several asset classes including energy, interest rates and equity derivatives. ICE Clear Credit (ICC) was established as a trust company in 2009 under the supervision of the Federal Reserve Board and the New York State Banking Department and converted to a derivatives clearing organization (DCO) following implementation of the Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA). Today, ICE owns and operates six clearinghouses that serve global markets across North America, Europe and Asia.

CCPs Facilitate Market Participation by Mitigating Default Risk

The risk reducing benefits of central clearing have long been recognized by users of exchange-traded derivatives (futures) and the efficacy of the clearing model throughout even the most challenging financial situations made it the natural foundation of the financial reforms put forward over the past decade for OTC derivatives around the world. Clearing has consistently proven to be a fundamentally safe and sound process for managing systemic risk throughout history. Observers frequently point to non-cleared derivative contracts as a significant factor in the broad reach and complexity of the 2008 financial crisis while noting the relative stability of cleared markets.

The disciplined and transparent risk management practices (including: initial and ongoing counterparty credit monitoring; uniform, risk-based, collateral requirements; and, the daily marking-to-market of losses) associated with regulated cleared contracts serves to reduce systemic risk. A clearing house, by acting as a central counterparty (or CCP), to transactions, minimizes bilateral risk by compressing derivative exposures. For example, since 2009, ICE Clear Credit and ICE Clear Europe have cleared more than \$89.5 trillion in CDS notional, but, in part, through compression (also known as multilateral netting) the amount of bilateral credit exposure among market participants has been significantly reduced. ICE Clear Credit and ICE Clear Europe currently maintain a combined open interest of \$1.6 trillion.

Over the past 100 years, clearing house risk management practices have been repeatedly tested and proven in resolving clearing member defaults including large bankruptcy proceedings such as Lehman Brothers and MF Global. The recent introduction of mandated clearing obligations for certain swaps has prudently extended the significant benefits of clearing to a broader array of vitally important capital markets.

Over the past decade, ICE has invested heavily in our clearing house technology and risk management practices. ICE has kept pace with and often preceded regulatory reforms, new global rules, and international standards¹ that have been established with respect to risk controls, levels of protection and proper functioning of clearing houses. We have worked closely with regulators, clearing members and end-users to implement clearing models that meet or exceed modern regulatory reforms and international standards. The result is an even more robust clearing model that includes many ICE-led initiatives, such as the introduction of "skin-in-the-game," or the contribution by the clearing houses of a designated, fully funded amount of its own capital to the default waterfall.

ICE clearing houses are subject to extensive regulatory oversight and strong corporate governance requirements, exercised largely through customer-constituted risk and advisory committees and independent boards of directors.² Risk committees

¹Committee on Payment and Settlement Systems, International Organization of Securities Commissioners (CPSS-IOSCO), *Principles of Financial Market Infrastructures* (April 2012). <http://www.bis.org/publ/cpss101a.pdf>.

²An overview of the risk governance at ICE clearing houses can be found online: ICE Clear Europe—www.theice.com/clear-europe/risk-management; ICE Clear U.S.—www.theice.com/clear-us/regulation; ICE Clear Credit—www.theice.com/clear-credit/regulation.

include representatives from our clearing member firms and, in some cases, end clients. ICE clearing houses regularly conduct margin back-testing, default fund stress testing, and liquidity stress testing—the results of which are publicly available and reviewed by clearing members and regulators. In addition, the clearing houses' margin, guaranty fund and liquidity methodologies are independently validated on a routine basis and are subject to the review and approval of the relevant risk committee, board and prudential regulator(s).

The rules, practices and procedures of ICE's clearing houses are fully transparent and are publicly disclosed in a consistent manner, as set out within the CPMI-IOSCO Principles for Financial Market Infrastructures (PFMIs)³ and various regulatory requirements. Any material changes to ICE's clearing processes are subject to rigorous internal governance review as well as applicable regulatory review and approval.⁴

CCPs Facilitate Market Participation by Managing Liquidity Risk

ICE's clearing houses collect a significant amount of collateral largely in the conservative form of cash and U.S. Government securities. The management of these large collateral balances and the need to facilitate daily variation margining requires the mitigation of custodial/depository risk and collateral liquidity risk.⁵ While CCPs have successfully managed these risks in the past through commercial arrangements, such arrangements are frequently with institutions that are also clearing members. Central banks, including the Federal Reserve, can (1) eliminate custodial/depository risk by allowing CCPs to deposit cash collateral in a Federal Reserve System account and (2) eliminate any liquidity risk by granting CCPs access to the discount window for the limited purpose of transforming U.S. treasuries into cash. Fed account access benefits the market, reduces depository and investment risk and has proven to be a useful tool, allowing designated CCPs to more safely and soundly manage collateral, including client funds.

Fed account access provides the maximum level of protection for customer collateral, a central goal of regulators and policymakers, and such access should be made available to all CCPs. By providing selective access to designated clearing houses, the current policy unintentionally drains more liquid assets from non-designated CCPs, exacerbating their liquidity challenges. In addition, customers of designated CCPs are provided enhanced protections from commercial and depository risk while customers of non-designated CCPs are not. Why should a wheat farmer enjoy a greater level of protection than a cotton farmer? The government should promote a policy that expands and equalizes access to Fed accounts to level the playing field for all market participants. It is important to note that such access creates exactly zero additional risk to the taxpayer.

In addition, as noted above, CCPs should have access to the discount window for the limited purpose of transforming U.S. treasuries into cash. Such access simply provides a facility to turn U.S. Government securities, at a hair-cut appropriate to the market environment at the time of access, into U.S. dollars to facilitate the vital variation margin process during a time of unprecedented stress. Again, such access in no way creates any additional risk to taxpayers.

Basel Impact on Clearing

Despite the growth in the volume of cleared contracts, the number of futures commission merchants ("FCM") available to provide clearing services for end-users has dropped considerably in recent years. There were around 190 firms providing clearing services in 2004 but only approximately 56 today, according to the Futures Industry Association. Exacerbating the decline, the majority of these FCMs focus only on futures execution services with only a subset providing both futures and over-the-counter swaps post trade clearing services. Consequently, the bulk of derivatives clearing is now concentrated amongst a few bank owned global FCMs and some customers find themselves excluded from markets because they cannot access clearing services. The term "off-boarding" of clients has become more prevalent in the industry than on-boarding.

One of the biggest constraints on clearing service providers is the proposed Basel Committee on Banking Supervision's leverage ratio framework ("Basel III"). Basel III requires a bank to hold regulatory capital against clearing customer margin on its balance sheet notwithstanding the fact that the customer margin is posted to a

³Supra, nt. 1.

⁴For an overview of ICE central clearing operation and governance see: https://www.theice.com/publicdocs/Central_Clearing_Reducing_Systemic_Risk.pdf.

⁵The liquidity of U.S. Government securities is a topic of industry debate. ICE believes that U.S. Government securities are one of the more liquid forms of collateral and that historically, during times of stress, there has been a flight to the quality of U.S. Government securities.

clearing house and held at the clearing house on a segregated basis. Said differently, risk *reducing* margins collected from customers and segregated on a bank's balance sheet are considered risk *enhancing* for capital requirement purposes. For example, Basel III treats the capital requirements for a client cleared transaction with initial margin ("IM") the same as a formerly bilateral trade without any IM posted. Without allowing IM Offsets, the clearing member is penalized for having a position that is actually more collateralized which makes the provision of clearing services far less attractive. As a direct result, and as reflected in the aforementioned statistics, the unintended consequence is that many FCMs are shrinking or ceasing their clearing services business at exactly the same time regulations are encouraging the increased use of clearing.

In addition, these increased capital costs may also impede customer porting from a failing clearing firm to a healthy clearing firm in a time of stress. Under current rules, FCMs accepting new customer positions from a defaulted FCM must immediately be willing and able to sustain large capital charges to absorb the new positions. While the global CCPs and their members successfully managed through the large bankruptcy proceedings involving Lehman Brothers and MF Global, Basel III capital rules did not apply and mandatory client clearing rules for OTC swaps had not gone into effect. In the current construct, FCMs are likely to be far more reluctant to accept ported positions which will exacerbate the instability in markets already present in a default situation.

CCP Recovery and Resolution

To accommodate extreme and unlikely circumstances that result in losses in excess of a defaulting clearing members' margin and guaranty fund resources, ICE clearing houses have established robust recovery plans that are clear and transparent and provide sufficient detail for members and regulators to anticipate the likely actions and tools that may be used during a default. ICE has been working with regulators and clearing members to implement changes to its recovery rules to further enhance the recovery process and incentivize clearing members, CCPs and market participants to work together during a crisis situation to maintain the viability of the market by returning to a matched book. The recovery rule amendments have been approved by regulators and clearing members for certain ICE clearing houses and we are actively working to harmonize changes across all ICE clearing houses.

Further, ICE believes that, to the fullest extent possible, resolution authorities should not interfere with a CCP's implementation of its existing recovery process. If it does become necessary for a resolution authority to intervene before a CCP has exhausted its available tools, the resolution authority should continue to act consistently with the CCP's existing rules and arrangements. ICE additionally believes that resolution should be invoked only in a situation where all efforts at recovery have been unsuccessful (whether taken by CCP itself, the resolution authority, or a combination of the two).

Finally, an appropriate resolution authority should possess a deep understanding of the markets and role of CCPs. The Commodities and Futures Trading Commission ("CFTC") possesses this requisite knowledge and experience given its direct regulatory oversight over CCPs and is well positioned to be the resolution authority for the CCPs it oversees.

Conclusion

ICE has always been, and remains, a strong proponent of open and competitive markets with appropriate regulatory oversight. As an operator of global futures and derivatives markets, ICE understands the importance of ensuring the utmost confidence in its markets and we take seriously our obligations to mitigate systemic risk. To that end, we have worked closely with regulatory authorities in the U.S. and abroad in order to ensure they have access to all relevant information available to ICE regarding trade execution and clearing activity on our markets. ICE looks forward to continuing to work closely with governments and regulators at home and abroad to address the evolving regulatory challenges presented by derivatives markets and to expand the use of demonstrably beneficial clearing services that underpin the best and safest marketplaces possible.

Mr. Chairman, thank you for the opportunity to share our views with you. I would be happy to answer any questions you and Members of the Subcommittee may have.

The CHAIRMAN. Mr. Salzman, 5 minutes.

**STATEMENT OF JERROLD E. SALZMAN, LL.B., OF COUNSEL,
DERIVATIVES; LITIGATION, SKADDEN, ARPS, SLATE,
MEAGHER & FLOM LLP, CHICAGO, IL; ON BEHALF OF CME
GROUP**

Mr. SALZMAN. Chairman Conaway, Ranking Member Peterson, Members of the Committee, I am Jerry Salzman. I am testifying on behalf of the Chicago Mercantile Exchange. Mr. Duffy has been unable to get here today. He can't fly.

Most of what I was going to say has already been said by Mr. Hill and Mr. Steigerwald, and I agree with them, so I am going to try and sort of change up on the fly and get a little more basic than what has been said here, which is pretty high-level, especially if you are not really into how clearing works, what it is, and why it protects the country.

A clearinghouse actually isn't a risk-taking enterprise. People bring contracts to the clearinghouse, and the clearinghouse steps between the buyer and the seller. It collects from those who lose, and it pays to those who win. It manages a matchbook, what we call it, because so long as the people are losing pay, the winners get paid, and the system works and the country works, and the markets work. We ensure that even if somebody fails, there still isn't going to be risk to the system. We apply the following types of devices. If you are going to be a member of a clearinghouse; a clearing member, we make you contribute to a guarantee fund, and your contribution to the guarantee fund is based on how much risk you bring to the clearinghouse. In addition to your contribution to the guarantee fund, we say not only that, but if you are going to put on a position, we are going to figure out how much can be lost on that position during the time it takes us to liquidate that position, or recreate the matchbook. We say in addition to what you pay to the guarantee fund, we want you to put up that money for your position and your customers' positions. We collect that money and we hold it at the clearinghouse. One of the things Mr. Steigerwald was saying is the safest place to hold that money is not at a bank, where we usually keep it, but at the Federal Reserve, because we know the Federal Reserve isn't going to fail, and that takes one piece of risk out of the system.

In addition to those things, the clearinghouse next says, every day, sometimes twice a day, we are going to watch how the market moves. As the market moves, we are going to ask you if you are losing money that day on your positions, pay the money in immediately or the next morning, if you are gaining money, we are going to pay you, so that there is no debt built up in the system. This is how clearinghouses work. This is how the safety of the system is preserved.

Now, in addition to the money flows, which are tremendously important, obviously, to keep debt out of the system, the clearinghouse does compliance reviews of all of its members on a regular basis. First of all, we have electronic systems to make sure that all the customer money is exactly where it is supposed to be, and we can get that on a daily basis. In addition, we do risk-based compliance reviews to make sure the finances of the clearing members continue to be solid, because one of the things we make sure is you don't get to be a clearing member unless you have the resources

to make good on your obligations to the clearinghouse. We are doing this on a regular basis, and the CFTC is overseeing all of our work in these areas.

Essentially, we are running a system where we have matchbooks and we have money to back anything up. If somebody fails to make a deposit when they are supposed to, or if somebody's financial condition is known to be too weak to continue as a member of the clearinghouse, we can declare them in default, even though there has been no loss. When we declare them in default, now we have all these resources we were talking about to cover their positions, to make it possible for us to liquidate their positions and to re-establish the matchbook.

The disaster you are concerned with is the situation where at least two major U.S. or international banks that are members of our clearinghouse fail simultaneously, where the whole world is more or less falling apart. We have set up our money flows to cover exactly that situation. In fact, we are good for four banks failing simultaneously: big banks. This means that the protections not only include what we have collected, what we are managing every day, but what the banking system is doing to protect the banks from failing, and to make sure that if they do fail, they fail in an orderly fashion.

As I have said, my actual testimony didn't involve anything I have just said to you now; it involved what has been said by the others. I hope this has been useful to you, and I will be here to answer any questions.

Thank you.

[The prepared statement of Mr. Salzman follows:]

PREPARED STATEMENT OF JERROLD E. SALZMAN, LL.B., OF COUNSEL, DERIVATIVES; LITIGATION, SKADDEN, ARPS, SLATE, MEAGHER & FLOM LLP, CHICAGO, IL; ON BEHALF OF CME GROUP

Good morning, Chairman Conaway, Ranking Member Peterson and Members of the Committee. I am Jerry Salzman appearing today on behalf of CME Group and its Chairman and Chief Executive Officer Terry Duffy. Thank you for the opportunity to testify today regarding Central Counterparty Recovery and Resolution.

CME Clearing is a central counterparty or "CCP." CCPs are risk neutral organizations. When a contract is submitted for clearing, a CCP becomes the buyer to the seller and the seller to the buyer. This is what CCPs call a matched book. By maintaining a matched book, a CCP does not take on any market risk and remains risk neutral. Furthermore, the substitution of the CCP eliminates the original counterparty risk and permits a party to exit its contract without dealing with the original party to the trade. Clearing members and their customers can trade without regard to the identity or credit of their counterparty and thereby achieve operational and financial efficiency.

Both CCPs and banks can be systemically important to the functioning of financial markets, but it is a mistake to assume that recovery and resolution planning for banks and CCPs should follow the same path. Unlike CCPs, banks have depositors whose assets are employed in the risk-taking activities of banks. Banks engage in lending, investment banking, asset management, and other similar services that pose risks to their depositors and the financial system. Banks engage in and offer bespoke, illiquid derivative and other financial products. CCPs participate in none of these risk-taking activities. As a result of the different services and products offered by banks and the consequence to depositors of bank failure, the regulations governing banks and CCPs—including plans to address impending failure, capital requirements, and liquidity requirements—must be quite different.

While some banks faced considerable challenges during the 2008 financial crisis, CCPs performed well. This strong performance led to the Congressionally-mandated expanded use of central clearing. The expansion of clearing in response to the 2008 financial crisis has increased the number of contracts cleared and, correspondingly,

the amount of performance bond¹ collected by CCPs to minimize the risk that a clearing member fails to meet its obligations when due (or defaults) and the risk of contagion resulting from that failure.

While CCPs have become intermediaries for more open positions, this increase in transaction clearing reduces the risk of a systemic failure. The critical point is that clearing lessens systemic risk by (1) netting down positions, (2) interposing a neutral party to set performance bond and pay and collect daily gains and losses, (3) netting pays and collects, (4) providing a properly scaled guaranty fund, and (5) isolating the impact of the failure of a clearing member by acting as the sole counterparty. In formal terms, increased clearing of positions significantly reduces the likelihood that a member default would impact other clearing market participants. Because of the protections that a CCP provides, a CCP interposed between its member firms is far less likely to fail and create system wide losses and systemic risk than a member firm or firms without the benefit of clearing.

As clearing has expanded, so has the focus on the safety and soundness of CCPs. The Congress, U.S. and foreign regulators, clearing members, customers, and banks, which provide services and liquidity facilities, have all been engaged in the efforts to build on the safety and stability demonstrated by CCPs during the 2008 financial crisis.

For example, the Commodity Futures Trading Commission (“CFTC”) enhanced its CCP rules, making a strong regime of oversight even stronger. The CFTC also implemented rules requiring CME Clearing to maintain plans to recover should an extreme, but plausible, event occur and to permanently cease, sell, or transfer one or more clearing services should a CCP’s recovery plan fail—all without using any taxpayer funds. The CFTC exercises diligent oversight of these plans.

In addition to these recent CFTC regulatory enhancements, the Committee on Payments and Market Infrastructures (“CPMI”) and the International Organization of Securities Commissions (“IOSCO”) published international guidance known as the Principles for Market Infrastructures or the “PFMIs” that calls for CCPs like CME Clearing to prepare and maintain a recovery plan.² The PFMIs provides that the CCP recovery tools that impact clearing members and their customers should be transparent to help clearing members and their customers measure, manage, and control their potential losses and liquidity shortfalls when electing to clear with the CCP. CPMI and IOSCO also published recovery guidance providing that CCP recovery tools should create appropriate incentives for participants of the CCP to “(i) control the amount of risk that they bring to or incur in the system, (ii) monitor the [CCP’s] risk-taking and risk management activities, and (iii) assist in the [CCP’s] default management process.”³

CME Clearing Initiated Protections for Financial Integrity

CME preserves the financial integrity of its CCP by mitigating the risk that a clearing member will default and by minimizing the impact of that default on the customers of the defaulting clearing member and other clearing members and their customers. CCPs maintain multiple layers of pre-funded financial resources as protection. In addition to the financial protections discussed below, CME Clearing regularly performs risk management and regulatory surveillance reviews to evaluate the quality of the risk management of its clearing members and to determine that clearing members are in full compliance with CFTC and CME Clearing financial and operational requirements and that customer funds are properly segregated.

The first layer of the pool of pre-funded financial resources is based on our valuation of the portfolio of a firm’s open positions. We require deposit of performance bond in an amount that has a high probability of covering the loss caused by a potential default. Performance bonds are posted in the form of high-quality, liquid assets and are isolated from CME Clearing’s assets.

Next, at least once or twice each business day, the portfolio is marked-to-market. If a position has lost value, we require the clearing member to make payments to CME Clearing to settle that loss. If a position has gained value, the clearing member receives a payment from CME Clearing to reflect that gain. This process—which we call settlement—avoids the build-up of exposures.

¹Performance bond is also called initial margin.

²CPMI-IOSCO, Technical Committee of the International Organization of Securities Commissions, *Principles For Financial Market Infrastructures* §3.3.8 (Apr. 2012), available at <http://www.bis.org/cpmi/publ/d101a.pdf>.

³CPMI-IOSCO, Board of the International Organization of Securities Commissions, *Recovery of Financial Market Infrastructures* §3.3.7 (Oct. 2014) (“CPMI-IOSCO Recovery Guidance”), available at <http://www.bis.org/cpmi/publ/d121.pdf>.

If a clearing member defaults,⁴ CME Clearing will use as the first resource to cover that loss the defaulted clearing member's posted performance bonds and any other assets of the defaulted clearing member that are available to CME Clearing, including the defaulter's contributions to the guaranty funds (described below). Performance bonds posted by the defaulted clearing member to secure its customers' positions may only be used to cover unpaid losses for customer positions that were cleared through the defaulted clearing member.

In our 100+ year history, CME Clearing has resolved every clearing member default it has experienced by using only the defaulter's performance bonds.

Third, the Chicago Mercantile Exchange, Inc. ("CME Inc.") has committed \$300 million of its own funds to the three separate guaranty funds it maintains for its different asset classes—one to support futures and options on futures (which are called "Base" products), one to support credit default swaps and one to support interest rate swaps. Each of these is called a "CME Contribution." If losses remain after CME Clearing exhausts the performance bonds and other assets of the defaulter that are available to CME Clearing, CME Clearing would use the CME Contribution to the relevant guaranty fund to cover or reduce the remaining losses. The CME Contribution to the guaranty funds for Base products, credit default swaps, and interest rate swaps is \$100 million, \$50 million, and \$150 million, respectively.

Fourth, if losses still remain after the CME Contributions to the relevant guaranty funds are exhausted, CME Clearing would use contributions from CME Clearing's non-defaulting clearing members to the relevant guaranty funds to address the remaining losses. These contributions may only be used for this purpose and are pre-funded by clearing members. The amount of a clearing member's contributions to each guaranty fund is proportionate to the risk of the positions in the relevant asset class that are held by the clearing member for itself and its customers. The proportionality of this requirement is designed to incentivize clearing members to control the risk they bring to the CCP. The requirement to contribute to the relevant guaranty funds also incentivizes clearing members to support strong CCP risk management programs. Clearing members' guaranty fund contributions are held in the form of high-quality, liquid assets and are isolated from CME Clearing's assets.

CME Clearing's pre-funded protections are robust and are based on resources that are substantial. CFTC regulations require CME Clearing to maintain financial resources sufficient to withstand the simultaneous default of its two largest clearing members. Stress tests performed by the CFTC as recently as November 16, 2016, have confirmed that CME meets this requirement. As of March 31, 2017, CME Clearing's guaranty funds and the CME Contributions exceeded \$8.5 billion.

Despite the robustness of our financial safeguards, some have suggested that a CCP maintain an additional *tranche* of pre-funded resources or "skin in the game" to cover losses resulting from a clearing member default. If the intent of the proponents of more skin in the game is to substitute the contribution of the CCP for obligations now borne by the clearing firms that are responsible for creating the risk, this adds an element of moral hazard that is inimical to sound risk management practices. Each clearing member should be responsible proportionately for the risk it adds to the clearing process.

We made a business decision to put the CME Contributions ahead of any call on the default fund as a means of assuring our clearing members that we were protecting them and doing an appropriate job of risk management. We sized our first line contribution to meet this purpose. We do not agree that our contribution should be a function of the size of the largest clearing member's obligation to the default fund. That amount is a function of the risk that the clearing member has determined is appropriate to its business and its risk assessment. If the biggest clearing member has a \$1 billion contribution level because of the risk it undertakes, there is no relationship between that amount and the purpose of our being first in line to cover losses. In fact, scaling the CCP's contribution in this manner would effectively reduce the mutualization of risk among clearing members, creating moral hazard.

The reasons to avoid excess skin in the game are apparent. Trapping additional resources of the CCP in a commitment to the guaranty fund is detrimental. Devoting substantial assets to a totally unproductive use impinges on the efficient man-

⁴ References to "default" are not limited to instances of a failure to meet an obligation to CME Clearing. As used herein, "default" includes instances where: "financial or operational condition of a clearing member or one of its affiliates is such that to allow that clearing member to continue its operation would jeopardize the integrity of [CME Inc.], or negatively impacts the financial markets by introducing an unacceptable level of uncertainty, volatility or risk . . ." CME Rule 975.

agement of the business and adds to the costs of clearing that must be passed on. Adding costs to clearing could, in effect, exclude smaller clearing members from the markets resulting in concentration of risk in fewer clearing members and will restrict access to the markets for certain classes of smaller customers including farmers and ranchers. Access to clearing and a diversity of clearing members and market participants is critical to the stability of the broader financial markets.

During the three major market crises since 1987, no U.S. CCP has failed. In the few instances where a clearing member was on the verge of failure, CME Clearing took action in advance of failure to close out or transfer positions and protect the defaulting clearing firm's customers. And even when a clearing member has defaulted, there were no losses to non-defaulted clearing members or their customers. At no time in CME Clearing's history have the losses arising from a clearing member failure come close to exceeding the failing firm's performance bonds. As a result, CME Clearing has never even approached utilizing the relevant CME Contributions or non-defaulted clearing members' contributions to the relevant guaranty funds.

Nonetheless, CME Clearing has planned for the possibility that CME Clearing would access and exhaust the CME Clearing contributions and non-defaulted clearing member contributions to the relevant guaranty funds and that losses could remain. Under CME Clearing's rulebook, if losses from multiple clearing member defaults exceed our pre-funded financial resources, CME Clearing would assess additional funds from clearing members to satisfy remaining losses. The rulebook provides for a maximum amount of funds that CME Clearing may collect as assessments from its clearing members that participate in the relevant products. The amount of assessments collected from a particular clearing member is proportionate to the risk of positions held by the clearing member in the relevant asset class. CME Clearing monthly informs each clearing member of the maximum amount they could be assessed under these powers, enabling clearing members to measure, manage, and control their exposure to the CCP. This requirement is designed to incentivize clearing members to control the risk they bring to the CCP and to participate actively and bid aggressively in CCP default management processes.

CME Clearing believes that these assessments, combined with the guaranty fund and the CME Contribution, would cover at least the simultaneous default of the four largest clearing members (which would equate to the simultaneous default of the four largest global banks).

In addition to the aforementioned financial safeguards, CME Clearing would utilize its default management processes to address a clearing member default. If a clearing member defaults, CME Clearing would step quickly into the positions of the defaulted clearing member to liquidate the clearing member's own positions and/or work to transfer positions to another clearing member that elects to take them.

CME Clearing would attempt to transfer or "port" the defaulted clearing member's customer positions to willing and able non-defaulted clearing members. To date, CME Clearing has always been successful in porting 100% of such positions where a clearing member has failed. Any customer positions that cannot be ported to a non-defaulted clearing member would be liquidated. CME Clearing requires that the required performance bond of each customer of a clearing member be held at CME Clearing—so-called "gross margining." This facilitates our ability to transfer the customer positions held by a defaulted clearing member promptly upon the clearing member's default.

Once all positions of the defaulted clearing member and its customers are (i) transferred by CME Clearing from the defaulted clearing member (for whom CME Clearing has stepped in) to solvent clearing members and/or (ii) liquidated, CME Clearing will have restored a matched book.

CME Clearing maintains credit facilities with third parties to further its ability to meet the potential liquidity issues that could result from a clearing member default. In a default situation, CME Clearing's liquidity resources would allow it to meet the settlement obligations of the defaulted clearing member in all relevant currencies while CME Clearing works to transfer and/or liquidate the positions.

Regulatory Enhancements: Recovery, Wind-Down, and Resolution

In 2013, the CFTC adopted regulations designed to further strengthen CCPs' risk management practices. These regulations require us to develop and maintain two types of plans in case we experience an extreme, but plausible, stress event that could threaten our viability—a recovery plan that sets forth how CME Clearing intends to recover and a wind-down plan that sets forth how CME Clearing would permanently cease, sell, or transfer one or more of its clearing services if its recovery plan fails. CME Clearing has developed these plans in consultation with the CFTC. Neither plan relies on taxpayer funds.

Our recovery plan divides the extreme stress events that could threaten CME Clearing's viability into two categories—one for clearing member defaults and a second for any other extreme stress event that could threaten our viability (which we call “non-default loss”). Recovery tools that could impact clearing members and their customers are set forth in the CME Clearing Rulebook, which is publicly available.

The extreme stress event most likely to trigger CME Clearing's recovery plan would be the simultaneous failure of four or more global, systemically important banks that are clearing members of CME Clearing as well as the failure of the bank resolution regime. In our recovery plan, we identify assessments as our first recovery tool to solve for losses arising from clearing member defaults that exceed CME Clearing's robust, pre-funded financial safeguards.

Domestic and international regulators believe that they can ease the process of recovering from clearing member defaults by requiring CCPs to have tools in place to allocate fully all losses that arise from clearing member defaults and to restore a matched book after a clearing member default.

Under current law, before adding new recovery tools to the CME Clearing Rulebook to address these regulatory requirements, CME Clearing published its proposed rules and submitted them for review by the CFTC who consults with the Board of Governors of the Federal Reserve System, along with analysis regarding the potential impact of the proposed tools on CME Clearing's clearing members and their customers.

To satisfy the regulatory requirement to fully allocate losses, CME Clearing adopted rules providing for net portfolio gains haircuts (“haircuts”, which are also known as “Variation Margin Gains Haircuts” or “VMGH”) for Base products should losses remain after CME Clearing exhausts its assessments. VMGH is designed to extinguish or “haircut” a portion of amounts due to clearing members and their customers with a net portfolio gain for a settlement cycle while collecting the full amount from clearing members and their customers with a net portfolio loss for the settlement cycle. CME Clearing determines the amount of the haircut based on the amount received from clearing members and their customers with net portfolio losses applied on a *pro rata* basis across the clearing members and their customers with net portfolio gains for the relevant account class for the settlement cycle. CME Clearing's rules provide for up to 5 days of haircuts for Base products and require that the legitimate interests of clearing members and customers of clearing members be considered before CME Clearing may change the duration of haircuts.

Also to satisfy the regulatory requirement to fully allocate losses, CME Clearing added rules providing for voluntary contributions in Base products. If losses from a clearing member default remain after CME Clearing has exhausted the financial safeguards package for Base, CME Clearing may offer clearing members and their customers an opportunity to make voluntary contributions to assist in curing remaining losses. Clearing members and their customers may elect to make voluntary contributions in order to avoid haircuts. It is expected that voluntary contributions would only occur if the amount of contributions received are in the aggregate sufficient to fully mitigate all losses and thus avoid haircuts.

In response to the regulatory requirement to restore a matched book, CME Clearing adopted rules to govern the use of voluntary or mandatory tear-ups for Base products. After identifying clearing members and customers whose positions are on the opposite side of defaulter positions that remain open, CME Clearing would provide those clearing members and customers an opportunity to agree voluntarily to have their positions extinguished to restore CME Clearing's matched book. It is expected that voluntary partial tear-ups would only occur if the universe of positions marked for voluntary partial tear-up are in the aggregate sufficient to fully mitigate all losses and would restore a fully matched book. If needed, CME Clearing would turn to mandatory tear-ups. CME Clearing designed the mandatory tear-up process to reestablish a matched book in a manner that, to the extent possible, localizes the impact of a failure to the markets in which defaulters' positions have not been fully transferred or liquidated and avoids impacting other markets. CME Clearing's rules for Base products explicitly require that the legitimate interests of clearing members and customers of clearing members be considered when determining the appropriate scope of tear-ups.

By fully allocating losses and restoring a matched book after clearing member defaults, CME Clearing could continue to offer clearing services and promote the stability of the broader financial markets.

By design, a CCP's recovery tools incentivize clearing members to participate in managing the default of fellow clearing members, without impact to taxpayers. This participation is critical in order for the CCP to recover. Any ability or expectation that the government could intervene to resolve the CCP before these tools are ex-

hausted would undermine these incentives, weaken the CCP's ability to recover, and subsidize clearing member risk taking.

CME Clearing's recovery plan addresses separately the extreme and remote scenarios that could threaten CME Clearing's viability as a going concern other than clearing member defaults as "non-default loss". These events include a disorderly failure by a settlement bank while it is holding money for CME Clearing; the failure of a custodian bank that is holding assets for CME Clearing at the same time as a clearing member defaults; a fraud or crime event; and a cyberattack.

CME Clearing believes that any non-default losses that could be allocated to clearing members and/or market participants should be set forth clearly in a CCP's rulebook. Under CME Clearing's rulebook, none of the pre-funded financial safeguards (neither performance bonds nor CME Contributions or clearing member contributions to the guaranty funds) or assessment powers could be used to solve for a non-default loss. CME Clearing maintains insurance coverage to address non-default losses arising from a number of insurable risks, including employee fraud, a crime event, and cyber risks.

CME Clearing maintains credit facilities with third parties to address liquidity issues resulting from temporary disruptions of the settlement and payment system upon which clearing relies.

Our wind-down plan would be activated only if recovery fails. Pursuant to CFTC regulations, CME Clearing's wind-down plan contains actions CME Clearing could take to permanently cease, sell, or transfer one or more of its clearing services. No taxpayer funds would be involved.

CME Clearing maintains financial resources to effect an orderly wind-down of its clearing house as required by CFTC Regulations.

If Title II of Dodd-Frank applies to derivatives clearing organizations like CME Clearing, a government-ordered resolution of our clearing house would only be permitted after the failure of multiple layers of protection—namely, the failure of: (1) banking regulations designed to prevent the collapse of the largest global banks; (2) the bank resolution regime which is designed to ensure a failed bank can continue to meet its systemic obligations; (3) our prefunded financial resources; (4) our recovery plan; and (5) our wind-down plan. Thus, government-ordered resolution would and should remain an extremely remote possibility. If this sequence prescribed by Title II of Dodd-Frank is followed, market participants will be responsible for their actions and both the financial markets and U.S. taxpayers will be better protected against future financial stress.

We are concerned by a trend we have observed of some market participants and groups of regulators across the globe looking to bank resolution structures and processes as precedent when considering how CCPs should be resolved if the need arises. Regulations or standards that treat CCPs like banks would weaken—rather than strengthen—CCPs and would be a mistake. To the extent that CME Clearing could be expected to comply with international standards in order to maintain international business, it is important that the international standards not require actions that would weaken CCPs.

The objective of CCP recovery is to promote the continuity of critical clearing operations and services and the stability of the broader financial markets. In order for recovery to achieve this objective, it is essential that resolution frameworks and strategies not undermine recovery or promote resolution over recovery. Government should not require CCPs to change their operations in order to become successful failures; instead, government should promote successful CCP recovery.

Thank you for your consideration of CME Group's views on these significant issues.

The CHAIRMAN. Thank you, sir.
Mr. Dabbs.

**STATEMENT OF JOHN DABBS, GLOBAL HEAD OF PRIME
DERIVATIVES SERVICES, CREDIT SUISSE, WASHINGTON, D.C.**

Mr. DABBS. Chairman Conaway, Ranking Member Peterson, and Members of the Committee, thank you for holding this important hearing today, and for the opportunity to present our views.

My name is John Dabbs, and I am the Global Head of Prime Derivatives Services, which includes listed derivatives and cleared swaps at Credit Suisse. We appreciate the Committee's leadership

in holding this hearing to examine the role that various market participants play in facilitating swaps clearing.

Today, I will focus my comments on two key areas: improving resiliency of CCPs, and improving end-user access.

Credit Suisse believes that the initiative to increase clearing has been successful, and that it has met many of the goals set out by the G20 in 2009, including improved transparency in financial markets, mitigation of systemic risk, and protection against certain market abuses.

Since 2009, market participants have moved from being skeptical of clearing to embracing clearing, as evidenced by the pipeline of new products moving away from bilateral markets and into CCPs. It is worth noting that many of these products are not mandated for clearing, but rather are being cleared on a voluntary basis. For our part, Credit Suisse is an industry leader in providing clearing access to clients, including many U.S. pensions, energy, agricultural producers, and insurers, who look to the cleared swaps market to hedge a wide variety of risks that they encounter in their normal course of day-to-day business.

I lead a team that, amongst other things, serves as the intermediary between the client and clearinghouse. Credit Suisse's ability to serve as the intermediary, aka, the clearing member, is a vital part of the clearing ecosystem as it not only is cost-prohibitive to clients, but simply, many clients can't meet membership requirements.

In addition to providing important access for clients to clear at CCPs, clearing members like Credit Suisse also significantly contribute to the safety and soundness of CCPs. For each cleared swap that we facilitate on behalf of a client, we guarantee the client's financial obligation to the CCP; *i.e.*, we make the CCP whole in the event that the client might fail to meet its obligations under a swap transaction. We also provide default fund contributions to the CCP in an amount that is proportionate to the risk our client's portfolio adds to the CCP.

Last, clearing members also provide an array of services to clients, such as setting margin levels, monitoring risk, and providing operational efficiencies. Given our experience as one of the market's largest clearing members, we have seen firsthand the benefits of the evolution of cleared swaps markets. Conversely, we have also seen where cleared swaps markets can be enhanced. We believe that small tweaks to the current regime could allow for broader access and even greater resiliency to cleared markets.

We believe that regulations should create a safeguard package that requires all CCPs, not just significant ones, to have enough resources to meet the coverage use standard; *i.e.*, maintain a safety net large enough to absorb losses in the event that a CCP's largest two members were to default. Further, all CCPs, not just systemically important ones, should have access to the Fed for deposits. SIDCOs, or systemically important DCOs, should also have access to the Fed to borrow on a secured basis for converting U.S. sovereign debt into cash during a time of stress. Together, these measures would greatly reduce the interconnectedness of CCPs, and reduce the additional pressures placed upon banks during a time of stress.

We also believe that CCPs should have skin in the game. They should contribute capital; either equity, debt, or insurance, that would act as a line of defense for the losses incurred in a clearing member default. There should be minimum standards that scale as clearinghouses and its risk profile grows or shrinks. We believe scaling this skin in the game to the largest clearing members' default contribution creates the right incentive for the CCP to diversify risk.

Additionally, there should be incentives to ensure that clearing members stay in the CCP during a recovery or resolution scenario. I would argue that the current incentive is to exit as quickly as possible if members believe resolution is imminent. In times of stress, clearing members, like Credit Suisse, have little to no upside to stay at the CCP. There is only significant downside risk as default fund payments, assessments, and variation margin gains haircutting don't have to be paid back to the clearing members who stick around to aid in the default waterfall. We believe clearing members should be repaid for saving the clearinghouse, either by compensation from future earnings or by equity.

And one last point on resiliency. Resiliency would improve if CCPs had mechanisms for clients to continue to perform on their positions carried by a defaulting clearing member. Allowing clients to directly guarantee their trades for a short period of time would greatly reduce the risk in the system, and allow regulators and bankruptcy trustees to quickly identify the good, paying clients from the bad, defaulting clients. Currently, all clients look the same at the time of an FCM insolvency because all clients stop paying variation margin.

In addition to increasing resiliency, we also focus on how to ensure broad access to cleared derivatives markets, especially for hedgers. To this point, I would like to highlight for the Committee two adverse consequences of Basel III and Dodd-Frank. First, under Dodd-Frank we have CCAR stresses. Current CCAR regulations require banks to run stress tests on client portfolios, which we did well before CCAR required us to. However, current standards don't take into account the creditworthiness of a client. In fact, CCAR has the adverse effect of making our most creditworthy clients like money managers, corporates, insurance companies, and public pensions, look as if they are the most risky clients. The reality of this is that the clearing intermediary, like Credit Suisse, either have to hold significant capital or reduce our business with these institutions. Unfortunately, we have had to do both. Second, the Supplemental Leverage Ratio, or SLR, applies an overly burdensome capital charge on client clearing members. SLR treats the risk of client transactions guaranteed by clearing members where margin is collected, segregated, and posted to the CCP, the same as that of a bilateral swap where a bank acts as principle and doesn't segregate or post any collected margin to a CCP. To this point, we endorse the Treasury's recommendation to allow margin to reduce the clearing member's exposure of client cleared transactions. Without changes to the SLR, clearing intermediaries will continue to have a group of low-capital, returning clients who are typically hedgers, such as pensions. The return on capital is unsustainable at the current levels.

In closing, we reiterate that the current clearing model is not broken. In fact, it has functioned quite well during the financial crisis and it has continued to grow. As clearing continues to expand and evolve, all market participants and regulators should continue to collaborate to achieve the objective of improving end-user access and CCP resilience, and, therefore, decreasing the probability of recovery and resolution.

[The prepared statement of Mr. Dabbs follows:]

PREPARED STATEMENT OF JOHN DABBS, GLOBAL HEAD OF PRIME DERIVATIVES SERVICES, CREDIT SUISSE, WASHINGTON, D.C.

Chairman Conaway, Ranking Member Peterson, and Member of the Committee thank you for holding this important hearing and for the opportunity to present our views.

Introduction

My name is John Dabbs and I am the global head of Credit Suisse' cleared derivatives business. Credit Suisse Securities (USA) LLC ("CSSU" or "Credit Suisse") is a U.S. futures commission merchant ("FCM") registered with the Commodity Futures Trading Commission ("CFTC") and the National Futures Association ("NFA"). CSSU clears derivative contracts-traded on exchanges, swap execution facilities ("SEFs") and in the over-the-counter ("OTC") derivatives markets directly through clearing house memberships and indirectly through affiliates.

Credit Suisse is a direct member of the following central counterparties ("CCPs"): the Chicago Mercantile Exchange Inc.'s clearing division ("CME"), Intercontinental Exchange's ICE Clear U.S., ICE Clear Credit and ICE Clear Europe and the London Clearing House's LCH.Clearnet, each of which is registered with the CFTC as a derivatives clearing organization "DCO").

Credit Suisse fully supports the clearing model and the efforts of regulators, clearing houses, clearing clients and clearing firms. Clearing has existed for decades and while it functioned extremely well during the financial crisis, it has grown considerably as a result of mandatory clearing under Dodd Frank. As the cleared derivatives markets and CCPs continue to expand and evolve, it is worth reviewing the model now with an eye towards promoting CCP resilience and reducing the risk of CCP recovery and resolution. We discuss aspects of the clearing model below, particularly the role of the clearing member, benefits and challenges of clearing, CCP resilience, recovery and resolution and finally the recent EU CCP supervisory proposal.

Clearing Member Role

Clearing members are the cornerstone of the cleared derivatives process. They act as intermediaries between clearing clients and CCPs. Clearing members provide clients with a portal through which they may access clearing by acting as their agent and guaranteeing their financial obligations to the CCP.¹ In addition, clearing members provide guaranty fund contributions to the CCP in an amount that is proportionate to the amount of risk carried in the clearing members' client portfolio. Clearing members are heavily regulated and provide an array of services to clients such as collecting margin, sending client statements and providing various operational efficiencies.

Client Clearing Benefits—General

Clearing provides many benefits to clients. Clearing reduces counterparty risk, since CCPs act as the buyer to every seller and seller to every buyer to ensure financial security in the marketplace. CCPs pay to one party to a derivative contract what they receive from the other party. Clients face a CCP as their counterparty to a derivative transaction as the CCP takes the other side of the client's trade. In an uncleared derivative, clients face various swap dealers, who are mostly banks or bank affiliates, and, as a result, face the risk of a default of each such counterparty.

Clearing reduces default risk through a performance bond system with daily mark-to-market payments. Clearing clients post initial margin to the CCP through their clearing members on each cleared contract and pay or receive daily variation margin payments based on market movements.

¹ Clearing members do not guarantee the financial obligations of the CCP to their clearing clients.

Client Clearing Benefits—Clearing Members

Clients access CCPs through clearing members and, as discussed below, CCPs impose numerous financial, capital, regulatory, operational and other requirements on clearing members that clearing clients either cannot or prefer not to undertake.

One of the basic tenets of client clearing is client fund protection. Clients of clearing firms who are registered as FCMs benefit from a robust regulatory client protection regime under the U.S. Commodity Exchange Act, U.S. Bankruptcy Code, CFTC, NFA and CCP regulations.

Clearing member FCMs are regulated by the CFTC, NFA, exchanges, CCPs and SEFs. They undergo periodic external and internal audits as to their compliance with applicable rules and regulations. Clearing firms:

- segregate client funds from house funds;
- are subject to restrictions on their use of client funds;
- establish client margin levels;
- establish and monitor risk based limits for each client;
- monitor client positions throughout the trading day;
- conduct stress tests of client portfolios;
- establish and monitor a robust risk management program;
- establish processes and procedures for client on-boarding, including reviewing and monitoring client financial condition;
- provide early warning notifications to regulators including immediate notice if:
 - the FCM clearing member is undercapitalized, or
 - the client segregation pool does not hold a sufficient amount of funds;
- comply with financial requirements, including contributions of a certain amount of their own funds to the client segregation pool and restrictions on amounts that can be withdrawn;
- comply with disclosure requirements to clearing clients at the inception of the relationship and provide public disclosure of certain clearing member information; and
- are subject to regulatory capital requirements, including CFTC requirements and, if: (a) a joint FCM-broker dealer, SEC requirements, and (b) if a bank or bank affiliate, prudential regulatory requirements.

Client Clearing Benefits—CCPs

CCPs are also regulated by the CFTC and are subject to DCO core principles set forth in the Commodity Exchange Act and CFTC Regulations. CCPs impose strict membership criteria such as adequate financial assurances, contributions to the guaranty fund, assessment rights, capital requirements, operational and technological requirements and demonstration of market and product knowledge and experience. Additional CCP requirements include robust CCP risk management, financial safeguards, such as performance bond and daily mark-to-market payments, surveillance and audit functions of clearing members and imposition and monitoring of position limits. CCPs:

- segregate client clearing funds from clearing member and CCP house funds;
- are subject to restrictions on CCP use of client funds;
- establish clearing member margin levels;
- establish and monitor risk based limits for each clearing member[;]
- monitor clearing member positions (house and client) throughout the trading day;
- conduct stress tests of clearing member portfolios;
- establish risk management program; and
- review and monitor clearing member financial condition.

In the event of a clearing member default, CCPs typically work to identify non-defaulting clearing members for purposes of transferring client positions and related margin.

Each CCP is required to establish financial safeguards that typically contain a “waterfall” setting forth the sequence in which various risk management and loss mutualization mechanisms would be employed in the event of a clearing member default.

Clearing Member Perspective

Clearing members view their role as similar to that of CCPs. CCPs run matched books and do not introduce market risk into derivatives markets. Clearing members are also market neutral. They perform agency and market intermediary services for clearing clients and are not principal counterparties to the underlying derivatives contracts. As clearing members guarantee the financial performance of their clients to the CCP, they are exposed to client credit and default risk. CCPs are exposed directly to the credit and default risk of their clearing members and indirectly to credit and default risk of the clearing member's underlying clients. Although, while clearing members are subject to regulatory capital rules of the CFTC and bank clearing members are also subject to regulatory capital requirements of prudential regulators, CCPs are not subject to capital requirements.

In the event of a clearing member default, non-defaulting clearing members are at risk of mutualized default losses, *i.e.*, covering losses from the non-defaulting clearing members' guaranty contributions and assessments.

Clearing Challenges

Prudential Regulators Capital Requirements—Basel III, IHC, CCAR

One of the major challenges to the clearing objectives of the G20 Pittsburgh Summit and Dodd Frank is the impact of the regulatory capital regime.

Basel III imposed numerous capital requirements on banks and bank affiliates. Two major components relate to risk weighted assets (RWA) and the leverage ratio. As currently implemented by prudential regulators Basel III disincentivizes client clearing and threatens the model for clients of the highest credit quality. Issues include reducing client access to clearing and challenges associated with transferring a defaulting member's client portfolios. The number of clearing firms is decreasing while client clearing is increasing, creating concentration and systemic risk.

Risk Weighted Assets ("RWA")

Basel III for the first time requires clearing member firms to obtain legal certainty, (*e.g.*, legal opinions from external counsel) that speak to the issues of collateral enforceability and "netting", *i.e.*, net exposure in the event that a clearing client were to default and or become insolvent. Such legal opinions must be obtained by law firms who are experts in the governing insolvency laws relevant for the form of organization of the clearing client in the client's jurisdiction (*i.e.*, a pension plan organized under the laws of particular state or a clearing clients organized under the laws of a non-U.S. jurisdiction).

There are certain jurisdictions and/or forms of organization of clearing clients that pose major challenges in obtaining a netting opinion. The result is that the clearing member's RWA capital requirement is calculated on a gross and not net basis, resulting in some clearing clients not being able to find a clearing member that can clear for them.

Supplemental Leverage Ratio ("SLR")

The Basel III Supplemental Leverage Ratio ("SLR") raises several issues. First, a clearing member bank may not reduce its SLR exposure by the amount of initial margin that it collects from its clearing clients and posts to the CCP and/or holds in a client segregated account, as required by CFTC regulations.

Second, the SLR includes a punitive add-on factor to the measure of a bank's exposure for certain types of clients (*i.e.*, high credit quality clients such as pension plans and insurance companies) who tend to trade directional, longer term portfolios. The add-on factors are based on the types of cleared products and time to maturity. For example, the add-on factor for an interest rate product with a maturity over 5 years is 1.5% and that of "other commodities" with the same tenor is 15.0%. The add-on factors provide a perverse incentive for an FCM bank clearing member to clear for high turnover speculators rather than low turnover hedgers.

Clearing clients have less access to clearing as the SLR provides barriers to entry for new clearing members and results in clearing members exiting the business or terminating client relationships with a non-SLR friendly portfolio.

In a clearing member default, porting will be difficult as CCPs and regulators may not be able to find another clearing member willing and/or able to take on the defaulting clearing member's client portfolios.

Comprehensive Capital Analysis Review ("CCAR")

CCAR and the Dodd-Frank Act Stress testing are part of the evolution of U.S. bank capital requirements in the wake of the financial crisis. Both of these exercises are administered by the Federal Reserve and require, among many other things, banks and certain affiliates to perform stress tests on their client's cleared deriva-

tive portfolios that do not take into account the creditworthiness or the probability of default of a clearing client under the stress scenarios. As a result, the most challenging clients under these tests prove to be real money investment vehicles, corporate, insurance companies and public pension plans as they clear required hedging positions in derivatives. When, as CCAR and the cleared derivatives are viewed in isolation from the commercial positions being hedged and ignoring the financial wherewithal of the client, the positions are likely to be identified as inconsistent with the CCAR limitations. The practical result is that clearing firms who are bank affiliates are required to hold significantly more capital, collect higher margin or reduce their clearing business with such clients—often some of the most highly regulated, well-funded and moderately positioned of the universe of market participants.

Risk Mitigation Versus Exacerbating Liquidity Risk

Mandatory clearing, as implemented by the Prudential Regulators in the U.S., has more often than not contributed to deeper, broader and more resilient liquidity. This is because clearing allows for additional market participants who can take and provide liquidity without transacting exclusively with bank dealers. However, capital standards pursuant to Basel III, particularly the measures and ratios for leverage and risk exposures, and the requirements to post and otherwise administer substantial collateral balances for uncleared derivatives have reduced liquidity when there is no available, or mandated cleared alternative. The simultaneous decisions made to require clearing, constrain clearing and constrain trading in non-clearable instruments reflect an effort to solve several perceived problems at once, instead of perhaps promoting clearing as a primary objective for a transitional period of years before adopting disruptive constraints on clearing and non-clearable instruments.

CCPs—Resilience, Recovery and Resolution

Clearing Ecosystem and Interconnectedness

The clearing ecosystem has grown significantly with the introduction of mandatory clearing and other policy prescriptions implemented in the aftermath of the financial crisis. As previously discussed, clearing offers many benefits to help control and mitigate risk at the systemic level. While central clearing would not have addressed all the issues associated with the financial crisis, it would have mitigated certain aspects. Viewed in hindsight, clearing houses and their members had continued to provide clearing services during the crisis even as the bilateral markets suffered a domino collapse. By reconfiguring the otherwise random and often duplicative interconnections among market participants and introducing a layered package of financial backstop, clearing provides a level of systemic safeguards and resilience that was not present in the pre-crisis derivatives markets.

However, we note that certain trends may have worked to reinforce a linier consolidation of interdependencies that may lead to perverse outcomes in distress scenarios.

The first of these is a misalignment in financial package priorities that incentivizes a “bank run” on the clearing house. The current package was designed for a mutualized structure where clearing members and clearing house owners were one and the same. As membership and ownership diverged, members have become the primary bearer of clearing house risks while all profits are captured by owners, at little or no cost of capital. In an extreme but plausible scenario, members could be forced to contribute enormous amounts of funds in guaranty fund contributions, assessments, *etc.*, while the clearing house could pay a substantial dividend to its investors. Moreover, the design of the clearing house financial package provides no legal certainty to clearing members for a full recovery of their default management contributions, even after the clearing house has been “bailed out” by clearing members and has returned to profitability.

Inevitably, this structure creates a tremendous disincentive to remain as clearing members, in any distress scenario and certainly during a clearinghouse recovery or resolution. The disincentive is further amplified by a fundamental shift in any rational expectation for clearing house risk management practices.

In addition, the clearing houses continue to become more interconnected to the banking system as some of the largest client clearing members are also the largest market makers, liquidity facility providers and custodians. There are inadequate incentives for clearing houses to diversify the risks beyond the silo’ed measure of “Cover Two”, *i.e.*, safeguards that are intended to cover only the largest two of the clearing house’s members.

Fed Access

ALL CCP’s (not just SIDCO) should have access to the fed for deposits and SIDCO’s should have access to the Fed to borrow on a secured basis for converting

U.S. Sovereign Debt into cash during a time of stress. Together, these greatly reduce the interconnectedness of the CCPs and banks and additional stress placed on banks during a time of stress.

Skin in the Game

Skin in the game is an important element of the CCP financial safeguards package and should have a minimum standard that scales as a clearinghouse grows (or shrinks). We also think scaling it to the largest clearing member's default fund contribution creates the right incentive to diversify risk.

CCP Recovery

CCPs in Time of Crisis and Severe Stress

One issue that CCPs and regulators will face in the event of a double default, *i.e.*, a clearing default that results in a clearing member default, is that porting, an essential element of an orderly default management, may not be an available option due to the impact of regulatory capital requirements. The RWA and leverage ratio issues impede a clearing member's clearing capacity. A clearing member may not be able to accept a non-leverage ratio friendly portfolio even though such portfolio would be fully margined and otherwise pose no additional exposure if measured under conventional risks metrics.

Recovery and resolution will always be most successful when the process is well-articulated and understood beforehand by the entire ecosystem. Key stakeholders must maintain a regular dialogue throughout the process and providing decisive and consistent guidance to end-users and infrastructure providers. The primary prudential regulator of the applicable CCP should be responsible for approving and administering the resolution structure. The applicable Federal Reserve banks should coordinate with and support the primary regulator in preserving necessary clearing member engagement and addressing any funding or liquidity challenges.

Clearing participants should be given a meaningful level of input with respect to a CCP's assumption of risk, post-default risk management decisions and other corporate governance decisions that materially affect the allocation of risks and potential losses that non-defaulting clearing participants may incur in connection with a clearing participant default. In particular, CCP rules and applicable regulations should provide legal certainty as to how impacted participants will be compensated for losses that participants may incur where the CCP avails itself of loss mutualization measures such as default fund assessments and variation margin gains haircutting.

Clearing Client Guaranty

When re-establishing a matched book, CCP's need a mechanism for clients to continue to perform on their positions (*i.e.*, continue to pay margin) that are cleared through a defaulted clearing member. Allowing clients to directly guarantee their trades, at least for a short period of time, would greatly reduce the risk to the system and allow regulators and a bankruptcy trustee to quickly identify the good (paying) clients from the bad (defaulting) clients. Currently, as clients are understandably reluctant to pay margin to a distressed clearing member, all clients look the same on such clearing member's the books and records.

CCP Resolution

In a CCP resolution proceeding, clearing participants should retain claims for the full amount of clearing participant losses associated with a CCP's use of such measures. Such claims should (i) be senior to existing CCP equity in the creditor hierarchy, (ii) not be extinguishable in resolution or post-resolution prior to full satisfaction or conversion into an instrument of equivalent value, and (iii) entitle claimants to future CCP accumulated earnings or returns in excess of regulatory capital requirements until they are paid in full (and during such time, both the CCP and its parent should be prohibited from paying dividends).

Non-default losses should be covered entirely by the CCP and should not be covered by member resources.

In the event of CCP resolution, cleared contracts should be transferred to another CCP; however, this may not be possible for all contracts. For example, equity Index futures clearing continues to grow at CCPs. During a severe CCP stress situation, there may not be alternative CCP's because of licensing agreements. Liquidity of many bond, interest rate and commodity contracts could conceivably move or be setup at alternative CCP's, however things like the S&P 500 futures are exclusively listened by a single exchange/CCP.

EU Proposal on CCP Supervision (June 13, 2017)

We welcome the European proposal for mandatory joint supervision of non-EU CCPs that are deemed “systemically important” to the EU. The newly announced approach is a preferable alternative to any mandatory general CCP location policy. The proposed model seems to address regulatory concerns in a less disruptive manner than ideas that have previously been considered. The new proposal is largely consistent with that which is already implemented by the U.S. CFTC. The CFTC approach requires foreign-based CCPs clearing U.S. markets or serving U.S. persons to be registered with the CFTC and be subject to dual supervision by the CFTC and their home country regulator.

By and large, systemically important non-EU CCPs should be able to continue to provide services in the EU subject to new, albeit strict, EU requirements. However, in its current form, the EC proposal also raises a number of questions:

- (1) The proposal gives new discretionary powers to the EC to decide that a non-EU CCP is of ‘substantial systemic importance’ and therefore should be established and authorised in the EU to provide services in the EU. Use of this discretionary ability is permitted as a last resort measure. At this stage it is unclear when and in which cases a non-EU CCP might be deemed of ‘substantial systemic importance’ for the EU and, as a result, required to get established and authorised in the EU to offer clearing services in the EU. The detailed criteria to determine the ‘substantial systemic importance’ of non-EU CCPs will only be defined at a later stage via implementing rules.
- (2) It is also unclear whether this obligation for non-EU CCPs of ‘substantial systemic importance’ for the EU to get established and authorised in the EU to offer clearing services in the EU would be a blanket obligation covering all clearing services provided to EU clients or whether this obligation could be more granular and targeted covering a particular service, activity or class of financial instruments.
- (3) Where a non-EU CCPs of ‘substantial systemic importance’ for the EU would have to get established and authorised in the EU to offer clearing services in the EU, query whether such CCPs would still be allowed to provide euro-clearing services to non-EU clients from its third country home jurisdiction.

Finally, it remains to be seen whether the existing recognition decisions (including for U.S. CCPs), which will have to be reviewed under the new EU regime, will be re-opened and put at risk in view of the new enhanced EU requirements or whether the introduction of the new concept of ‘comparable compliance’—which would allow ESMA to determine whether the application of the relevant third country rules is comparable to compliance with EMIR—will be sufficient to maintain the validity of those existing recognition decisions.

Conclusion

The clearing model is not broken; however, as clearing continues to expand and evolve, all market participants and regulators should continue to collaborate and achieve the objective of improving CCP resilience and therefore decreasing the probability of CCP recovery and resolution.

The CHAIRMAN. Thank you.

Mr. Gerety.

STATEMENT OF AMIAS MOORE GERETY, SPECIAL ADVISOR, QED INVESTORS; FORMER ACTING ASSISTANT SECRETARY FOR FINANCIAL INSTITUTIONS, U.S. DEPARTMENT OF THE TREASURY, WASHINGTON, D.C.

Mr. GERETY. Thank you, Chairman Conaway, Ranking Member Peterson, and the Members of this Committee. It is a great opportunity for me to be here today, and to share my perspective on the critical issue of central counterparties’ resilience and resolution.

Before I begin, I would like to emphasize that the views I express today are my own, and are not those of QED investors or its partners.

Let me start with a clear statement. Dodd-Frank made derivatives markets safer and more stable. These reforms made our econ-

omy stronger, not only because they will help prevent future financial crises, but also because the stability and safety of the U.S. financial markets is a significant competitive advantage for the U.S. as a global economic power.

In the lead-up to the crisis, the derivatives markets were characterized by complex webs of transactions, with limited or no credit protection against billions of dollars of daily market movement, woefully inadequate documentation and back-office systems. There was simply no way to make sense of who owed what to whom in extreme market scenarios.

In the course of the crisis then it should be no surprise that not only were derivatives transactions central to the failure of AIG and Bear Stearns, but they were the very instruments marbled through some of the most toxic securities, such as CDOs, CDO-Squareds, and synthetic CDOs that unraveled in the mortgage meltdown.

In the height of the crisis, as Lehman Brothers failed, uncertainty about the value and holders of their risk transacted in derivatives markets acted as the single strongest accelerant of financial uncertainty, panic, and contagion.

So what then did the Dodd-Frank reforms accomplish? Most importantly and most directly, Dodd-Frank gave the CFTC and the SEC explicit comprehensive authority to oversee their respective derivatives markets, according to the same standards that we uphold for other financial markets. Next, Dodd-Frank required pre- and post-trade transparency for all derivatives transactions, capital and margin rules for all dealers in derivatives, and mandated that standardized derivatives be centrally cleared. Dodd-Frank has changed the way derivatives markets operate for the better; making for deeper, more liquid markets, with simpler products and lower risk. And in doing so, reduced food, energy, and other costs for farms, businesses, and families across the country.

Last, and the topic of today's hearing, Dodd-Frank extended existing frameworks for the oversight of central counterparties. Central counterparties are designed to centralize documentation, reconciliation, risk management, and margin for all their members. This means that well-managed and well-regulated central counterparties do not just centralize the risk of derivative markets and increase transparency to regulators, they actually transform and reduce that risk.

Therefore, policymakers focus on resilience and resolution of central counterparties, and in today's hearing, should be understood as part of a responsible approach to risk management. First, diagnose the risks, then put in place controls to mitigate, then reassess the remaining risk. The regulators' current focus on the potential failure of central counterparties is part of an iterative process of assessing the risk after effective reforms.

When considering the policy priorities ahead, the first obligation must be to preserve the gains to stability and safety that we have made since the financial crisis. And most importantly for this context, this means preserving Title II of Dodd-Frank and the orderly liquidation authority. Removing this authority would be deeply irresponsible for taxpayers; explicitly returning to the policy framework that gave birth to the TARP program. It would suggest that policymakers had forgotten the immense pain and suffering of fam-

ilies all across this country faced in the crisis and its aftermath. And most importantly, the stated rationale, which is to achieve budget savings, are a mirage. Those savings appear simply as an accounting quirk. By law, taxpayers cannot bear losses for any entity liquidated by the FDIC as part of the orderly liquidation authority.

In today's hearing, I look forward to discussing both potential scenarios for the failure of a central counterparty, and it is worth emphasizing both member-default-related and non-member-default-related operational failures. I also look forward to offering my perspective on three continuing challenges for policymakers. First, coordination across multiple central counterparties; second, cross-border cooperation, where the U.S. Government has quietly had significant successes since the crisis; and the need to develop strategies that create *ex ante* incentives for positive risk management and for recovery before we get to resolution. There, much work remains to be done. But while we do not yet have complete strategies and tools to handle the resolution of a critically important central counterparty, the only way to avoid catastrophic outcomes in that event will be to build those tools on the foundational authorities created by Dodd-Frank.

Thank you, and I look forward to answering questions today.
[The prepared statement of Mr. Gerety follows:]

PREPARED STATEMENT OF AMIAS MOORE GERETY, SPECIAL ADVISOR, QED INVESTORS; FORMER ACTING ASSISTANT SECRETARY FOR FINANCIAL INSTITUTIONS, U.S. DEPARTMENT OF THE TREASURY, WASHINGTON, D.C.

Successes of Derivatives Reforms and Continuing Risk Mitigation in Central Counterparty Recovery and Resolution

Thank you, Chairman Conaway, Ranking Member Peterson, and Members of the Committee for the opportunity to be here today and to share my perspective on the critical issue of central counterparties' resilience and resolution.

Before I begin, I would like to emphasize that the views I express today are my own and not those of QED Investors or its partners.

My testimony today will focus on three main areas:

First, the importance of the post-crisis reforms to derivatives markets and the central role that clearing mandates and central counterparties play in the effectiveness of those reforms. Second, I will offer the Committee a description of the potential mechanisms that could result in the failure of a central counterparty. Third, I will discuss key challenges for policy makers to continue to build the resilience and positive role that clearing will play in the stability of U.S. and global financial markets.

Let me start with a clear statement. Dodd-Frank made derivatives markets safer and more stable. These reforms have made our economy stronger, not only because they will help prevent financial crises, but also because the stability and safety of U.S. financial markets is a significant competitive advantage for the U.S. as a global economic power.

In the lead up to the crisis, derivatives markets grew exceptionally rapidly and volume increases were driven significantly by trades made between global banks. The opacity of the market meant that this interconnected web of exposures were neither clear to regulators nor to the firms themselves. The complexity of these markets developed because of the structure of the transactions, the credit relationships between the players, and the weakness of risk management and backend processing capacity. As we saw in the crisis, all three of these weaknesses played major roles in the uncertainty and destruction that the financial crisis brought to towns and cities all across the country.

It is important to understand each of these weaknesses in some detail before discussing the reforms in Dodd-Frank.

The complexity of the market was driven by the structure of bilateral derivatives transactions. Derivatives, or swaps, are mostly long-dated arrangements to exchange one type of risk for another. Unlike a stock or a bond, market participants

do not exchange the cash for the security. In a bilateral context, this means that the notional value of a contract was constantly layered on top of previous contracts rather than simply changing hands. To illustrate, if Dealer A buys a bond from Dealer B and later sells that bond to Customer C—only customer C owns the bond at the end of that process. In the bilateral derivatives context, if Dealer A agrees to take interest rate risk from Dealer B in exchange for a series of payments, and then customer C buys that interest rate risk in exchange for a series of payments from Dealer A—both contracts will remain in force for the life of the agreements. Dealer A maintains its interest rate swap with Dealer B, and maintains a separate interest rate swap with Customer C. Played out over thousands of transactions and multiple years prior to the crisis, the complexity of the bilateral arrangements quickly grew to impenetrable density—with very little clarity within dealer systems and essentially no understanding of where risk existed in the system as a whole.

The credit relationships that underlay bilateral derivatives transactions in the pre-crisis period added another significant layer of risk. Because large banks traded largely with important clients or with each other—the terms of these transactions included large quantities of counterparty credit risk, over and above the risk in the transaction itself. Let's take the example of the interest rate swap above. Dealer A and Dealer B would each have longstanding financial relationships with each other, they each had processes to understand the credit risk of the other (*e.g.*, periodic underwriting, credit ratings, *etc.*), so even when the market value of a long-term swap would move up or down (that is, in favor of A or in favor of B) the dealers would treat that market move as part of a credit relationship—they would treat it as a loan to each other. This meant that billions of dollars of market value could be contractually obligated between dealers on a daily basis, with no margin (in the form of cash or other assets) changing hands. The value of the relationships and the generic trust between counterparties substituted for the rigor of assuring that dealers would be protected from market moves over time. This meant that in the crisis, when market prices moved rapidly and additional margin was sought, dealers were requesting huge sums from one another and from clients. And in the crisis, these sums were significant enough to materially affect the capital and liquidity positions of the largest and most complex financial institutions in the United States.

Moreover, documentation of transactions and reconciliations of errors lagged the transactions themselves by months or more. Putting these three dynamics together, the pre-crisis regime was characterized by complex webs of transactions, with limited to no credit protection against billions of dollars of daily market movement, and woefully inadequate documentation and back office systems to make sense of who owed what to whom and where losses would be registered in extreme market movements.

To make matters worse, there was an explicit statutory bar against the CFTC or SEC taking actions to set standards for this market which, in 2008, was measured at \$673 trillion globally.

In the course of the crisis then, not only were derivatives transactions central to the failure of AIG and Bear Stearns, they were also the very instruments marbled through some of the most toxic securities such as CDOs, CDO squareds, and synthetic CDOs that unraveled in the mortgage meltdown. And in the height of the crisis, as Lehman Brothers failed, uncertainty about the value and the holders of risk transacted in derivatives markets acted as the strongest accelerant of financial uncertainty, panic and contagion.

What then did the Dodd-Frank reforms accomplish?

Most importantly and most directly, Dodd-Frank gave the CFTC and the SEC explicit, comprehensive authority to oversee their respective derivatives markets according to the same standards that we uphold for other financial markets. Strong standards and oversight have made the U.S. a global destination for financial investment and helped support our position as a global economic power.

Next Dodd-Frank required pre- and post-trade transparency for all derivatives transactions, attacking the risk of uncertainty and lack of documentation that featured prominently in the pre-crisis derivatives markets. Dodd-Frank required capital and margin rules for all dealers in derivatives, so that large players could not simply ignore the real financial risks of daily market moves, but had to collect margin from each other and also fund their derivatives positions with shareholder equity and retained earnings—known as capital.

Dodd-Frank also mandated that standardized derivatives be centrally cleared. A centrally cleared transaction allows for the complex web of transactions that I described above to be compressed into transferable units of risk—much more like the transfer of a stock or bond. In doing so, Dodd-Frank created incentives towards standardization both by requiring the CFTC to mandate which standardized con-

tracts must be cleared and with the simple concept that bespoke contracts that remain uncleared require higher margins. Dodd-Frank has changed the way derivatives markets operate for the better, making for deeper, more liquid markets with simpler products and lower risk. This move towards standardization allows for netting on a massive scale, reducing outstanding exposures and risk while increasing liquidity and lowering transaction costs for end-users. This also reduces food, energy, and other costs for farms, businesses, and families across the country.

Last, Title VIII of Dodd-Frank extended existing frameworks for the oversight of central counterparties. The benefits of central counterparties extend beyond their role in reducing the complexity of the market. Central counterparties are designed to centralize documentation, reconciliation, risk management, and margin for all their members. This means that well-managed and well-regulated central counterparties do not just centralize the risk of derivatives markets and increase transparency to regulators—they actually transform and reduce that risk.

Perhaps the clearest example of this transformation is in the collection and management of margin. As I described above, market movements in derivatives in the bilateral market, especially in the pre-crisis period, were managed as extensions of credit. But central counterparties are not in the business of extending credit. When a trade is initiated, the participants place cash or securities as collateral at the clearinghouse as initial margin. Then, as swaps contracts change value, at the end of each day, they require each of their members to deposit additional funds equal to their new exposure. In some cases, central counterparties can and do require intraday payments of margin to limit the buildup of risk. While central counterparties follow these procedures to protect their own viability and to follow the standards of their regulators, these procedures mean that the maximum exposure of a dealer to a central counterparty will be the value of 1 day's market movements. The rigor of this margin procedure has benefits throughout the system as a whole. It means that for all standardized trades, the question of who owes what to whom is both answerable and limited.

Much of the policy debate about central clearing has suggested that central counterparties themselves now hold and manage significant amounts of risk. This is true. Central counterparties play a more important role in the financial system today than they did before the crisis. But it is clearly also the case that the net risk for the system is reduced by the role of central counterparties. They are entities designed and overseen to manage that risk in a rigorous way—they do not manage derivatives counterparty risk as an ancillary function of their trading businesses. It is also worth emphasizing that within a central counterparty, all trades are matched, therefore the central counterparty itself has no exposure to market risk.

Carefully designed regulatory oversight is critical to the risk-mitigating role of central-counterparties. While the CFTC has vastly greater responsibilities in the wake of Dodd-Frank, its funding and resources have not kept up. In particular, its ability to oversee the swaps markets and its participants and ensure that the benefits of these reforms flow to businesses, farms, and families is severely hamstrung by their current lack of resources. Like other Federal financial regulators, the CFTC should be self-funded based on fees from the industry it regulates.

I will also focus briefly on the role of the Financial Stability Oversight Council (FSOC) in designating systemically important financial market utilities. FSOC designation has led to the codification of higher standards for the most critical central counterparties and enabled greater oversight and cooperation between the Federal Reserve, SEC, and CFTC. The policy goal behind designation of central counterparties recognizes that while the CFTC regulates many small commodities/futures exchanges, only those whose failure could threaten the financial stability of the United States should be subject to heightened standards and oversight. When the FSOC designated eight financial market utilities, we did so in a process that relied deeply on the expertise of the primary regulators, minimized data collection burdens on the companies themselves, gave significant access for companies to understand the process and review the Council's draft designation materials.

In addition to higher standards, designation also provides security to the broader system in other ways. For example, by giving designated central counterparties access to accounts at the Federal Reserve, Title VIII allows central counterparties to manage billions of dollars in customer margin without reintroducing the credit risk that would result from placing that customer margin at a commercial bank or investing it in the money markets. Importantly, being able to place cash in a Federal Reserve account does not give central counterparties the ability to borrow from the discount window the way that banks can; it simply removes a potential source of risk for customers that rely on central counterparties to mitigate risk in derivatives markets.

It is also important to note, as you will hear today from other witnesses, that the largest financial firms are deeply supportive of the increased role of central counterparties and clearing in derivatives markets. They recognize the risk management and risk mitigation benefits and share the same goals as this Committee—for central counterparties to be well-managed, transparent entities that mitigate risk and facilitate market functioning.

Mechanisms for Failure of Central Counterparties

Policy makers' focus on resilience and resolution of central counterparties reflects a well-founded desire to evaluate and mitigate any well-understood and potentially important risks in our financial system. The focus on central counterparty risk should be understood as part of a responsible approach to risk management—first diagnose the risks, then put controls in place to mitigate, then reassess the remaining risk—and repeat that process. Dodd-Frank examined the risks posed by derivatives markets, put in place mechanisms to mitigate that risk, and now we are left with the residual risk. The regulators' current focus on the potential failure of central counterparties is part of an iterative process of assessing the risk after effective reforms have been implemented and seeking to prepare and mitigate any remaining risk.

In addition to the policy benefits of central clearing enumerated above, the economic benefits of functioning central counterparties are important to understand when considering the possibility of central counterparty failure. In the normal course of business, central counterparties underpin both the value of existing derivatives contracts and the ability of market participants to transact in new, standardized derivatives contracts. Remember that since derivative contracts often last for multiple years, they are integral to long term economic arrangements both for financial institutions acting as dealers and for end-user clients seeking to hedge risk. To take an example, many large corporate loans have floating rate terms but corporate treasurers often pair those loans with interest rate swaps that allow the business to transform that floating rate loan into a fixed rate loan. Therefore, businesses across the country rely on the resilience of central counterparties just as they rely on the smooth functioning of our banking system.

There are three main mechanisms for the failure of a central counterparty. They can be thought of as: a failure caused by cascading defaults of central counterparty members which overwhelm the resources of the central counterparty; operational failure that is unrelated to economic and market conditions; or some combination whereby operational, risk management or modeling problems within a central counterparty lead the resources of a central counterparty to be insufficient in scenarios far less severe than cascading defaults.

The first mechanism for failure has been the primary focus of both central counterparty risk management and policy makers' discussions, in part because it most closely resembles the events in the financial crisis of 2008 and because it is most closely connected to broader policy discussions about how to handle the failure of a large, complex financial company. Under this scenario, central counterparties, which are required to hold financial resources large enough to survive the default of their two largest clearing members, could find those resources overwhelmed by the failure of three or more large members to make timely payments into the central counterparty. Although there are many layers of protection against even this scenario, such a cascade could imperil the central counterparty's ability to make payments to its solvent clearing members. In turn, solvent clearing members may refuse to participate in the ongoing operation of the central counterparty. Importantly, [because] of the resolution planning efforts that the FDIC and the Federal Reserve have undertaken, along with the critical authorities granted the U.S. Government in the Orderly Liquidation Authority—even if a large clearing member becomes insolvent, the subsidiaries of that entity which directly engage with central counterparties *should* be able to meet their daily obligations to each central counterparty they are members of. Therefore, while it is important to prepare for and understand these risks, this scenario requires not only the failure of multiple large, complex financial institutions; but also the failure of existing strategies to handle to orderly liquidation of those large, complex financial institutions.

The second mechanism for failure would be a scenario in which the central counterparty is unable to complete its obligations to its members based on internal problems. Importantly, because the risk of central counterparties is absorbed primarily in margin accounts and default funds, this second mechanism of default could happen without any financial stress occurring in clearing members themselves. Given the current threat landscape, the most important potential risk in this area is probably the threat from a malicious cyber attack. While at Treasury, we designed and executed a number of cybersecurity exercises that examined ways that

malicious cyber attacks could affect financial stability either by directly or indirectly affecting large money-center banking organizations or central counterparties. One positive takeaway from these exercises is that the spirit of cooperation that firms demonstrated in working to provide assistance to an institution affected by cyber attacks bodes well for our ability to avoid self-destructive financial reactions to a cyber event. One negative takeaway is that our collective ability to identify and respond to cyber attacks that affect critical functions in our financial system needs significant and continuing development.

The third mechanism for failure of a central counterparty would be a scenario in which a central counterparty suffers an economic or market based shock that should be within the economic resources, but due to operational, risk management, or model weaknesses—the liquid financial resources of a central counterparty are insufficient to meet its obligations.

I am not the only person to recognize these potential scenarios. Central counterparties and their regulators have in place mitigating procedures to address different types of distress. I will leave it to my fellow witnesses to elaborate, but each central counterparty has a recovery plan to manage the default of a clearing member and provide *ex ante* certainty about loss allocation. And market regulators are working at an international level through CPMI-IOSCO to establish best practices for the stress testing of central counterparties' resources. The CFTC conducted their first stress tests of how central counterparties under their supervision would fare under extreme but plausible market stress in the fall of last year.¹

However, if any of these scenarios were to come to pass, it would put distinct pressures on the U.S. financial system and on U.S. regulators. And it is important to note that derivatives are a global business; so it is unlikely that the U.S. would be the only market affected. Significantly more work will need to be done to understand what authorities would be brought to bear and what strategies would be used to maintain the critical functions of the central counterparty and to maintain market confidence in the flow of payments through derivatives markets.

Policy Priorities and Policy Challenges

When considering the policy priorities ahead, the first obligation must be to preserve the gains to stability and safety that we have made since the financial crisis. Above, I described the significant achievements of the Dodd-Frank Act in reducing risk and transforming transparency of global derivatives markets. Equally important is maintaining the tool of the Orderly Liquidation Authority. This is the central answer to the horrible dilemma that faced U.S. policy makers in the fall of 2008—should they allow another disorderly bankruptcy like Lehman Brothers or a deeply unfair bailout like AIG. The practical effects on small businesses and farms from those events should be motivation enough to maintain and support these reforms. Estimates of lost output due to the crisis, and due to the lack of tools to contain the damage are \$10 trillion or more. And those estimates do not include the incalculable pain and suffering of families who lost jobs, houses, farms and lives because of their economic suffering.

Many Members of this Committee have already voted to eliminate this authority, but it must be stressed that removing this authority from the U.S. toolkit would be misguided, shortsighted, and deeply irresponsible to the taxpayers that Members of this Committee represent. Removing the orderly liquidation authority would be misguided because the purported savings that the CBO has scored with this proposal are a mirage. They appear simply because of an accounting quirk in the budget window. By law, taxpayers cannot bear losses for any entity liquidated by the FDIC as part of the orderly liquidation authority. It would be short-sighted because it would suggest that policy makers had forgotten the immense pain and suffering families all across this country faced when the crisis-induced panic ripped through global financial markets and hurt families and small businesses most of all. It would be deeply irresponsible for taxpayers, because in the absence of this authority—we would be explicitly returning to the policy framework that gave birth to the TARP program of bank bailouts and taxpayer bailout risk. Orderly liquidation authority is the best tool the government has to provide predictability, fairness, and financial stability even as it allows any large, complex financial firm to fail because of their own mistakes.

It may also be helpful to note that there is no serious debate about whether orderly liquidation authority can be used to resolve a central counterparty. While the Dodd-Frank Act does not explicitly reference financial market utilities when discussing orderly liquidation authority, the authority is written deliberately to allow

¹ <http://www.cftc.gov/idc/groups/public/@newsroom/documents/file/stresstestpresentation111616.pdf>.

for its use with **any** nonbank financial company whose failure could threaten financial stability. Financial market utilities are very clearly nonbank financial companies and therefore fit squarely within that authority. Importantly, while the resolution approach for a central counterparty will likely not mirror the approach that has been developed for bank holding companies, the core authorities that are needed to facilitate any successful resolution are included in orderly liquidation authority. These authorities include the ability to allocate losses—by utilizing pre-funded resources, assessing members or tearing up contracts—and to provide liquidity. If a central counterparty were to need to be resolved, the resolution authority would ‘step into the shoes’ of the central counterparty, assuming responsibilities (principally operation of the central counterparty and the payment of variation margin) and rights. The rights of the central counterparty are laid out in an extensive rulebook that serves as a contract between the central counterparty and its clearing members. U.S. central counterparties have expansive powers in extenuating circumstances, if necessary, the FDIC would assume these powers and have at its disposal tools to affect recovery or orderly wind down of the central counterparty’s operations.

Going forward, I would like to highlight three key challenges for policy makers: coordination across multiple central counterparties; cross-border cooperation; and the need to develop resolution strategies that create *ex ante* incentives for positive risk management and for recovery.

The first challenge is coordination across multiple central counterparties in the event of default or multiple defaults. As discussed above, one mechanism for central counterparty failure would be cascading defaults among clearing members. Because derivatives trading is a highly concentrated industry, each of the major derivatives dealers is a member of virtually all the major central counterparties; and may be a member of dozens of central counterparties worldwide. Even in a scenario with just a single dealer default—a scenario that is very unlikely to threaten the viability of a central counterparty—the need for coordination among U.S. and European central counterparties to avoid confusion or uncertainty about market functioning will be necessary. Here U.S. regulators have taken to heart the lessons of central counterparties own fire drills (semi-annual events where they simulate distress scenarios with clearing members) and our experience working with industry on cybersecurity exercises, to begin both coordinated and cross-border exercises to understand and iron out potential points of friction and misunderstanding. As I learned in my experience in government, often simple arrangements for collaboration and communication are enough to avoid market confusion and destabilizing market movements.

Second, efforts on cross-border regulatory cooperation are essential, and have quietly had a number of important successes in the years since the crisis. Even before the crisis, market regulators like the CFTC and SEC regularly worked with international counterparts through Committee on Payments and Market Infrastructures and the International Organization of Securities Commissions (CPMI-IOSCO). In April 2012, these standard setting bodies published *Principles for Financial Market Infrastructures* (PFMI), which are a set of 24 principles that apply to FMIs including central counterparties on areas including credit and liquidity risk management and default management. It has been the responsibility of local authorities to codify rules and regulations customized for their jurisdiction that are broadly in line with these principles. This means that U.S. firms operating globally will have confidence in the risk management procedures and the rights that they will have when they participate in global clearing houses.

Since 2013, CPMI-IOSCO has performed a series of jurisdictional assessments to mark progress on compliance. In August 2016, their first report on financial risk management and recovery practices in place at a selected set of derivatives central counterparties, found that central counterparties have made important and meaningful progress in implementing arrangements, but identified some gaps and shortcoming in certain jurisdictions. A follow-up assessing the further progress is expected this year. These mechanisms for accountability are a critical support for the agreement to global principles that U.S. Companies need. By providing ground for assessment, we can increase our confidence that other countries do not seek unfair advantage by lowering their standards and our confidence that our companies will be protected when they pursue global business opportunities.

Regulators have also recognized that analysis of central counterparties cannot be done in isolation by market regulators; since clearing members and their clients are financial institutions, it is also important to coordinate with the Financial Stability Board (FSB) on issues related to resolution and the Basel Committee on Bank Supervision (BCBS) on bank exposures to central counterparties. In 2015, a joint

workplan² was published and the committees are continuing to coordinate among themselves and provide public updates³ on progress. This international, principles-based coordination does not supersede the ability and, indeed the necessity, of U.S. regulators to create granular standards and supervisory rules for central counterparty resilience, recovery and resolution. U.S. regulators have also successfully worked bilaterally with jurisdictions like the EU as they seek to create authorities to handle the potential failure of a central counterparty in their jurisdiction. Our close engagement has allowed us to seek alignment based on an understanding of the tools local jurisdictions will need to address the failure of a central counterparty and enable cross-border coordination in the event of broader market distress.

The successes of international coordination have also included private-sector partnerships, such as an agreement to change the standard global derivative contract (known as the ISDA protocol) to avoid damaging withdrawals from a firm that is undergoing resolution. This agreement was led by industry in cooperation with regulators and will significantly increase our ability to limit the damage to the economy if a large, complex financial institution fails.

The third challenge is to develop and clarify the specific strategies and parameters around tools that will be used by central counterparties, the CFTC, and the FDIC to handle the unpredictable losses that will attend an unsuccessful recovery and move a central counterparty into resolution. This was an important element of my own efforts within government last year, and it was a deeply collaborative effort—both between U.S. regulators and with other stakeholders. While I look forward to engaging with the Committee about some of the specific tradeoffs in developing those strategies and parameters, I want to first lay out the basic problem. There is a necessary tradeoff between giving *ex ante* certainty to stakeholders and giving regulators the flexibility to manage a situation that we have never before faced. Making this more complicated, the incentives of central counterparty management, clearing members and other market participants need to be compatible whether we are talking about resilience, recovery or resolution.

Necessarily, the interests of these parties cannot be perfectly aligned. In the normal course of business, private-sector entities want to optimize the amount of capital they commit to the safe operation of central counterparties; this is why regulators have imposed rules about initial margin and collateral quality. The same must be done for more extreme cases where both central counterparty management and market participants will be focused on minimizing their own exposure to losses. There are creative solutions already in place to align incentives in recovery; for example, some central counterparties ‘juniorize’ the pre-funded resources of clearing members who submit poor bids in auctions.

For resolution, regulators must work with other stakeholders to both strike a balance between flexibility and certainty, ensure that solutions follow laws that prevent taxpayer risk, and endeavor to make incentives for orderly wind down, liquidation or complete recapitalization as compatible as possible among market participants. There is not yet agreement on how best to do this. To highlight just one example, central counterparties argue that their members, who bring market risk to the central counterparty, should be subject to broad, but not unlimited, capital assessments to recapitalize the central counterparty. Clearing members and their trade groups have suggested that central counterparties be required to issue long term debt that could be converted to equity if the central counterparty needed to be recapitalized. As stakeholders continue to explore these questions, keeping our focus on creating incentives for each group that are compatible with market stability and resilience is an important and achievable aim.

The work of financial stability monitoring is never finished, but we must remain mindful of the progress we have made since 2008. Safe, stable markets are a U.S. competitive advantage and are good for business; markets thrive where rules are clear and integrity is valued. Central clearing of standardized products has materially improved the resilience of our financial markets. It has increased transparency, efficiency and raised the bar on risk management standards. Progress has been made on strengthening the recovery tools at central counterparties; there are more assets available for loss allocation and market participants have worked and continue to work with regulators to stress test the adequacy of those assets and increase clarity about what would happen in the event of a large counterparty default. With these measures in place and regulatory and cross-border coordination continuing, it is important that we continue to explore solutions for resolution. Most importantly, there is no viable approach to these challenges without existing orderly

² <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD508.pdf>.

³ <http://www.iosco.org/library/pubdocs/pdf/IOSCOPD509.pdf>.

liquidation authority. While we do not yet have complete strategies and tools to handle the resolution of a critically important central counterparty, the only way to avoid catastrophic outcomes in that event, will be to build those tools on the

The CHAIRMAN. Well, thank you, gentleman, and I appreciate your testimony this morning.

The chair would remind Members that they will be recognized for questioning in order of seniority for Members who were here at the start of the hearing. After that, Members will be recognized in order of arrival, and I appreciate Members' understanding.

And with that, I recognize myself for 5 minutes.

Well, thank you for presenting this. I understand it is unsettling, perhaps, to talk about failure of a clearinghouse and all those kind of things, but if we don't talk about it, and have some reasonable understanding of it, then we as policymakers will have a difficult time making sure we have the policies in place.

All of you have talked about the extensive protections and counterbalances, and all the things that are in place right now for the risks that we know about. This is what we are trying to explore this morning are the risks that we don't know about, or the ones we don't think could happen. I am old enough to have been around in 1987 when the stock market dropped 22 percent in 1 day, which was a bit unsettling. All of us were around in 2006, 2007, and 2008 when the housing market property values collapsed across the country. No one necessarily thought that was the case. Looking at the two sides to this question: one, what all those kind of things would cause monster liquidity risks in the system that where if two banks failed, or more than several banks failed; in that scenario what would we do and how we handle it, could the market take it? On the resolution side that, if you had that, what happens then to the clearinghouse, those customers, and everything else. Looking at the broader side of it from the liquidity standpoint, is there a plausible or just stunningly remote scenario that would create that kind of liquidity risk where the largest banks out there couldn't make their intraday transfers, and that we would have a circumstance that would cause the Secretary of the Treasury to be as white as my shirt in trying to explain to us in 2008 what was about to happen in his mind with respect to the credit markets at that point in time.

Anybody want to jump in and just tell us are we unreasonably asking that question?

Mr. SALZMAN. I can try. Jerry Salzman. Essentially, we are running tests on a regular basis, internationally and nationally, looking at scenarios that are far out but still plausible, given current market conditions, to create a risk or liquidity risk big enough to bring down a clearinghouse. So far, we have all been passing all of the tests, but obviously, it is possible that something could happen. For example, one of the things the CME does is to have a standby liquidity facility from the major banks. The problem in the world is there has been tremendous concentration among the banks that are still out there; the banks that are the major banks, where the money is held, who the clearing members are. And although we have a liquidity facility in place, and we have tons of treasuries to give to the banks to convert to immediate cash, the question is if

the banks are failing at the same time we are going to the banks to get cash, now we just have treasuries.

We have plans to settle in treasuries instead of cash if we had to, but that is not particularly a good way to do things. The best way to do things from our point of view is what Mr. Steigerwald has said and what Governor Powell has said, and to make the access to the Fed window to borrow on treasuries more expeditious than it currently is under law.

The CHAIRMAN. Let's flesh that out because one of the criticisms of that is somehow the taxpayers would be on the hook for some sort of *bailout*, to use a horrible phrase. What is the credit risk to the Fed for a clearinghouse swapping treasuries for cash?

Mr. SALZMAN. Is zero. They are ahead two percent the second we give them the treasuries, because they—

The CHAIRMAN. That is assuming the Federal taxpayers continue to make good on their debt.

Mr. SALZMAN. That is assuming that the Federal taxpayer and the Federal Government continues to make good on their debt, yes, sir.

The CHAIRMAN. All right. One of you mentioned, Mr. Hill may have mentioned access to that window could be, in statute or policy, limited to that transaction only. In other words, the only thing the Fed could lend on the window would be against U.S. treasuries. Is that what you anticipated?

Mr. HILL. That is exactly what I propose.

It is for that very direct and limited purpose. I completely agree with Mr. Salzman, in that scenario, we would even suggest if the Fed felt it was necessary that they could put a larger haircut on those when we show up at the window.

But it is only for the U.S. treasuries to turn them into U.S. dollars to facilitate liquidity.

The CHAIRMAN. All right.

And quickly, the risks to the taxpayer for allowing clearinghouses to park their excess collateral and assets at the Fed is what?

Mr. STEIGERWALD. I see no additional risk that goes beyond the ordinary incidences of acting as the depository, performing account services and functions that the Fed performs each and every day, day in and day out.

I would add very quickly that the sort of liquidity support that I have spoken to would be extremely short-term in nature. These institutions could not survive without immediate liquidity provision, and will not survive by being dependent on resources provided from outside of the clearing community.

The CHAIRMAN. All right. My time has expired.

Mr. Peterson, 5 minutes.

Mr. PETERSON. Thank you, Mr. Chairman.

I have been saying for years that the Basel Committee's supplemental leverage ratio accounting treatment of initial and variation margins gets it wrong. Late last week, Federal Reserve Board Governor, Jerome Powell, suggested the SLR should be changed. In his last speech before he retired, Daniel Tarullo, another Fed Board Governor, suggested the same.

Mr. Steigerwald, for those who don't know, could you please describe the problem and tell us how regulators could go about fixing this? And, Mr. Dabbs, how, as a clearing member, you see this issue. Mr. Steigerwald first.

Mr. STEIGERWALD. Thank you, Ranking Member Peterson.

This, as you undoubtedly are aware, is a very complicated topic, the application of the capital rules, I must say, causes my head to spin when I try to think about it and its comprehensive nature.

Let me say that there are implications both to the ordinary ability of financial institutions that are subject to the supplementary leverage ratio in providing access to clearing. The mandate to centrally clear standardized derivatives, frankly, doesn't mean very much if the end-user can't get there. That has to be a concern.

More importantly from my perspective, in an emergency circumstance where a clearing member has failed it is essential for customer accounts to be smoothly, swiftly, and safely transferred to a solvent operating clearing member. My understanding from the analyses I have seen suggests that that process could be, almost certainly would be, impaired by the existing form of the SLR.

Mr. PETERSON. How do we fix it?

Mr. DABBS. Well, I will grab that one.

From an SLR perspective, just to real quickly describe what SLR does, on the derivatives side, it was intended to make visible the non-balance sheet items of a bank, because traditionally we would measure leverage just by looking at the balance sheet of a bank, and it added an ability to recognize derivatives that are not on the balance sheet. And we are okay with that as a concept. Where we think we got it wrong is in the case of derivatives that are cleared for clients. We recognize the risk of the instrument; however, we don't recognize the value of that deposit that the client has provided. If the risk of the instrument is \$5 and you give me \$3, then clearly, $\$5 - \$3 = \$2$, and we have \$2 of risk that we should cover and should be on our balance sheet, and we are okay with that. Currently, we take the \$5, we ignore the fact that we have collected margin from that, and simply put \$5 on our balance sheet.

And if I step back and just look at where your capital regulations and your legislation have kind of divided is, when we made the mandate to centrally clear, we took one transaction that historically had been done between a bank and a client and we split that up into two transactions; each transaction facing a clearinghouse. We have two transactions: one where a bank faces the clearinghouse; and a second one where a clearing member, which is typically a bank, and a client. Now you have taken the universe and you have effectively doubled leverage as we measure it today.

We didn't do anything. We, in fact, made the market safer, but as measured under our capital regime, we have actually taken one unit of leverage and made it into two units of leverage, so when we look at the system it actually appears that the leverage is doubled in the system.

We think the effective policy would be to use the initial margin that a client has provided us as a deduction from the risk of the instrument that the client has put on in their account.

Mr. PETERSON. Thank you.

It appears from a review of the material that one of the weak spots in the system is the repo market. Could somebody describe the role of the repo market and what the concerns are out there in regards to how this might undermine the system? Jerry?

Mr. SALZMAN. Well, I will try. The repo market is used by people who have securities who need cash, and generally it is an overnight market, and the liquidity in that market has been very high, so that if you had securities, generally, you could get cash often the next day. Frequently, for clearinghouses, they need the cash immediately because all their payments are made at set times.

In the past, we have been able to make arrangements with people to get paid the same day, the same day we give up our securities, and so that functions wonderfully for us. But, one of the things we are worried about, one of the things everybody has to worry about, is that in a time of crisis the repo market will be one of the first things that breaks down, it did during the Lehman Brothers situation, they could not use their securities to get cash. And that would be a disaster because everybody is sitting there, everything is solvent, everything should work, but the system breaks for 1 second and then we are all in trouble that we shouldn't be in.

Again, we fall back to the idea, we do have a central bank with essentially unlimited liquidity, and as long as we have really good securities to give it, we are not hurting the taxpayer, we are helping the taxpayer, because the cost of undoing a crisis is ten times the cost of the potential losses of the crisis.

Mr. HILL. One thing I would add, and I agree with everything that was said is, we have established for our clearinghouses committed repo facilities, so that at a time of crisis we are able to access liquidity. I know the CME has done the same thing. We have committed FX facilities. We have taken steps in the commercial market to do what we can, similar to the default stress tests, we run liquidity stress tests that look at what happens if your two largest clearing members go down in the middle of a liquidity event, are you able to sufficiently provide the liquidity, Mr. Salzman notes that it is necessary to keep the system functioning. And I will give you an example. In our clearinghouses, that stress could be up to as much as \$4 billion in the middle of the day. And so we have provided backstops against that, but it is important to realize that those backstops are with large financial institutions that in many cases are the large clearing members. And so you have effectively a potential wrong-way risk, in that your committed backstop may be from a firm that is also subject to the risk of default. And that is where the Fed can step in and provide the services that Mr. Steigerwald talked about, again, not as the primary defense, we at CCPs have primary defenses, but as a last step to ensure the liquidity continues to flow in the system.

The CHAIRMAN. The gentleman's time has expired.

Mr. Austin Scott, 5 minutes.

Mr. AUSTIN SCOTT of Georgia. Thank you, Mr. Chairman.

Mr. Hill, sorry to keep coming back to you, but you represent ICE, and one ICE clearinghouse is designated as systemically important, and another one is not. Does it make sense that we treat

systemically important clearinghouses differently from other clearinghouses, and how does this impact you representing both?

Mr. HILL. Thank you for the question.

It doesn't make sense, is the short answer, to treat one clearinghouse differently than another. And I will give you a specific example. ICE Clear Credit is our CDS clearinghouse. It has been deemed systemically important. It does have access to put its cash at the Federal Reserve. It is a similar position that the CME is in. Our agriculture clearinghouse, ICE Clear U.S., was not deemed to be systemically important and does not have the access to deposit its cash at the Fed.

The Fed today provides returns on cash that are above what the market pays, and we have seen cash leave ICE Clear U.S. and go to other clearinghouses where that money will be put on deposit at the Fed and earn a higher return. And that is an unintended consequence where you have a wheat farmer whose cash is lodged at the Fed at the end of the day, and a cotton farmer whose cash is lodged at a commercial market earning a lower return. And to be clear, it is not about the return.

Mr. AUSTIN SCOTT of Georgia. Yes.

Mr. HILL. The fact that the Fed pays an above-market return is not particular logical to me, as it is. It is really about the security of those deposits, not the return on them. What we are looking for is the ability for each of our customers to have the same access to the secure deposit services that are available to systemically important institutions.

Mr. AUSTIN SCOTT of Georgia. And so prior to Dodd-Frank, the clearing community was required to find its own solutions to the clearinghouse solvency question. All of you have testified, and this is unusual that all would testify that the same solution would work. Each of you endorsed the Federal Reserve account as an important place to hold the cash reserves of the clearinghouses. Those accounts are currently provided by Title VIII of the Dodd-Frank Act for systemically important clearinghouses, some of your clearinghouses are, some aren't. This discussion about repealing Title VIII without addressing all of the individual things in Title VIII that it covers, and whether or not repeal is appropriate in all cases.

Just a few questions about the Federal Reserve account services. Mr. Hill, again, where will clearinghouses put their financial reserves if they lose access to those account services at the Federal Reserve?

Mr. HILL. Thank you again for the question, Congressman Scott. To be clear, the clearinghouses have existed a long time and have been able to facilitate places to put their cash, and to generate the liquidity necessary, before the *systemically important* designation, and to the extent that that is removed, we will be able to continue to find those commercial services.

The direct answer to your question, if ICE Clear Credit no longer was able to deposit its cash at the Fed, we would create relationships with other commercial institutions, other financial institutions, that would be able to take those deposits. And again, those are the same relationships we have today for ICE Clear U.S., they are the same relationships that we have for our large lending clearinghouse, ICE Clear Europe, so we know that those facilities are

available and able to be implemented. I simply am suggesting that access to the Fed makes the system more secure. And, therefore, whether Dodd-Frank and Title VIII are repealed or not, I think a rational policy decision would be to provide that access.

Mr. AUSTIN SCOTT of Georgia. Mr. Steigerwald, what problems are there with market-based solutions to managing clearinghouse cash collateral in a crisis?

Mr. STEIGERWALD. Congressman, the answer to that question is that in the midst of the sort of crisis that would cause a central counterparty clearinghouse to turn to its resources, the financial system as a whole would be stressed. We would see a generalized phenomenon known as hoarding of liquidity, akin to a bank run. We saw this clearly during the crisis, and we can expect that private-sector transactions will slow, if not cease.

We were pleased to have Governor Powell speak at an event at the Chicago Fed on Friday, where he went into some detail about the events relating to the 20th of October 1987, which showed, in fact, the kind of gridlock in the payments system and in the exchange of these critical settlement payments that we are concerned with. That is why I think the public-sector as a backstop and as a custodian of these critical resources makes a lot of sense.

Mr. AUSTIN SCOTT of Georgia. Right. Thank you.

Mr. Chairman, my time has expired.

The CHAIRMAN. The gentleman's time has expired.

David Scott, 5 minutes.

Mr. DAVID SCOTT of Georgia. Thank you, Mr. Chairman.

I want to ask several questions here. And let me just commend the panel on the expertise, that you all are dealing with, what is a very complex and complicated system.

But I want to first of all, Mr. Hill, address this question to you. We recently saw that the EU proposed additional standards for clearinghouse regulation, and I believe that this will tie into the Brexit determination. I want to ask your opinion on whether or not these proposed standards threatened the equivalence determination that we negotiated for, we fought for, for so long, and how do you view this from the perspective of cross-border competition and cooperation?

Mr. HILL. Thank you, Congressman Scott, it is a really important question. And happy birthday.

I would tell you, and for the Committee's benefit, if you haven't seen it, what the European Commission has done is published a paper that has effectively looked at how they will regulate clearinghouses that aren't on the European Continent, but in their opinion may create some form of systemic risk, particularly around Euro-denominated products.

And they define two tiers of clearinghouses. Tier 1 is effectively not material; we are not going to worry about it, we will defer to the home jurisdiction. Tier 2 is a very, very broad category that can range from anything to, we will work closely with the home regulator, to, we, Europe, will have direct oversight of a non-European CCP, to the very extreme of we will not allow our European companies to use that CCP if they remain located outside of Europe.

Unfortunately, Congressman, that is a wide breadth of possibilities. It is difficult to say ultimately what it will mean because, effectively, they have left all the cards on the table.

They have complete optionality on what they will do.

I don't know that it will be a threat to the equivalence that, I agree with you, we worked long and hard to establish. The CFTC, particularly, did a remarkable job working with our European colleagues to reach that agreement. I can't say for certain that it will impact it, but it has the possibility to impact it if, for example, the European regulators decide that a U.S.-based clearinghouse, or, in our case, a UK-based clearinghouse, clears Euro-denominator products in a sufficient amount that they deem to create risk.

Mr. DAVID SCOTT of Georgia. Yes.

Mr. HILL. It creates uncertainty, without question.

Mr. DAVID SCOTT of Georgia. Well, thank you, Mr. Hill.

I want to turn my attention to you, Mr. Salzman. In addition to my work here on the Agriculture Committee, I am also a Member of the Financial Services Committee. And we recently reported on a bill, controversial, that I thought had serious problems, and that is the Financial Choice Act, because it repeals both Title II, which provides for the orderly liquidation authority to wind down in a crisis, and then it also repeals Title VIII, which provides access to deposit in the Federal Reserve in the Dodd-Frank Act.

How damaging is this, and could you share with us why it is important that if, and as we move forward, that we keep these two sections in place?

Mr. SALZMAN. Well, I am going to be a bit more limited and less political, if I can.

The part of Title VIII that is definitely important to us, as everybody here has testified, is access to the Fed accounts and access to the Fed window. And to the extent that is preserved, I don't want to jump in and talk about essentially getting rid of the rest of Title VIII.

With respect to Title II, and the authority to wind down a clearinghouse, I am deeply concerned that the determinations made by the European regulators on equivalence depended on the notion that there was resolution authority in the government. And I am very concerned that getting rid of Title II will give somebody in Europe a further excuse to assert either more power or to deny us European clients. I want to be really careful about that.

With respect to the Choice Act itself, there are actually some very interesting things in the Choice Act in other parts.

As I say, I don't want to be political on those issues if I can avoid it.

Mr. DAVID SCOTT of Georgia. Thank you, sir.

The CHAIRMAN. The gentleman's time has expired.

Mr. Comer, 5 minutes.

Mr. COMER. Thank you, Mr. Chairman.

With respect to liquidity risk, during the Brexit vote we saw very significant margin costs from clearinghouses. What lessons should we draw from that experience in terms of liquidity management and risk management? Mr. Steigerwald. Yes.

Mr. STEIGERWALD. I think you point to a very important illustration of exactly the principle that I was talking about.

Mr. COMER. Yes.

Mr. STEIGERWALD. These markets, the clearinghouses that serve them use time-critical settlement processes to contain credit risk, precisely because clearing members are called daily and sometimes intraday to make payments that extinguish obligations they have to the clearinghouse, that credit risk can be managed in an efficient and effective way.

That means, however, that all participants in the system, and we have to think about clearing as a system, have to be ready, willing, and able to meet those time-critical obligations as they come due. On extraordinary days, the amounts involved can be quite exceptional. The Brexit vote and the aftermath demonstrates that. That is a part of the new world of interconnectedness.

Mr. SALZMAN. I do want to say one thing about that. There wasn't a problem at every clearinghouse. There was no problem at CME's clearinghouse. And this is, in part, a matter of experience and a matter of judgment. And remember, clearinghouses have been in business for 100 years, and some of us have actually learned something during that period, including 1987 where our clearinghouse made a mistake and we made an extra call for intraday margin that actually caused a problem. This is not something you forget when you make a mistake, and I am sure that the clearinghouses that did call for extra margin this time have learned a significant lesson, and at least that will be out of the system, going forward.

Mr. DABBS. Yes, as a member that had to make a very large payment, I can tell you that each clearinghouse was unique in their response, and there was one clearinghouse that acted differently than what I would call the global standard. It has been remedied at this point, however, the challenge really was that it was a one-way collection. Instead of taking money from the loser and paying it to the winner, it was just a collection from all the losers, without any of the winners benefitting. You were effectively trapping liquidity at the very time that you wanted to provide liquidity back to the market.

Mr. COMER. Right.

Mr. DABBS. They have since remedied it. It was a combination of rules and general structure of their technology systems, but I think that we have moved in the right direction.

These are why those stress tests and things, and real-life examples, are always better than just a test that we do behind the scenes. It is always good that we have results that are proved.

Mr. COMER. Right.

Mr. HILL. The only thing that I would add is two important things. First, the Brexit scenario created a lot of volatility, and the outcome was, loosely saying, unexpected. It demonstrated the system does work because the money did move.

Mr. COMER. Right.

Mr. HILL. It is also important to note that the one clearinghouse that was the exception was outside the U.S., and that reinforces the importance of the cross-border communications and regulations, because even though the clearinghouse was outside the U.S., a number of members weren't. The system did work in this situa-

tion, and where the issue existed demonstrates why we have to have cross-border cooperation among regulators.

Mr. COMER. Okay.

Thank you, Mr. Chairman. I yield back.

The CHAIRMAN. The gentleman yields back.

Ms. Kuster, 5 minutes.

Ms. KUSTER. Thank you, Chairman Conaway and Ranking Member Peterson, for holding this hearing. And thank you to our panel.

Nearly 10 years ago, the United States and the world experienced one of the most serious financial crises in our nation's history, which wiped away a generation of wealth for countless American families, and put millions of Americans out of work. While the 2007–2008 financial crisis was in large part caused by an unprecedented number of defaults on subprime mortgages that should never have been awarded in the first place, reckless trading on Wall Street and risky bets placed by hedge funds wreaked havoc on our economy. Dodd-Frank was put in place because the financial crisis made it clear that just a few bad actors can hurt the economic well-being of millions of Americans. And I refuse to let us go back to a time when Wall Street can wreak havoc on Main Street.

Now, I appreciate the opportunity to evaluate the role that clearinghouses have in protecting market participants against systemic risks, and discussing how the recently passed Financial Choice Act would hurt the clearinghouses' ability to effectively manage risk.

So my question is this, for the panel, I am talking about the repeal of Title II and Title VIII of Dodd-Frank, which was a provision of the Financial Choice Act, passed on a pure party-line vote on June 8, if this were to become law what effect would the repeal of these two titles have on clearinghouses in the overall health and safety for swaps markets? And anyone can respond.

Mr. GERETY. Let me jump in. Thank you very much. It is a very important question, and already has been addressed to some extent. But it is important to note that the framework absent Title II is bankruptcy, and bankruptcy alone. I don't think there is anyone on this panel who would not hope that these entities or any financial entity can go through bankruptcy, but in the context of a severe financial crisis, when normal sources of commercially available liquidity are frozen, there is no other opportunity other than Title II.

It is also worth noting that Title VIII is the key to allowing for account services from the Federal Reserve, and the reason for that is that the Federal Reserve generally has not ever felt comfortable giving account services to entities that it did not have some sort of regulatory relationship with.

While it is theoretically possible to give account services to entities that are completely outside of the Federal Reserve's regulatory orbit, it would be completely unprecedented in the history of the United States.

The reason we have banking relationships between the Federal Reserve and banks all across this country is because banks are regulated by the Federal Reserve. Similarly, what Title VIII did was an arrangement where, in exchange for more cooperation between SEC, CFTC, and the Federal Reserve, there is also an arrangement

for more security for monies held by CCPs to be able to go to the Fed. That arrangement is consistent with the way we regulate our financial services, and it is an arrangement that would be broken if either of those titles were repealed.

Ms. KUSTER. As a follow-up, if the Choice Act were to become law, would the CFTC likely become responsible for the resolution of a failed clearinghouse? We have heard testimony for the last 10 years, including this year, that the CFTC is understaffed and under-funded, and it seems unlikely that the agency will see an increase in funding or staffing any time soon.

My question is, does the market have confidence that they would be up to the task of resolving a failed clearinghouse?

Mr. SALZMAN. Let me try that for a second. The problem is, as Mr. Gerety said, in the absence of the appointment of either the FDIC, or somebody else, the actual fallback is to bankruptcy under the Bankruptcy Code, and under the Bankruptcy Code the only option for clearinghouses is pure liquidation, not reorganization. The CFTC wouldn't step in.

In the CFTC somehow were, by law or otherwise, made the party responsible for dealing with the resolution of a clearinghouse, even though its budget didn't go up, I believe that by appointing an appropriate person as trustee, and overseeing the process and getting the fees out of the process, that it could be done by the CFTC. But as I say, that isn't what the law is now, and it isn't the fallback position.

Ms. KUSTER. You are saying what would likely happen then is a total liquidation under bankruptcy?

Mr. SALZMAN. Unfortunately, I believe that is what the fallback is if Title II goes away, but there are other options out there and legislation floating around, I know, people are talking about.

Ms. KUSTER. Okay, thank you very much.

I yield back.

The CHAIRMAN. The gentlelady's time has expired.

Mr. Marshall, 5 minutes.

Mr. MARSHALL. Yes, thank you, Mr. Chairman.

I will direct my first question to Mr. Hill and Mr. Dabbs both. I serve on other committees, on the Science, Space, and Technology Committee we talk a lot about cybersecurity. And if I was to prioritize my concerns sitting on this side of it as a more pressing danger concerning cybersecurity, and maybe, Mr. Hill, you can talk a little bit about what ICE is doing to get a handle on some of those.

Mr. HILL. Yes. I suspect what I will say will be very similar to the CME and others. Cybersecurity is at the top of our agenda. Effectively, we operate exchanges and clearinghouses, but we fundamentally run technology. And so our ability to have those markets run, our clearinghouses to operate, our exchanges to facilitate risk management, all depends on our technology being up and running.

We have developed significant disaster recovery and business continuity plans that have been reviewed with our members, have been reviewed with our regulators, that are reviewed by our independent boards of regulators, and have made significant investments in our information security in terms of resources, and in

terms of not just trying to keep the bad guys out, but more important, assume the bad guys are in, and can you find them and can you stop them. This is an area where I would suggest to you, over the last 3 years, there has not been a heavier place of investment for our company, or a topic that has had more senior management and, frankly, board-level attention at our company.

Mr. MARSHALL. Mr. Dabbs, do you have anything to add?

Mr. DABBS. Yes, I would echo some of the things that Scott said. I would say that, first and foremost, I am not an expert on cybersecurity within my institution. As an institution of 45,000 people, we have teams of people that do this as their day-to-day job. In terms of expertise, I can follow up and give you some greater detail of what we have been doing, but just from a user perspective and how I see it, we have BCP plans, we have employee training where we will go through not only video and instructional training; also, we'll send spoofing e-mails and things like that that will try to catch people that you shouldn't click this, and whoever clicks it gets an e-mail saying, "Hey, you shouldn't have done that." We will do things like spoofing e-mails, we will do tire-kicking, we look at things like two-factor authentication.

I engage in it and I am aware of it, but I am certainly not the expert on the subject for my institution.

Mr. MARSHALL. Okay.

Mr. GERETY. If I may.

Mr. MARSHALL. Sure.

Mr. GERETY. One of the responsibilities that I had when I was at the Treasury Department was to oversee the Treasury's relationships with the financial industry on cybersecurity. And as part of that, the centerpiece of our efforts were a series of tabletop exercises where we brought together law enforcement, Homeland Security, intelligence community, industry, and regulators to explore scenarios where a cyber incident would create business impact. And as part of that, we had members of the CME, ICE, and other clearinghouses participate fully.

The bad news in those scenarios was that the uncertainty associated with cyber means it may well be our single most important risk in this or any other context. The scale of the resources, while very significant, still pales in comparison to the scale of the potential threats.

Second, the good news in this is that when we went through these exercises, the reaction and the spirit of cooperation among all parties, the spirit of alignment was notable and notably different than what happens when people are in a creditor relationship.

There is much to be learned, but also very significant cooperation that is undergoing even today across government and with industry.

Mr. MARSHALL. Okay. My last question is, in 1987 I was in medical school, I didn't even know there was a crisis. Mr. Salzman and Mr. Steigerwald, lessons learned, what happened then so it doesn't happen today? I mean I have a minute left, so each of you get 30 seconds at it. Mr. Salzman.

Mr. SALZMAN. Okay. Well, in 1987 when the crisis hit, fortunately, a bunch of CME people were actually at a meeting that night, and I almost would have needed the services of a doctor be-

cause I thought my heart was going to stop. We found that the interconnections between the Stock Exchange, the commodities exchanges, and the banks were nonexistent. It was the closest thing to essentially blowing up that event into a major disaster. The banks didn't know what their obligations should be to create liquidity. The Stock Exchange and the futures exchange were at the beginning of a fight as to who was to blame, with the Stock Exchange trying to blame the futures exchange. Finally, the Federal Reserve stepped in and told the banks to provide liquidity and they would backstop them. And the next morning the Chicago Mercantile Exchange, I forget at what time, but at some time in the morning, the Chicago Board of Trade, the Dow Jones contract started moving up and that put a stop to the crisis and we all healed, and then we had 3 years of reports afterwards, as you know, to look back and try and learn something from it. And the things we learned was, you had better have hotlines, you had better be prepared, you had better have everybody interconnected and stopping and starting at the right time.

We did learn, and we are still learning.

Mr. MARSHALL. Okay.

My time has expired, sorry.

The CHAIRMAN. The gentleman's time has expired.

Mr. O'Halleran. Tom, I cannot get your last name right.

Mr. O'HALLERAN. Well, we will get that there, Mr. Chairman.

The CHAIRMAN. Keep working at it.

Mr. O'HALLERAN. Thank you, Mr. Chairman.

I guess 1987 is where it all began because I was on the Board of Directors at Chicago Board of Trade at the time, and the word *liquidity* was something that I will never forget. And when we are talking about these issues; the complexity of these issues, if we are talking about protecting the American public, we have to understand that if our economy goes awry, we are still, 10 years later, suffering as an economy from what occurred in 2007 and 2008.

What occurred back in 1987 was exactly as was explained, but the concerns continued on and on. And, yes, communication was bad. It is better today. But it still gets down to this cascading impact that occurs within the marketplace. And one of the things that is not realized a lot, we talk a lot about the crisis and the cascading impact is how to stop it from occurring in the first place. And that is where clearinghouses come in, their ability to change margin requirements, their ability to liquidate positions, their ability to see markets that are cornered, their ability to understand the marketplace. But they require that type of liquidity that only, I believe, the Federal Reserve can produce. The guarantee fund, the position requirements, all of that can only get us to a certain point, but each and every one of those segments protects the economy of America.

It is part of the whole process that without it, that is what we saw in 2007 and 2008. There was none of that available to us, for the most part, and we had that cascading impact that just tore us apart as an economy, and luckily, the decision was made for the Federal Reserve to step in, because if it hadn't those banks that we tried to get ahold of in 1987 in October, and other exchanges tried to get ahold of, there was limited ability. And now we are commu-

nicating more on an international basis, which adds another level of complexity. We had markets that were international at the time and trading internationally, but the complexity today is so different. I just can't envision a marketplace in which we have to identify that the Federal Reserve is not the backstop for this whole process.

With that, if we are really going to protect the taxpayers of our nation, the economy has to be the number one protection, not just worrying about the risk on the Federal Reserve side of the equation. We have really smart, competent people that will address that risk, but our overall objective needs to be how do we protect the American people.

With that, I will ask for anybody to comment how much better off are we today than we were in 2007 and 2008 as far as creating that protection?

Mr. HILL. I appreciate the question, and I will start and be quick, John, so you can jump in.

A great example is the credit default swap, or CDS, market. Back in 2007 and 2008, I like Mr. Gerety's phrase, I wrote it down, *a complex web of transactions*. That is what you had. They were bilateral trades. It was undetermined who was exposed to whom, you didn't have the benefit of netting, you didn't know what margins had been required, if any, and based on what the individual firms knew, but collectively nobody had insight into exactly what the exposures are.

Cycle ahead a decade later and more than 80 percent of the CDS index market is now cleared, around 1/2 of the CDS single-name market is cleared, and on any given day we know what the net exposures are, we know exactly how much collateral is held against those positions, and that collateral is held based upon an ability to liquidate the positions over a 5 day period, representing the relative illiquidity of the CDS market. You have transparency in the market today, you have certainty of collateral in the market today, you have a—

Mr. O'HALLERAN. I only have 4 seconds, so I am going to ask does anybody identify that lack of liquidity would help this process? No. Thank you.

The CHAIRMAN. The gentleman's time yield back.

Mr. Bacon. General Bacon.

Mr. BACON. Thank you, gentlemen. I appreciate it.

As a 30 year Air Force guy, your testimony is informational for me, so I appreciate it.

My first question is to Mr. Dabbs. How might a clearinghouse failure occur? We touched on this a little bit, maybe in the testimony, but is it more likely to be a gradual or just a shock or a surprise?

Mr. DABBS. It is going to be a relatively shocking event. It is not going to be a gradual demise, it is going to be a kind of cliff event. And to the point that we were just talking about: how is the system safer, how does this happen—

Mr. BACON. Right.

Mr. DABBS. Post-2008 we have ratcheted-up all of the reforms. We have had money market reform, we have increased bank cap-

ital, we have taken leverage out of the system. All of the components of the ecosystem have gotten safer.

I don't think anybody can tell you how safe, because we haven't gone through the next crisis, right, but we all know that every component of the market infrastructure has gotten safer. When I think about, how do we get to this point of a failure, the failure, again, has to happen where a major banking institution, at least one of them, again, I know that you are covered for four, and you are covered for two, but again, it depends on how bad the world is, a major banking institution has to default, and that is your start of the scenario.

Mr. BACON. That will be a first indication?

Mr. DABBS. Yes, that is when you know. In our minds what we would call that is your stress event.

Mr. BACON. Yes.

Mr. DABBS. Right? And then, do we just stay in stress zone, or do we get to a recovery zone or do we get to a resolution zone, but our goal that all of us have kind of focused on is the resiliency, and that is how do we respond when we hit that stress moment how do we respond, and what tools and what infrastructure have we built for readiness for that stress moment, because that, to me, is the real time when all of this matters.

Mr. BACON. Okay, thank you.

Mr. Salzman and Mr. Dabbs both for this next question. When should a regulator step in and trigger its resolution powers?

Mr. SALZMAN. Well, I mean many people believe, and I know Mr. Gerety believes, that Title II is the authority to the FDIC, and I agree with that with respect to certain clearinghouses, but there are actually definitions in there that raise a question as to whether that applies to every clearinghouse under all circumstances.

Right now, my guess is whatever the law is, the FDIC would be the one who would step in, and nobody would really have, despite my legal background in technicalities, I don't know that anybody could really stop them once they did step in.

The real point here is the timing of when they should step in. Remember, we have all spent 2½ to 3 years creating plans to deal with how do we avoid getting to resolution. How do we have resilience so that when one bank fails, nothing really happens? We employ a bunch of the stuff, everybody opens the next day, everything is good. Two or three banks fail, we start using these pools of money, we can still open the next day, everything is still good.

What happens past then? Well, we have been required by our regulators and by European regulators to have ways to distribute losses and still keep working. The question is, is a Federal regulator, the FDIC, going to step in and do something else that differs from the plan that everybody else has accepted and that has been worked through in the industry. We think that is a bad idea. We don't know what is going to happen. Nobody knows what is going to happen.

Mr. DABBS. Yes, my view on this would be there are a few things. First, from a resolution perspective, it is my opinion that whatever the resolution authority is, when they step in all they are going to be doing is distributing funds. There is no high-functioning moment at that point, it is who is at the table at stress and recovery that

is the key. The actual resolution process is now the clearinghouse is defunct and now it is just distributing whatever funds are left over. And so in my opinion, the CFTC, for the two CCPs up here, or more broadly you could follow the designated regulator under Title VIII of all the relevant CCPs, but for up here I would say the two CCPs, that CFTC is the expert of their functioning domain. And then you want the Fed at the table, just because if you want to take any extraordinary actions, the Fed has the most credibility to take extraordinary actions, given we don't know what the problem is, where it is coming from. We can't predict what that is, you want the Fed there just to be able to take action if there are extraordinary measures that they could do at the time that were appropriate.

Mr. BACON. Thank you to all five for sharing your expertise.

And, Mr. Chairman, thanks for the time. I yield back.

Mr. LUCAS [presiding.] The gentleman yields back.

The chair recognizes the gentlelady from Delaware for 5 minutes.

Ms. BLUNT ROCHESTER. Thank you, Mr. Chairman. And thank you to the panel. I first want to also thank Mr. Salzman for going off-script. It was very helpful what you shared.

And I heard so much today. I come from Delaware, the financial services industry is important to my state, but I heard a lot about mitigation and management of risk, about interconnectedness and resiliency, safety, and solvency. And my question initially was going to be really about the safety of the market, but Mr. Dabbs basically started to run through some of the answers there as well about the swaps market. I am going to ask more of a general question for the whole panel. Are there other big-picture changes to the regulation of clearinghouses post-Dodd-Frank that we in Congress should be watching out for?

Mr. DABBS. And like you, I applaud you for going off-script as well. I would point in, and in my testimony I also mentioned it, but one of the mechanisms that currently is unavailable that would enhance the system at a time of stress is for a client of a defaulted clearing member, so that is the time when we have described as a stress event where a clearing member has defaulted, their clients immediately stop paying because nobody is going to pay to a bankrupt entity or a defaulted entity. And so what that does is you then have a regulator come in and you also have a trustee come in, and they can't tell the difference between a good client, which is they have the finances available to pay, they just won't pay it because it is defaulted, and a bad client, who is actually insolvent as well. When a regulator comes in they can't tell the difference, and immediately you want to decipher between where are my problem areas within that defaulted clearing member, and where are my areas that are fine and just need to be ported out to a new member.

Establishing a mechanism that is a very temporary mechanism that allows an end-user to make payments to a clearinghouse during the default of their member would not only make the system easier for the regulators and the trustee to manage, but it would also increase the liquidity at which the clearinghouse requires during that time. Instead of the clearinghouse needing to go source that liquidity because those clients have stopped paying, those clients would be able to continue to pay and receive, and so you

would decrease the size of the problem and provide more transparency.

In my opinion, that would be a very simple, simple in the sense that nobody is going to argue with it in the ecosystem, but it still needs to find an avenue between Bankruptcy Code and the Commodity Exchange Act, where that could actually work and function.

Ms. BLUNT ROCHESTER. All right.

Mr. SALZMAN. We have been working with Mr. Dabbs for years to find this type of solution, and we are in the process, but unfortunately at this point it is only going to work for very large clients, not for smaller clients, I don't think, because you have to have everything prearranged, and it is expensive.

Mr. DABBS. Yes, this is slightly different, so this is a new one.

Mr. SALZMAN. Well, again, but the fact is in order for there to be proper banking relationship so these cash flows can work the next day, you have to have a lot of stuff prearranged, including a prearranged place to go to another clearinghouse. And we do that for swaps to a certain extent. To futures, it has been more difficult, and there are problems with the Bankruptcy Code. And we are happy to have technical meetings with your staff, who, by the way, I want to compliment the staff. The preparation for this hearing is about as good as I have ever seen. It is really great.

Ms. BLUNT ROCHESTER. And my second question, Mr. Gerety, last year the CFTC conducted stress tests of the clearinghouses. What were some of the key lessons of those tests, and how could those tests be improved?

Mr. GERETY. Thank you for that question. It is very important, obviously, as I was not a staff member of the CFTC, I can't speak to all of the lessons learned, but as Mr. Hill mentioned earlier, the general set of stresses found that the existing resources across the CCP landscape were sufficient.

The places where additional work probably should be done, and needs to be done, is on the interaction effects. Because of the concentration of derivatives markets, if a large clearing member fails at one, they are also very, very likely to be members of other CCPs. There is a coordination element to that, which is just the simple communication and collaboration of knowing who will communicate what to whom and at what time. That is a very important part that could be, and is already being worked into stress tests. And then there are also liquidity elements, and Governor Jay Powell talked about that earlier, to make sure that the liquidity flows in the system as a whole would be sufficient and prearranged, those are two areas.

The stress tests themselves were successful, but the collaboration between multiple sets of CCPs and multiple clearing members is a place where more work can and is already being done.

Ms. BLUNT ROCHESTER. My time has expired. Thank you.

The CHAIRMAN [presiding.] Mr. Dunn, 5 minutes.

Mr. DUNN. Thank you, Mr. Chairman.

Let me start by saying I certainly have enjoyed the opportunity to listen to five such learned financial leaders. It is important for us to understand the mechanisms of the clearinghouses and the processes by which they might fail. It has been a great deal of fun for me.

But I am going to ask you a question that Joe Citizen on the street might ask. I want something that is maybe a little more visceral and palpable to our constituents back home.

Your clearinghouses are full of treasury bills, and those assets are central to mitigating the risks that you manage. In the past, we talked about here in Congress, and it is said about us that we are talking about raising the debt ceiling, and maybe we won't, maybe we will fail to pay all or part of the United States' obligations. No big deal, I don't think we are going to do this, by the way, but the argument is made that this will somehow affect, we actually will perhaps default on our interest. And what I want to know is how do the clearinghouses respond, how would you value U.S. debt, how would you respond to that? I will start with Mr. Salzman, if I may.

Mr. SALZMAN. Well, right now, clearinghouses that take treasuries and other kinds of collateral, we value them each night. If there were some fear that interest might not be paid and the value of treasuries went down, the clearinghouses would automatically revalue all the collateral they are holding. Some collateral might go up in value, some would go down.

Mr. DUNN. You are chasing the market on the U.S. debts.

Mr. SALZMAN. And we would require our clearing members to come up with additional collateral if the value of their collateral went down.

In addition, at the same time the collateral is going down in value, obviously, the value of contracts is changing, and so to the extent that there are losses on these contracts, those people who have bigger losses than were expected would be required to pay, and, of course, we would then pay over the money to the people who can't—

Mr. DUNN. Do you ever reprice intraday or just once a day?

Mr. SALZMAN. For futures we price intraday, for swaps we price once daily. Futures we price about 1 o'clock.

Mr. DUNN. How does that affect the value, or what does that—in your clearinghouse you are going to stay solvent, no matter—

Mr. SALZMAN. We stay solvent—

Mr. DUNN. I mean we do something terribly stupid up here, will you stay solvent?

Mr. SALZMAN. We will stay solvent as long as you don't bring down the banking system, and bring down the bank, which I am sure you are not going to do that, please.

Mr. DUNN. No, I know we are not.

Mr. SALZMAN. Good.

Mr. DUNN. We are not. But I mean these are the questions that you hear, and I really wanted something to come out of here that the citizenry could understand without creating a derivatives market.

Mr. SALZMAN. From your point of view, we are prepared for changes wrought in the market by ordinary, even extraordinary uncertainty. That is all built into the system, 100 years of work, it all gets done automatically, and the next morning the books are clean.

Mr. DUNN. Mr. Gerety, you seem to be the pessimist in the group here. Would you opine on that?

Mr. GERETY. Yes. It is difficult to overstate the severity of the shock if the U.S. Government failed to pay its interest or its obligations of any sort. Can you imagine a scenario in which the U.S. Congress made the decision and asked the Treasury to pay foreign investors who held U.S. treasuries instead of Social Security beneficiaries? I simply cannot imagine that scenario. And because of that, the question of the debt ceiling it is impossible to overstate the severity of the shock both to U.S. citizens and the world financial system. The U.S. credit is the single safest asset that we understand in the globe. It would cause an immediate repricing of all financial securities worldwide, and I am not sure that anyone at this table or in the world is prepared for the severity of that shock.

Mr. DUNN. That is an excellent answer.

Would you answer that, Mr. Steigerwald? Same question about if Congress loses its mind and we default on some portion of the U.S. debt.

Mr. STEIGERWALD. Well, I am mindful that it is an awfully delicate issue to address issues involving the operation of the U.S. Treasury as a staff member of the Federal Reserve, so I don't want to go beyond, say—

Mr. DUNN. I can give you a hall pass, since we are short on time.

Mr. STEIGERWALD. Yes.

Mr. DUNN. Let me ask Mr. Hill instead. You are up, Mr. Hill. Same question, we have defaulted up here.

Mr. HILL. Okay, so I agree with what Mr. Salzman said. First, we do hold U.S. treasuries as collateral, but we also hold a significant amount of cash. And so assuming it was a temporary loss of mind and things resolved itself, I think it would be fine.

I will tell you our experience in running up to, and I will be interested if CMEs was different in running up to the prior is, we actually saw the value of U.S. treasuries longer-dated go up, not down, as we approached the debt ceiling. And so though we stopped taking some of the very short-dated treasuries, the value of the treasuries we held longer out the curve actually went up.

Mr. DUNN. Glass half full kind of guy. Thank you guys very much for those answers. And I thought they might be more interesting—

The CHAIRMAN. The gentleman's time has expired.

Mr. DUNN. I yield.

The CHAIRMAN. Ms. Plaskett, 5 minutes.

Ms. PLASKETT. Thank you so much, Mr. Chairman. And thank you, gentlemen, for being here this morning.

This is all very fascinating, and, of course, my head is just now kind of full with numbers and processes, but it is important that we understand how this works, and it is really integral to how our money stays safe. I wanted to ask a couple of questions that were related to some of the testimony that you have given already.

Mr. Salzman, in your testimony you went through the series of precautions to be taken in the case of a defaulting member, and that was the waterfall discussion that you gave us. First, the collection of initial margin, the default fund contributions, the clearinghouse would put it in its own capital, its own contribution to the waterfall. Then, if necessary, non-defaulting member contributions

would be involved. And if that were still not sufficient, you would go to an assessment of your members.

Now, have you ever gone to the place where you have to go beyond the defaulter's contribution?

Mr. SALZMAN. No.

Ms. PLASKETT. That has never happened? And if not, what do you feel that says about the resilience of the clearinghouse? What does that mean?

Mr. SALZMAN. Well, you don't want to make too much because, obviously, we are planning for worse.

Ms. PLASKETT. Yes.

Mr. SALZMAN. We have seen a lot of things, but nobody can guarantee that 1987 is the worst we are ever going to see, or that there couldn't be some combination of things.

We think we are very good, we think we have learned a lot, but we know we aren't all-knowing.

Ms. PLASKETT. Yes.

Mr. SALZMAN. There is only one that is all-knowing, and so we need to prepare—

Ms. PLASKETT. That is your mother.

Mr. SALZMAN. We need to prepare.

Ms. PLASKETT. The all-knowing is your mother. I know you were thinking God, but—

Mr. SALZMAN. At my age, I no longer—yes. We are prepared for much worse than we have seen. Much worse than we have seen.

Ms. PLASKETT. Okay, thank you.

And I know this was discussed in some measure by my colleague, Ms. Kuster, with you, Mr. Gerety, but I wanted to ask Mr. Steigerwald—

Mr. STEIGERWALD. That is it.

Ms. PLASKETT. Yes. That same issue with regard to the sufficiency to cover losses that result from default. We know that you ultimately may have to step into a manager resolution under the orderly liquidation authority that is under Dodd-Frank, however, just recently in the House the Financial Choice Act rolled back some of Dodd-Frank, and the Financial Choice Act would repeal some of that authority, in addition to the authority of the Financial Stability Oversight Council, the FSOC, to designate non-bank financial institutions for heightened supervision by the Fed. If that is adopted, what are your thoughts on the effects this would have on clearinghouse resiliency should a crisis occur?

Mr. STEIGERWALD. Thank you. That is quite an important and complicated question. Let me—

Ms. PLASKETT. That is how I like to do it.

Mr. STEIGERWALD. Let me address first the resolution aspects of the issue.

Ms. PLASKETT. Great.

Mr. STEIGERWALD. I must say, as I indicated in my opening statement, that we should be mindful of the extraordinary default management and recovery authorities that central counterparties have. I would distinguish central counterparty clearinghouses from other kinds of financial companies that might be eligible for resolution under Title II.

Ms. PLASKETT. Okay.

Mr. STEIGERWALD. Speaking strictly with respect to CCPs, I, frankly, see almost no need for resolution whatsoever. My view about resolution is that we need to have effective measures and the appropriate incentives to make recovery work. Bear in mind that the issue in a clearinghouse is not only the allocation of losses, as it is in an ordinary bankruptcy, but critically it is the effort to reestablish a matchbook to serve the ongoing interests, the continuity of those positions for clearing members. That is the whole *raison d'être* of the clearinghouse; it serves as a commitment mechanism to preserve the value of open positions struck at market prices in voluntary transactions.

Ms. PLASKETT. And you feel you have the mechanisms in place now to do that?

Mr. STEIGERWALD. The clearinghouses, in my opinion, have various mechanisms that will ensure or best assure the coordination and cooperation with clearing members to preserve value. It is in their interest as well as the CCP's interest to preserve that value.

We should not get so fixated on money losses. Though they may be large in an extreme market circumstance, we have to remember the value of the matchbook.

Ms. PLASKETT. Thank you.

The CHAIRMAN. The gentlelady's—

Ms. PLASKETT. Thank you very much, Mr. Chairman.

The CHAIRMAN. The gentlelady's time has expired.

Mr. Thompson, 5 minutes.

Mr. THOMPSON. Thank you, Mr. Chairman.

Mr. Steigerwald, numerous scholars have written that Title VIII of Dodd-Frank creates moral hazards for clearing participants by promising government support to a failing clearinghouse. They generally argue that account services imply a possible bailout of insolvent clearinghouses by the Federal Reserve, which might cause clearinghouses and their members to be more risky. Despite your ultimate support for the Federal Reserve accounts, do you share these concerns? Why or why not?

Mr. STEIGERWALD. I do not. In fact, it is incumbent upon us to understand the critical distinction between solvency and illiquidity. This is an age-old problem. Of course, it goes back to Walter Bagehot and his original prescriptions for the lender of last resort function. I would say, by comparison to banks, it is even simpler to determine that a CCP is solvent while it is undertaking default management and recovery efforts.

The extraordinary powers I referred to that CCPs have embedded in their rules to liquidate a defaulter's positions, or conduct an auction so that those positions can be assumed by other clearing members, or to tear up the positions if it turns out that it is impossible to reestablish a matchbook, those measures, I believe, are sufficient to restore the clearinghouse to a proper matched operating basis. And we should not regard that as a problem of solvency; we should merely assure that private-sector sources of liquidity are operating, or if not, that the Federal Reserve has the opportunity to provide temporary secured liquidity to sustain the recovery efforts of the clearinghouse.

Mr. THOMPSON. Okay, thank you.

Mr. Dabbs, if the market has lost confidence in a clearinghouse, swap participants may stop transacting simply to avoid being forced to make the clearinghouse their counterparty. How can the market continue to function while a clearinghouse is failing, and should the resolution authority be empowered to suspend the clearing mandate temporarily?

Mr. DABBS. It is a very problematic situation because: first, when you have concern about the safety of a clearinghouse, what you really have is you have concern about its clearing members. That is almost every example. There are non-defaulting losses, but your general concern that we are all playing towards is that a clearing member has a problem. Your willingness to transact on a bilateral basis with counterparties is also going to be decreased because in the stress situations, if we go back to Lehman, you have concerns about who is the good bank and who is the bad bank, who is the next guy to fail. And so that is problem number one. I don't see necessarily going back to the bilateral market as being a good liquidity function. Second, we have had such a large migration from uncleared markets to cleared markets that if I look out 10 years from now, the size of those uncleared markets are going to be significantly smaller. They are getting smaller by the day, and they are going to continue to get smaller.

The ecosystem and the ability for those markets to actually function 10 years from now is greatly reduced. We simply will not have the infrastructure from a legal perspective, from a documentation perspective, and from a technology and operational equipment perspective to be able to fall back on a bilateral market in 10 years, 5 years.

Mr. THOMPSON. Thank you.

I am going to ask this just briefly to the panel, since we will have some different views. What power should regulators have when dealing with a failing clearinghouse?

Mr. SALZMAN. The regulators currently have emergency power to step in and take wide range of actions, but what they have done, which is the good thing, is that they have acted in advance before there is any failure, and they have caused us to spend 2, 2½ years drafting plans which have preset steps that we will take under certain circumstances. Instead of trying to get a Commission together, make a determination that there is an emergency, and then decide how to act, we have it already on paper and the Commission can just say to us, "Fellas, this is your plan, you agreed to this, your clearing members know what it is, everybody knows what it is, it is in your rules, you had better carry it out as it has been established."

That has been the solution. I think it is the right solution.

Mr. THOMPSON. Thank you.

The CHAIRMAN. The gentleman's time has expired.

Mr. LAWSON, 5 minutes.

Mr. LAWSON. Thank you, Mr. Chairman. And welcome to the Committee.

Probably 2 weeks ago there was a considerable amount, and I understand you don't want to get into the political aspect of it, but a considerable amount of concern coming from the banking community about overturning Dodd-Frank. Mr. Gerety, I understood your

comments earlier you said that Dodd-Frank was not implemented to prevent another financial crisis, but to mitigate the impact of another financial crisis that we might have on our economy. Please describe the role that a clearinghouse may have in helping to mitigate the impact of another financial crisis.

Mr. GERETY. Thank you. I think that is a very important point that you make, Representative Lawson, that while it is all of our intentions and hopes that financial crises are prevented, if we look across the scope of history we know that we also need very strong tools to mitigate, because there is no possibility of no financial crisis as we look into the stretch of the future.

At the same time, I think that central counterparties play a really critical role in the transformation from very large and poorly documented bilateral arrangements, with poor credit arrangements and worse liquidity arrangements, moving to a central counterparty world they can act as very significant buffers in terms of making sure that the losses from one are prefunded so that the defaulter pays, rather than immediately transmitting losses across to other parts of the financial system. And just as importantly, they can act as beacons of transparency and predictability, as Members of this Committee have said, because in the crisis, it is that panic and uncertainty even more than the losses that can generate such terrible outcomes.

Mr. LAWSON. Okay. And anyone can answer this, because I am trying to understand it. The big banks and the commercial banks all seem to be on the same page about the amount of paperwork and everything that is caused by Dodd-Frank. Is that a legitimate concern? Is it overburden, has Dodd-Frank overburdened these institutions? What is causing them to come together, because normally they are on different spectrums?

Mr. DABBS. If I understand the question correctly, the question is the burdensome nature of Dodd-Frank. And if I look at institutions; peer institutions, our institutions, everybody has a team, and I should actually call it an army of people over the last 8 years, 7 years, that have implemented the Dodd-Frank standards, and now continue to operate under those standards.

And whether it is measured in paperwork or process, I think that there is a level in here where we might have gone too far on certain things that are not necessarily beneficial to the actual ecosystem. As I mentioned earlier, we have kind of ratcheted everything up. Whether it be money market reform for asset managers, we have taken leverage out, we have done lots of things to the system in all different spheres of the ecosystem. And now that we are kind of starting to get to the completion of implementation, everybody looks back and says, "Okay, well, did we really need this in this, or are we solving the same problem twice, and, therefore, adding extra burden onto the system."

I think that the goal is to find things that are not necessarily going to harm the taxpayer or the economy, but yet make the system more efficient, because we have increased the inefficiencies in the systems by just simply complying with Dodd-Frank.

Mr. LAWSON. Okay. And this will probably be a quick one because I am running out of time. The concerns of the financial insti-

tutions about all of the issues that they have to go through is legitimate, if I understand the latter part of your statement?

Mr. DABBS. Yes.

Mr. LAWSON. Okay.

And with that, Mr. Chairman, I yield back.

The CHAIRMAN. The gentleman yields back.

Mr. Allen, 5 minutes.

Mr. ALLEN. Thank you, Mr. Chairman.

And to expand on the banking situation a little bit, from your standpoint in the clearinghouse, Mr. Salzman, do you all exclusively, we have the large national, almost international, banks, and then we have our regional banks that maybe across one or two states, and then we have our community banks, which are all important to the, as stated, the ecosystem of our financial markets. The folks that are getting killed right now are the community banks, because the larger institutions are able to deal with the compliance issues because they have the expertise, and they have to keep that ongoing expertise because of their business model.

Who does a clearinghouse typically do business with? Is it just large banks, or is it regional banks or even community banks?

Mr. SALZMAN. It is the large banks.

Mr. ALLEN. It is the large banks.

Mr. SALZMAN. Yes. I mean the smaller banks come to us through the larger banks indirectly.

Mr. ALLEN. In participations, or something?

Mr. SALZMAN. No, not so much in participations, but doing their own business, their own hedging through the bigger banks, not directly. We do not face them.

Mr. ALLEN. Okay. Largely under the Financial Choice Act that we passed, basically it deals with banks that are community banks, banks that have a fairly conservative business model, and did that Choice Act affect your relationship as far as the big banks were concerned?

Mr. SALZMAN. No, not with the big banks. And what you are doing for the small banks, as I say, I am trying to stay out of politics, so—

Mr. ALLEN. You can't stay out of politics.

Would anybody want to take on that question?

Mr. GERETY. It is worth highlighting, when I was the Assistant Secretary for Financial Institutions at the Treasury I spent dozens and dozens of hours a year with hundreds of community bankers. That was a significant part of my role. It is important to make distinctions even within the community banking space in terms of the resources and the size of the institution that we are talking about.

If you take a community bank with \$100 million in assets, the right way to think about that community bank is as a small business. They will often have \$1 million, or less than \$1 million in net earnings over the course of a year. When you get to about the \$10 billion frame, you are talking about quite large enterprises that might have, on average, about \$100 million in their profit earned each year. Even within the community bank space, it is important to keep our focus on what are the reforms doing and what can be done to simplify the world for the smallest of the community banks.

Those community banks also tend to serve the areas that are more rural and lower income as a general matter.

Mr. ALLEN. Exactly.

Mr. GERETY. As it relates to clearinghouses more generally, any community bank of whatever size has interest rate risk. That interest rate risk ultimately finds its place in global financial markets. And so when community banks are managing that risk, they do rely on the strength and stability of the central counterparties.

Mr. ALLEN. And that is why I was asking about your impact on those community banks because they loan to small business, and their risk model is totally different. It is built on relationships. And small businesses create 70 percent of all new job growth, and that is what we have to do is create jobs in the country. And I just wanted to see kind of how you played out in those risks.

This is a question for anyone on the panel. The Federal Government is guaranteeing a lot of debt out there. You have the mortgage industry that depends on Fannie Mae and Freddie Mac, your industry, lots of people are depending on the Federal Government to back the debt. Any of you have any idea what percentage of all debt is backed by the Federal Government, and is that a danger to the whole system? I mean I have heard numbers as far as like 60 percent of all consumer, business, debt is backed by this Federal Government. Does anybody have the answer to that question?

Mr. GERETY. While I don't have a precise answer to the question, one simple way to think about that question is think about the size of large debt markets. The global treasury market is about \$10 trillion, the global mortgage market is about \$10 trillion. If you just take in very rough numbers, those obviously are not precise numbers, you can take, if you look at the size of aggregate debt markets, the two largest debt markets in the world are U.S. mortgages and U.S. treasuries.

Mr. ALLEN. Yes.

Mr. GERETY. And those are obviously at this point guaranteed.

Mr. ALLEN. Right.

Mr. GERETY. When you look into consumer credit, outside of mortgage you find very little, and similarly in the small business space, outside of the SBA, which is obviously a different arrangement.

Mr. ALLEN. And the concern there, and I know I am out of time, is that when one goes out, it is not like a domino effect. And that is a very big concern, getting back to Mr. Dunn's question.

I yield back.

The CHAIRMAN. The gentleman's time has expired.

Mr. Soto, 5 minutes.

Mr. SOTO. Thank you, Mr. Chairman.

I had a different concern about our cybersecurity of our clearinghouses. It would be great to hear from Mr. Dabbs, Mr. Hill, or any other member of the panel who wants to comment on how well protected are these clearinghouses from cyber attacks?

Mr. HILL. Thank you for the question. And I will acknowledge, as Mr. Dabbs did earlier, I am not a cybersecurity expert, but I noted earlier that the number one topic that we have spent time and resources on over the last 3 years has been cybersecurity. Fundamentally, we operate exchanges and clearinghouses that depend

on technology, and our customers depend on that technology being up and available. We move billions of dollars every day across that technology. There couldn't be a more important topic. Examples that, again, Mr. Dabbs noted earlier, we do similar things where we do employee education, we do phishing tests on our employees. We invest a significant amount in ensuring that we can detect intrusions, prevent them, of course, is the first goal, but then to detect the intrusions. We run red and blue teams where we have one of our own teams that we have attack our exchange. We pay third-party firms to attack our exchange, all in order to learn lessons and build better defenses. There is not a more important topic at our senior management and board level.

I would be happy to introduce you to our head of information security who could give you far more details than I can, but I assure you it is topic number one on our agenda.

Mr. SOTO. Are there generally multiple locations that you all store data sort of as a redundancy network? I know they do that with the stock market currently.

Mr. SALZMAN. Yes, it is not just storing data, we essentially have to have a second facility that is more than 400 miles from our first facility, that can be brought up in under 2 hours now.

Mr. HILL. Two hours.

Mr. SALZMAN. And so we run that test regularly. Even in our first facility, the redundancies in terms of the different electrical systems coming in, plus they have a set of back-up generators, they have six of them that look like the biggest jet engines you have ever seen. I don't know if anybody has been there. But they test them once a month, I was there when they did, and when they test them, they blow the walls off the building, and they fire up these generators, and they have 50,000 gallons of diesel to run in case two different electrical sources go down.

Not only do they have strength at the original facility, but they have a separate facility, everything is tested. That is not the problem. The real problem are cyber intrusions, which is something that we are working on every day. And I must say, the CFTC has required our board, at the board level, not just the management level but the board level, to bring in outside experts and to have prepared remarks and discussions at board meetings all the time.

Mr. SOTO. Has there been any recent, over the last 5 to 10 years, successful cyber attacks on any of our clearinghouses?

Mr. SALZMAN. It just depends on what you mean by successful? There are literally hundreds of attempts to get into every financial system in this country, every day. Hundreds is an understatement.

Mr. SOTO. I guess *successful*, I would define as an interruption in the clearinghouse procedures.

Mr. SALZMAN. No, not that I am aware of. Not for us, nothing like that.

Mr. HILL. Or us.

Mr. SOTO. Thank you.

I yield back.

The CHAIRMAN. The gentleman yields back.

Well, gentlemen, thank you very much for being here this morning and testifying for us. We certainly appreciate that.

Just a couple of nits and nats. On a clearinghouse, is there, in fact, a bright line between illiquidity and insolvency? Mr. Steigerwald.

Mr. STEIGERWALD. In the broader context, that is always a very tricky——

The CHAIRMAN. Because at the heart of the fight, when it is at the speed of light happening, can regulators tell the difference?

Mr. STEIGERWALD. In the context of central counterparty clearinghouse, it is simpler to make that distinction than in general banking organizations. The matchbook that the clearinghouse operates is crystal clear; it needs to intermediate all of the sellers and all of the buyers. That is very easy to see. When a default occurs, it destroys a part of that match, and the clearinghouse's immediate exercise is to restore that match.

The regulators, the CCP itself, and its clearing members, frankly, don't have to engage in the kind of speculative valuation of capital assets in order to determine whether the clearinghouse is viable.

The CHAIRMAN. While the clearinghouse is still functioning, even though it has a major clearing member who has defaulted, which, I assume, triggered this issue, they are able to keep matching that up.

But getting back to Mr. Dabbs' comments about shifting your customers of that customer, being able to go directly to the clearinghouse or whatever, all that analysis everything, someone else stepping in to that point in time and deciding is this illiquid or is this insolvent, it can't be particularly crystal clear, can it?

Mr. STEIGERWALD. Well, again, all of these issues are terribly complicated, no doubt about that, but again, it is relatively clear, the clearinghouse either liquidates in open markets the defaulter's position, or conducts an auction so that those positions can be assumed. There is a very regular process for making that happen. And if, for some reason, those processes do not restore a matchbook, the clearinghouse has tear-up authority which would, in effect restore the clearinghouse to a match.

Mr. DABBS. I——

The CHAIRMAN. Okay. Real quick.

Mr. DABBS. And just to make a quick point, I think that one of the major differences between a CCP and a banking institution is it is much easier to identify the assets and liabilities of a CCP, relative to the banking organization. The banking organization just has so many tentacles——

The CHAIRMAN. Right. But still even a CCP has assets related to customers, that you talked about.

Mr. DABBS. Exactly. They are segregated at all times so you know what your assets are here, what shape of liquidity, but you know how much they are worth here, and then you have your liabilities, which is what are the clearing members' obligations that aren't being paid. It is just the math is easier just because there aren't as many moving components of things that get revalued.

The CHAIRMAN. Okay. Unrelated, Mr. Hill, you mentioned that the Fed pays above-market rates on their deposits. Banks in the dark ages, when I was in banking, we would only pay higher interest rates if we needed deposits. Does the Fed need deposits, is that

why they are paying higher interest rates? Is there a stated reason why that is the case?

Mr. HILL. I can't speak to Fed policy. I will revert to what I said thought, for us, it is not about the return, it is about the security.

The CHAIRMAN. Right.

Mr. HILL. I don't know the policy aspects of that decision.

The CHAIRMAN. Okay. One of the things I hope is clear today is that we have established there is relatively limited risk to the taxpayers of the country to allow all clearinghouses access to Fed account services, and in very narrow, specific transactions, access to the Fed window. And so hopefully that came clear with the testimony.

Again, thank you very much for being here this morning.

Under the Rules of the Committee, the record of today's hearing will remain open for 10 calendar days to receive additional material and supplemental written responses from the witnesses to any question posed by a Member.

This hearing of the Committee on Agriculture is adjourned. Thank you all.

[Whereupon, at 12:01 p.m., the Committee was adjourned.]

