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VIEWPOINT

New Public Disclosures Shed Light on Central Counterparties

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Reforms after the financial crisis of 2007-09 promote the use of central counterparties (CCPs) to improve transparency in derivatives markets. CCPs stand between the two parties to a derivatives contract. Unlike in bilateral trades, the two trading parties are not directly exposed to the other's default. The increasing role of CCPs has focused attention on their potential risks and benefits. This OFR viewpoint examines data that CCPs began to report in 2016 to comply with international guidelines. Although the data shed light on the activities, financial condition, and risk management of CCPs, shortcomings in the data remain.

The over-the-counter (OTC) derivatives market was a source of contagion during the crisis. Firms had built up large credit exposures to each other in this market. The size and nature of these exposures became clearer after the failure of Lehman Brothers, an investment bank, and the distress of American International Group, Inc., the world's largest insurance company.

Since then, regulators across the world have moved OTC derivatives from bilateral transactions to transactions cleared through CCPs. In 2007, about 15 percent of transactions in swap markets supervised by the Commodity Futures Trading Commission were centrally cleared. Today, that figure is about 75 percent (see Massad, 2016).

CCPs not only improve transparency, they also have the potential to improve risk management. At the same time, central clearing concentrates risks in CCPs themselves. If those risks are not managed well, a CCP may pose contagion risks to the financial system. A CCP is vulnerable to the default of its clearing members. These clearing members are often large and interconnected banks acting as dealers and clearing agents for themselves and their customers. If the losses from a clearing member default exceed the CCP's safeguards, losses may be transmitted to other clearing members.

In 2016, CCPs began to make quarterly public disclosures in response to new international guidelines (see BIS and IOSCO, 2015). The new disclosures enhance market discipline by helping the public assess the resilience

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of CCPs. This OFR viewpoint analyzes the new data, focusing on the four major derivatives CCPs active in the United States. In their disclosures, these CCPs report large amounts of resources to cushion against potential defaults. The cushions exceed the standard established by international regulators. The CCPs report that these resources are held largely as high-quality, liquid assets. The disclosures also include metrics that show how these CCPs performed under estimated and actual stress conditions, such as instances of shortfalls in haircuts and margins, and operational failures. Although the disclosures are a significant step forward in improving transparency, they have shortcomings, such as ambiguity due to incomplete and inconsistent information from CCPs.

This OFR viewpoint follows a 2014 recommendation by the OFR's Financial Research Advisory Committee, made up of academics and industry leaders, that the OFR conduct further analysis and engage with regulators to improve the quality of data on CCPs. Since 2015, OFR researchers have published papers analyzing potential financial stability risks posed by CCPs, as well as policy options (see Glasserman and Wu, 2017; Tompaidis, 2017; Paddrik, Rajan, and Young, 2016; Ghamami and Glasserman, 2016; Capponi, Cheng, and Rajan, 2015; and Glasserman, Moallemi, and Yuan, 2015). One of the OFR's programs focuses on CCP research, data, monitoring, and policy analysis (see OFR, 2016a, 43).

Assessing the New Disclosures

Until 2016, little public information was available about derivatives CCPs. Beginning in the quarter ending Sept. 30, 2015 (released in January 2016), CCPs have published data on their websites in accord with the standards set by the Committee on Payments and Market Infrastructures and International Organization of Securities Commissions. The data show the financial condition of the CCPs, including the amount of resources available in the event of default and the quality of the assets held in margin accounts and guarantee fund accounts. CCPs also report on the degree of concentration of default resources and positions in derivatives trades. In addition, CCPs publish incident reports and a variety of metrics for evaluating stress.

The four major U.S. derivatives CCPs and 30 of 32 major CCPs around the world have published information under the new reporting standards. Supervisors and clearing members continue to receive more detailed confidential information from CCPs.

The remaining sections in this viewpoint show how the new public disclosures can be used to analyze CCPs' default waterfalls, default resources, liquidity resources, counterparty concentrations, and key stress measures. The final section before the conclusion summarizes shortcomings in the data. The analysis focuses on four derivatives CCPs active in the United

States: CME Clearing (CME), which is part of CME Group (formerly known as the Chicago Mercantile Exchange); ICE Clear Credit (ICE), which is part of the Intercontinental Exchange; LCH Clearnet Limited (LCH), which was formed following the merger of the London Clearing House and Clearnet SA; and Options Clearing Corporation (OCC). The viewpoint uses data for the quarter ended June 30, 2016.

Default waterfalls

CCPs face the credit risk that one or more of their clearing members will be unable to fulfill their obligations due to distress or failure. To protect themselves and other clearing members from default, CCPs collect and hold high-quality, liquid assets that can be used to cover such losses. The new disclosures provide information about these resources and describe each CCP's default waterfall. A default waterfall is the protocol or order in which a CCP uses its default resources to cover losses from a defaulting member (see **Figure 1**). It serves as a buffer to help prevent failure of the CCP if one or more clearing members default.

Waterfall details vary among CCPs. To cover losses after a clearing member defaults, a typical CCP would first draw from funds in the defaulter's margin account. If the initial margin is not enough, the CCP would next draw on the defaulting member's prepaid contribution to the CCP's guarantee fund.

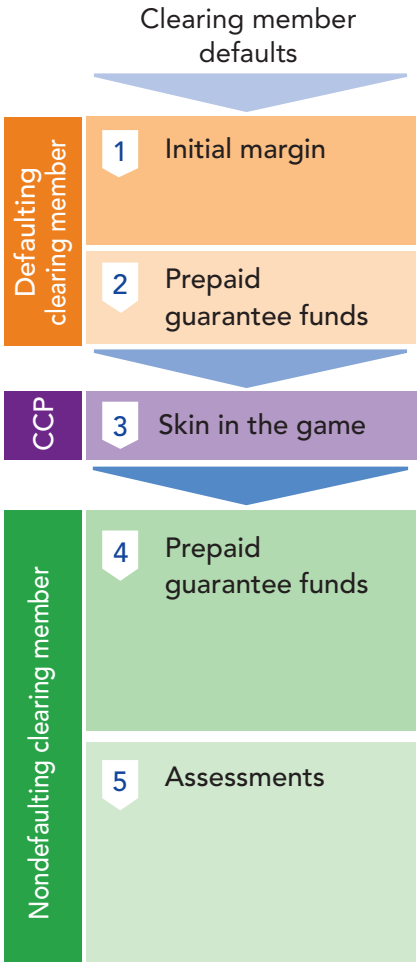
The next layer of loss absorption typically comes from the CCP's equity, sometimes called "skin in the game." This equity represents the CCP's own contribution to cover potential losses from defaults.

If losses from a clearing member default were to exhaust the defaulter's resources and the CCP's skin in the game, the CCP would draw on the prepaid guarantee fund contributions of other clearing members. This move would have the effect of mutualizing — or sharing in common — the losses caused by the default. If the losses were so large that the prepaid guarantee funds were not enough, the CCP would call upon clearing members for additional resources. Clearing members commit to providing a limited amount of additional resources in such circumstances; these are known as assessments.

Additional steps are available if assessments prove insufficient. These steps may include variation margin gains haircuts. Variation margin gains are payments CCPs make to clearing members based on increases in the mark-to-market values of their positions. A CCP can increase its available resources by reducing those payments. CCPs may also resort to tear-ups — terminating derivatives contracts — to reduce their exposures.

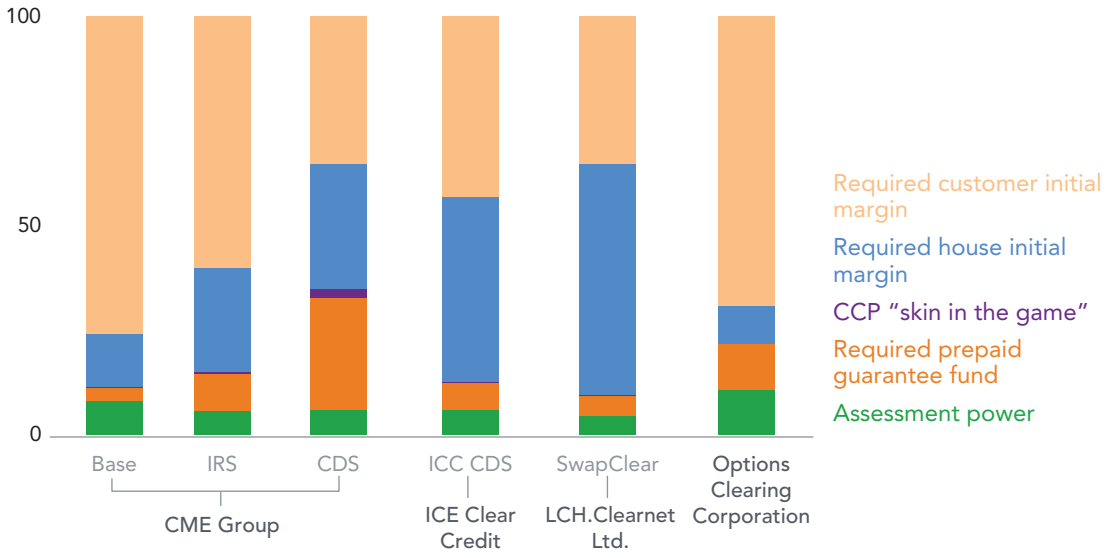
The new disclosures show the amounts and proportions of default resources at the CCPs (see **Figures 2** and **3**). The data do not reflect the amount of margin held in any one member's account because they are aggregated across clearing services or entire CCPs. Although the

Figure 1: How the Typical Central Counterparty Default Waterfall Works



Note: CCP stands for central counterparty.
Source: OFR analysis

Figure 2. CCP Margin and Default Resources (percent)



Note: Data as of June 30, 2016. The CME Group provides three clearing services. Two of them, named CDS and IRS, focus on clearing over-the-counter transactions in credit derivatives and interest rate swaps respectively. The third, named Base, clears the exchange-traded futures and options derivatives that form the core of CME's business. LCH.Clearnet Ltd. operates seven clearing services; this figure focuses on SwapClear.

Sources: Individual CCP responses to the CPMI-IOSCO Principles for Financial Market Infrastructures Public Quantitative Disclosure Standards for Central Counterparties

reported amount of aggregate margin accounts is large at each CCP, only the defaulting clearing member's portion of that amount can be used to absorb losses from its default. Unlike the prepaid guarantee fund contributions and assessments, the margin accounts of clearing members and their customers are protected from being used to cover losses in other members' accounts. The proportions of resources shown in **Figure 2** illustrate the relative size of margin, equity, and guarantee fund contributions.

The guarantee fund and callable assessments shown in the figures reflect resources available to absorb losses if the CCP collects all callable assessments.

Default resources

Initial margin requirements are set according to a CCP's estimates of potential losses on each clearing member's derivatives portfolio. The requirements apply to clearing members' own (house) accounts and those of their customers. Clearing members are responsible for meeting the minimum initial margin requirements on behalf of their customers.

The proportion of total margin that clearing members post for their customers varies among U.S. CCPs. The relative size of customer margins and house margins should reflect their positions and risk exposures. Reported customer margin accounts are relatively large for traditional futures and options markets cleared by CME and OCC (see **Figure 3**). Margin posted in OCC's customer account was 89 percent of total required initial margin. It was 82 percent of required initial margin at CME.

Figure 3. CCP Default Waterfall ($ billions)

	CME				ICE Clear Credit	LCH.Clearnet Ltd.[a]	Options Clearing Corporation
	Base	IRS	CDS	Total	ICC CDS	SwapClear[b]	OCC
Required customer initial margin (IM)[c]	83.4	19.7	0.9	103.9	9.6	36.6	76.0[d]
Required house IM	14.1	8.1	0.7	23.0	9.8	57.4	4.7
Total required IM	97.5	27.8	1.6	126.9	19.3	94.0	41.7
Total actual IM held in all accounts[e]	-	-	-	138.6	20.2	134.3[f]	-[g]
Total actual IM held less required IM (excess)	-	-	-	11.8	1.1	40.3[i]	-[g]
CCP "skin in the game"	0.10	0.15	0.05	0.30	0.05[j]	0.06	_[h]
Required prepaid guarantee fund (GF)	3.3	2.9	0.7	6.8	1.4	4.9	5.8
Actual prepaid GF	3.5	3.0	0.7	7.2	1.6	4.9	6.2
GF held in excess of requirement	0.2	0.2	0.0	0.4	0.2	0.0[k]	0.4
Assessment power[l]	9.0	1.9	0.2	11.1	1.4	4.9	5.8
Total default resources (prepaid)	100.9	30.8	2.3	133.9	20.7	98.9	47.4
Ratios:							
Required customer IM/total required IM	85.5%	70.8%	54.2%	81.9%	49.5%	39.0%	88.7%
Required IM/total default resources	96.7%	90.2%	69.4%	94.7%	93.3%	95.0%	87.9%
"Skin in the game"/total default resources	0.1%	0.5%	2.2%	0.2%	0.1%	0.1%	-
Required GF/total default resources	3.2%	9.3%	28.4%	5.1%	6.6%	4.9%	12.1%

Note: Data as of June 30, 2016. The CME Group provides three clearing services. Two of them, named CDS and IRS, focus on clearing over-the-counter transactions in credit derivatives and interest rate swaps respectively. The third, named Base, clears the exchange-traded futures and options derivatives that form the core of CME's business.

a LCH.Clearnet Ltd. operates seven clearing services; this table focuses on SwapClear.

b LCH, when reporting at the default fund level, categorizes one fund as "Interest Rate." The OFR assigns this amount to SwapClear. In other cases, LCH reports at the CCP level. The OFR assigns those aggregate amounts to SwapClear. Those cases are footnoted below.

c The figures in this row reflect customer gross required initial margin.

d This figure is the sum of reported customer gross and net required initial margin positions. This modification has been made because Options Clearing Corporation reported only customer gross initial margins held against futures positions, while it reported customer net initial margin positions including margin requirements on all product classes.

e Actual margin held is reported at the central counterparty (CCP) level, not the clearing service level.

f This figure represents the aggregate value across all LCH's clearing services, including Swapclear.

g Options Clearing Corporation does not report actual post-haircut margin held figures for several classes of collateral, including U.S. government securities, non-cash equities, and non-cash sovereign government securities.

h Options Clearing Corporation has zero prepaid own default resources that would be committed to absorb losses before or alongside the use of surviving clearing member default resources would be tapped to cover losses.

i If the IM requirements of all clearing services operated by LCH.Clearnet were considered, this figure would be reduced to $27.3 billion.

j $25 million of ICE Clear Credit's skin in the game contribution is provided before mutualized guarantee fund disbursements. A further $25 million is distributed alongside the guarantee fund disbursements.

k LCH reported a net margin deficit of approximately $26,000. LCH has indicated in private correspondence that the reported negative value is a typographical error in LCH's disclosure and that the correct value for this figure is zero.

l Assessment power is the permissible level of assessment against clearing members in the event of a single default event.

Sources: Individual CCP responses to the CPMI-IOSCO Principles for Financial Market Infrastructures Public Quantitative Disclosure Standards for Central Counterparties

Customer margin accounts are relatively small for interest rate swap and credit default swap markets: 50 percent of total margin at ICE and 39 percent at LCH.Clearnet.

CCP waterfalls reflect the principle of "defaulter pays," which means in the event of a default, the defaulting firm's initial margin is the first resource to cover losses. Initial margin makes up almost all of total default resources: 95 percent for LCH and CME, 93 percent for ICE, and 88 percent for OCC (see **Figure 3**). In contrast, the share of CCP skin in the game is much smaller — 0.2 percent or less at all four CCPs.

Data reported on default resources do not provide full transparency because they lack detail. The disclosures show large amounts of funds posted as margin and guarantee fund contributions at the CCPs, but the amounts are aggregates. They do not show how much of a potential defaulter's resources would be available to cover losses before drawing upon CCP skin in the game or resources from other clearing members.

Liquid resources

The major liquidity risks for derivatives CCPs result from the nature of their payment flows. To make timely payments to some clearing members, the CCPs rely upon timely collections from others.

Liquid resources reflect a CCP's ability to meet daily payments. CCPs are also required to hold a sufficient amount of their default resources as qualifying liquid assets that would be available in a default event.

The major liquidity risks for derivatives CCPs arise from their payment flows. To make timely payments to clearing members, CCPs rely on their holdings of liquid assets and on the timely collections of payments from clearing members.

Clearing members are required to make variation margin payments to their CCPs in response to declines in the market values of their own house positions or of their customers' positions. The CCP is required to make variation margin payments to clearing members that have had increases in their or their customers' positions in derivatives trades. The ability of a CCP to meet its payment obligations is bolstered by its holding of liquid assets that clearing members have posted in margin and guarantee fund accounts.

The new disclosure data show the amount of liquid assets held by each CCP as margin and default guarantee funds. The disclosures use qualifying liquid resources as measures of liquidity adequacy. These measures include asset classes such as cash, lines of credit, foreign exchange swaps, repurchase agreements, and marketable securities held in custody (see BIS and IOSCO, 2012, 57).

The data show that CCPs hold the majority of margin and guarantee funds in cash and other liquid assets (see **Figure 4**). Margin held as qualifying liquid resources ranges from 104 percent to 143 percent of required margin for three of the CCPs. (OCC calculates margin in a substantially different way from the other three CCPs.) All four CCPs reported that

Figure 4: CCP Liquidity ($ billions)

	CME				ICE Clear Credit	LCH.Clearnet Ltd.[a]	Options Clearing Corporation
	Base	IRS	CDS	Total	ICC CDS	SwapClear[b]	OCC
Initial margin (IM)							
IM held in cash and cash equivalents	-	-	-	23.5	13.7	41.3[c]	4.9
IM held as government securities	-	-	-	91.7	6.5	89.1[c]	0.8
Total liquid IM[d]	-	-	-	115.1	20.2	130.4[c]	5.7
IM held as qualifying liquid resources (QLR)[e]	-	-	-	133.3	20.2	134.3[c]	5.7
Total actual IM held	-	-	-	138.6	20.5	134.3[c]	6.7
Prepaid guarantee fund (GF)							
GF held in cash and cash equivalents	0.7	0.7	0.3	1.6	1.5	6.6	2.2
GF held as government securities	2.9	2.4	0.4	5.7	0.2	0.0	3.9
Total liquid GF[d]	3.5	3.1	0.7	7.3	1.6	6.6	6.2
GF held as QLR	3.5	3.1	0.7	7.3	1.6	6.6	6.2
Total GF held	3.5	3.1	0.7	7.3	1.6	6.6	6.2
Ratios:							
IM held in cash/required IM[f]	-	-	-	18.5%	70.8%	43.9%	11.6%
Total liquid IM/required IM[f]	-	-	-	90.8%	104.3%	138.7%	13.6%
IM held as QLR/required IM[f]				105.1%	104.3%	142.9%	13.6%
GF held as cash/total required GF[f]	-	-	-	22.4%	89.0%	100.0%	36.3%
Total liquid GF/total required GF[e,f]	-	-	-	100.0%	100.0%	100.0%	100.0%
Cash/average daily variation margin[g]	-	-	-	697.7%	6,909.8%	1,282.8%	-[h]
QLR/average daily variation margin[g]	-	-	-	3,966.4%	10,186.6%	4,174.3%	-[h]
Cash/peak daily variation margin[g]	-	-	-	180.2%	1,266.5%	261.0%	-[h]
QLR/peak daily variation margin[g]	-	-	-	1,024.5%	1,867.1%	849.2%	-[h]

Note: Data as of June 30, 2016. The CME Group provides three clearing services. Two of them, named CDS and IRS, focus on clearing over-the-counter transactions in credit derivatives and interest rate swaps respectively. The third, named Base, clears the exchange-traded futures and options derivatives that form the core of CME's business.

a LCH.Clearnet Ltd. operates seven clearing services; this table focuses on SwapClear.

b LCH, when reporting at the default fund level, categorizes one of the funds as "Interest Rate." The OFR assigns this amount to SwapClear. In other cases, LCH reports at the CCP level. The OFR assigns those aggregate amounts to SwapClear. Those cases are footnoted below.

c These figures represent the aggregate value across all LCH's clearing services, including Swapclear.

d Liquid initial margin and guarantee fund are available cash, cash equivalents, and government securities-based resources.

e Qualifying liquid resources (QLR) are cash, sovereign bonds, agency bonds, municipal bonds, corporate bonds, equity shares, mutual fund shares, and undertakings for the collective investment of transferable securities (UCITS).

f Initial margin and guarantee fund requirements are shown in Figure 3, CCP Default Waterfall. Cash and QLR are sums of IM and GF.

g Variation margin figures are shown in Figure 6, CCP Stress Measures. Cash and QLR are sums of IM and GF.

h Options Clearing Corporation's ratios are not available because it did not report the average or peak variation margin payments.

Sources: Individual CCP responses to the CPMI-IOSCO Principles for Financial Market Infrastructures Public Quantitative Disclosure Standards for Central Counterparties

qualifying liquid resources made up 100 percent of required guarantee fund amounts.

CCPs' cash holdings in margin accounts exceed their average daily needs to make variation margin payments, the data show. The ratio of qualifying liquid resources to average daily needs to make variation margin payments ranges from 4,000 percent to more than 10,000 percent. A stricter measure is the ratio of qualifying liquid resources to the peak variation margin payment in the previous 12 months. That ratio ranges from 850 percent to 1,900 percent. (OCC's ratios are not available, because it did not report the average or peak variation margin payments. CME reported totals across its clearing services.) This calculation is based on the disclosed amounts aggregated across all accounts. The ratio does not imply that all of the qualifying liquid resources are available to meet a particular variation margin payment. The degree of liquidity between house and customer accounts and across clearing members likely varies significantly.

The new data also contain the measure of liquidity adequacy in the quantity of cash and other qualifying liquid resources held as margin by CCPs. LCH holds $134 billion in margin accounts as qualifying liquid resources, CME holds $133 billion, ICE holds $20 billion, and OCC holds $6 billion (see Figure 4).

Clearing member concentration

CCPs face the risk that their outstanding exposures become concentrated in one or a few large clearing members.

CCPs face the risk that their outstanding exposures become concentrated in one or a few large clearing members. Such a concentration would pose potential systemic risks in the event of default of a large clearing member. First, if losses on the concentrated exposures were in excess of that member's own default resources and the equity of the CCP, then mutualizing these excess losses would transmit losses to other clearing members. Second, the unwinding of large, concentrated positions might lead to fire sales.

The disclosure data include new but limited information about the degree of concentration of risks in CCPs. The largest five clearing members account for 44 percent to 66 percent of average daily open positions in all but one clearing service (see **Figure 5**). The exception is LCH, for which the top five clearing members account for 29 percent of open positions.

The reported sum of the margin accounts of the largest five clearing members as a share of total margin posted to the clearing service is also shown in **Figure 5**. The peak amounts are similar to the average amounts. This similarity implies that the largest five firms did not change position sizes from typical to peak volatility days, or that they did not change them much more than other clearing members. The absence of a large difference mitigates concerns about the potential for risks to become highly concentrated when markets become volatile.

Figure 5. CCP Concentration Ratios

	CME				ICE Clear Credit	LCH.Clearnet Ltd.[a]	Options Clearing Corporation
	Base	IRS	CDS	Total	ICC CDS	SwapClear[b]	OCC
Number of total clearing members (CM)	66	24	13	103	30	105	115
Open positions							
Share of top 5 CM (peak in quarter)	54.9%	68.7%	71.0%	-	46.0%	28.9%	54.0%
Share of top 5 CM (average in quarter)	52.7%	65.4%	66.2%	-	44.0%	28.2%	54.0%
Share of top 10 CM (peak in quarter)	77.4%	-	-	-	74.0%	47.9%	71.0%
Share of top 10 CM (average in quarter)	75.6%	-	-	-	73.0%	46.9%	70.0%
Initial margin (house plus customer)							
Share of top 5 CM (peak in quarter)	49.9%	65.4%	78.8%	-	45.0%	24.1%	42.0%
Share of top 10 CM (peak in quarter)	77.7%	-	-	-	66.0%	37.6%	63.0%
Guarantee fund							
Share of top 5 CM (peak in quarter)	49.6%	49.3%	38.5%	-	38.0%	15.7%	42.0%
Share of top 10 CM (peak in quarter)	73.9%	-	-	-	59.0%	29.0%	58.0%
Clearing for customers							
Number CMs clearing for customers	46	15	11		13	53	103
Share of top 5 CM: average daily client transactions	63.2%	78.7%	91.2%		80.0%	84.1%	61.0%

Note: Data as of June 30, 2016. The CME Group provides three clearing services. Two of them, named CDS and IRS, focus on clearing over-the-counter transactions in credit derivatives and interest rate swaps respectively. The third, named Base, clears the exchange-traded futures and options derivatives that form the core of CME's business.

a LCH.Clearnet Ltd. operates seven clearing services; this table focuses on SwapClear.

b LCH, when reporting at the default fund level, categorizes one of the funds as "Interest Rate." The OFR assigns this amount to SwapClear.

Sources: Individual CCP responses to the CPMI-IOSCO Principles for Financial Market Infrastructures Public Quantitative Disclosure Standards for Central Counterparties

The guarantee fund contributions of the top 5 and top 10 clearing members are shown in **Figure 5**. Two clearing services do not report this figure for the top 10 because they have fewer than 25 clearing members.

The data show that in some cases, customer clearing service providers are highly concentrated. The top five clearing members account for 79 percent or more of customer transactions at four of the clearing services. The clearing services for derivatives markets with more retail participation — the CME's core futures and options markets and the OCC's equity options markets — have lower concentration levels of 63 percent and 61 percent, respectively.

The concentration figures show the share of margin and guarantee fund contributions by the largest five and largest 10 clearing members. However, they do not show the amounts for the largest one or largest two. That information would be the most relevant for supervisors and market participants because it would shed light on the impact on a CCP if its largest one or two members defaulted.

The disclosures also contain the share of aggregate exposures, margin, and guarantee fund contributions from the largest 5 and largest 10 clearing members. House and client account amounts are aggregated for exposure and margin amounts. Separating the house and customer account would be useful because customer funds are not available to cover clearing members' defaults. In addition, the measures do not show whether customer positions are concentrated.

Stress metrics

The disclosures contain metrics that show how a CCP would perform under stress.

The disclosures contain metrics that show how a CCP would perform under stress. For example, one metric sheds light on the adequacy of margin levels. It shows the number of instances when margin levels fell below the marked-to-market exposure of any account over the previous 12 months (see first row in **Figure 6**). It also shows the peak and average sizes of those shortfalls. For the quarter ending June 30, 2016, LCH reported 521 such instances; CME reported 10 instances; and OCC reported 39 instances.

Another set of stress metrics provides information about a CCP's ability to meet the Cover 1 and Cover 2 losses used as standards for resilience (see **Figure 6**). These standards refer to the CCP's exposure to the default of one or two clearing members and their affiliates with the largest exposures. OCC reported the largest estimated Cover 2 exposure, $4.3 billion. The disclosures also show this critical measure of resilience: the number of days in which the prepaid guarantee fund resources from non-defaulting clearing members were less than Cover 1 or Cover 2 losses. No CCP reported a shortfall of total default resources needed to meet Cover 1 or Cover 2 losses for the 12 months ending June 30, 2016.

Additional measures of stress include peak variation margin paid to each CCP and the largest aggregate daily margin call. Variation margin refers to the normal required daily margin payment. In addition to daily settlement margin calls, CCPs sometime use discrete, intraday margin calls for additional margin resources (see BIS and IOSCO, 2012, 50-54). During the second quarter of 2016, a substantial surge in market volatility followed the Brexit vote. CCPs reported large variation margin payments and margin calls.

The disclosures also have data on CCP liquidity under stress. The data include the number of instances of qualifying liquid resources falling below each CCP's estimated stressed payment obligations. Only OCC reported such an instance, and that shortfall was $2.2 billion.

The size of the largest variation margin payment to a single clearing member during the previous 12 months is shown in **Figure 6**. The payments are as high as $3.8 billion for LCH and as low as $0.4 billion for ICE. In between are OCC at $3.7 billion and CME at $2.6 billion. (The figure for CME is a sum of its three clearing services. It is unlikely that each peak occurred on the same day, so the sum is a worst-case estimate.) Although these

Figure 6. CCP Stress Measures ($ millions, quarterly unless otherwise indicated)

	CME				ICE Clear Credit	LCH.Clearnet Ltd.[a]	Options Clearing Corporation
	Base	IRS	CDS	Total	ICC CDS	SwapClear[b]	OCC
Initial margin (IM) adequacy							
Instances of IM below mark-to-market exposure[c]	10	0	0	10	0	521	39
Actual exposure in excess of IM (peak)	13.0	0.0	0.0	13.0	0.0	187.3[d]	81.3
Actual exposure in excess of IM (average)	2.6	0.0	0.0	2.6	0.0	3.5[d]	8.1
Cover 1/ Cover 2 stressed losses							
Simulated Cover 1 stress loss in excess of IM	1,847.9	1,495.2	197.0	-	1,109.1	1,835.3	2,577.2
Simulated Cover 2 stress loss in excess of IM	2,619.3	2,847.8	318.3	-	1,984.3	3,417.9	4,281.7
Days actual default resources < simulated Cover 1 stress loss[c]	0	0	0	0	0	0	0
Days actual default resources < simulated Cover 2 stress loss[c]	0	0	0	0	0	0	0
Variation margin (VM) paid to and called							
VM paid to clearing service (average, daily)	-	-	-	3,361.5	197.9	3,216.6	-
VM paid to clearing service (peak, daily)	-	-	-	13,014.1	1,079.5	15,812.1	-
Largest margin call in a day	1,470.4	1,279.5	149.5	2,899.3	1,214.0	6,933.3	2,478.8
Liquidity							
Instances of qualifying liquid resources (QLR) below Cover 1 losses[c,e]	0	0	0	0	0	0	1
Amount of shortfall	-	-	-	-	-	-	2,238.0
Largest payment to single clearing member in past 12 months	2,015.3	509.4	41.1	2,565.8	405.5	3,803.4[f]	3,682.8
Other							
Days collateral price change was greater than haircut[c]	-	-	-	2	0	0	0
Operational risk: number of failures in past 12 months[c]	-	-	-	-	10	12	12

Note: Data as of June 30, 2016. The CME Group provides three clearing services. Two of them, named CDS and IRS, focus on clearing over-the-counter transactions in credit derivatives and interest rate swaps respectively. The third, named Base, clears the exchange-traded futures and options derivatives that form the core of CME's business.

a LCH.Clearnet Ltd. operates seven clearing services; this table focuses on SwapClear.

b LCH, when reporting at the default fund level, categorizes one of the funds as "Interest Rate." The OFR assigns this amount to SwapClear. In other cases LCH reports at the CCP level. The OFR assigns those aggregate amounts to SwapClear. Those cases are footnoted below.

c Units are individual incidents rather than millions of dollars.

d The exchange rate used to convert to U.S. dollars was the rate at the end of the quarter. The actual exposure events may have occurred at any point in the quarter.

e Qualifying liquid resources (QLR) are cash, sovereign bonds, agency bonds, municipal bonds, corporate bonds, equity shares, mutual fund shares, and undertakings for the collective investment of transferable securities (UCITS).

f These figures represent the aggregate value across all of LCH's clearing services, including Swapclear.

Sources: Individual CCP responses to the CPMI-IOSCO Principles for Financial Market Infrastructures Public Quantitative Disclosure Standards for Central Counterparties

payments are high, they should be seen in light of the quantity of cash and other qualifying liquid resources that CCPs hold as margin, shown in **Figure 4**.

Although the public disclosures contain several stress measures, they collectively give an incomplete picture of the resilience of each CCP. The average and peak payment obligations of clearing members to the CCP are reported, but only in aggregate. The average and peak payment obligations from the CCP to the clearing members are not reported. Knowing the largest variation margin payment a CCP has received from and paid to a single clearing member, as well the largest two payments paid from and paid to two clearing members, would be useful for regulators and market participants to assess actual peak liquidity needs. The same information for the largest 5 and 10 clearing members would provide more insight into the degree of concentrated risks at each CCP.

Other data shortcomings

CCPs vary in how they interpret the data reporting instructions and how closely they comply with them. Data cells are sometimes empty. CCPs sometimes insert footnotes to explain why data are not submitted. In some cases, CCPs report numbers but don't identify the currency unit. In other cases, CCPs cite data by referring to a website that refreshes frequently.

The disclosures have no information on compression transactions. Compression is the execution of targeted trades that reduce risk from existing positions. The Bank for International Settlements attributes the decline in global gross notional amounts of traded derivatives to compression. The primary provider of compression services, TriOptima, reports that $924 trillion in gross notional amounts were compressed as of Jan. 31, 2017, and the vast majority occurred through CCPs (see TriOptima, undated).

A challenge in aggregating the data from the new data disclosures is that not all CCPs use the same file format. For example, some CCPs report in PDF files, some report in text files, and some report in spreadsheet files. Files are also organized differently. The use of tabular data sheets and the numbering of data elements varies. These variations make comparing disclosure data across CCPs and filing periods challenging.

Together, these shortcomings impede comparing or aggregating data across CCPs. In addition, differences in how CCPs report margin held and margin requirements may result in prudent CCPs appearing in weaker condition than less prudent CCPs.

Conclusion

The new public disclosures are a significant step toward transparency. They enhance the ability of market participants, regulators, and the public to assess the resilience of the financial market infrastructure. Improved transparency supports market discipline, but more is needed.

This OFR viewpoint describes measures that can be used to assess the financial condition and activities of CCPs. The disclosures show that CCPs hold sufficient resources to withstand losses from the defaults of two clearing members. Also, the disclosures show that such resources are highly liquid. CCPs report only a few cases of existing margin being insufficient to cover margin calls.

This viewpoint highlights data gaps and other shortcomings in the public disclosures. Although the CCP disclosures are useful, areas for improvement remain.

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