

ARE CLEARING HOUSES THE NEW CENTRAL BANKS?

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Central banks are in the news all the time, clearing houses only occasionally and, even then, typically in the back pages of the FT and Wall St Journal. Could it be the other way round in a few decades time; or might clearing houses at least be sharing the attention of markets, media and politicians?

If those questions seem not only exaggerated but bizarre, pause for a moment to think about what central banks and central counterparties do, how they evolved, and the State's role in their functions. I will do just that, before going on to review why this matters now more than ever and the high-level public policy issues it raises.¹

Comparing central banks and clearing houses

Insurance against financial risk

Central banks provide insurance against liquidity risk to the banking system and wider economy. In the past the only recipients of this insurance were, in the language of the Federal Reserve, their 'member' banks. Central counterparty clearing houses (CCPs) also provide insurance to their members: *against counterparty credit risk*. As time passes, the insurance is being extended to non-clearing-member participants in markets.

Just as central bank liquidity insurance can reduce the incidence of liquidity runs on banks, so clearing-house counterparty insurance reduces the probability of counterparties refusing to deal with an ailing firm, because they know they are protected by the clearing house. This is important: central bank liquidity provision is not enough of itself to stem a 'counterparty run' on a trading firm.

Central banks lend money. They protect themselves against risk by taking collateral, with an excess (haircut) over the amount lent. They are, therefore, exposed to tail risk: namely, if their counterparty(ies) fails and the collateral doesn't cover the debt. Central counterparties enter into securities and derivatives transactions, interposing themselves between buyers and sellers of cleared contracts. Multilateral netting simplifies the network of counterparty credit exposures, leaving the clearing house with a series of contingent exposures to their members. They protect themselves against having to 'pay out' on counterparty default by taking collateral (initial margin) from their members. They too, therefore, are exposed to tail risk: if a large member bank or dealer failed and their collateral proved inadequate. And if one large member failed, such might be the market frenzy that others would fail too.

¹ My thanks to Steve Cecchetti and Andrei Shleifer for comments.

Central banks are protected against their tail-risk exposures by virtue of being underwritten by the State. That underwriting may be explicit, or it might be implicit via a right to offset losses against seigniorage income derived from demand for their monetary liabilities. It means that a central bank cannot fail (although the political economy costs of fiscal support might be high). By contrast, central counterparties are, more or less, underwritten by their members. I say ‘more or less’ because whereas that used to be explicit in their rule books, it no longer is. That is part of the big issue of what happens if a CCP fails. It is a huge issue. As already observed, central counterparties reduce the inter-connectedness of the financial system. But not if they fail. Then market participants would need to realize their claims on the clearing house, and find substitute arrangements. And since their own failure is very unlikely unless one or more systemic members failed, CCPs --- especially those clearing globally traded instruments --- can be thought of as *super-systemic*. It is striking that political leaders and economic commentators and not more focused on this.

Turning back to the recipients of the insurance, central banks’ provision of liquidity insurance creates problems of moral hazard. Other things being equal, banks --- and others who might think they will get access to the central bank *ex post*, including shadow banks --- have incentives to take more liquidity risk than they would if there were no insurer. And to the extent that they take that risk by increasing their debt liabilities, they might become more levered and so more exposed to solvency risk too. Likewise, the firms using a CCP have incentives to take more counterparty credit risk in their market transactions than otherwise, discriminating less when choosing with whom to trade because their credit exposure is not to their market counterparty but rather to the clearing house --- unless the tail risk is credibly mutualized, as I shall discuss.

Historical evolution

The similarities don’t end there. Given the shared features of their respective economic functions, it is not hugely surprising that their histories have much in common. There is a clue in the term “clearing house,” which I have been using interchangeably with “central counterparty.”

In many countries, central banks emerged as *de facto* or *de jure* clearing houses for settling payment claims amongst other banks issuing monetary liabilities.² Indeed, in the United States the Clearing House was at the centre of the banking and credit system between the closure of the Second National Bank in 1836 and the establishment of the Federal Reserve a hundred years ago.³ When a liquidity crisis threatened to engulf the system, the Clearing House would sometimes resort to issuing its own liabilities, which amounted to a temporary mutualisation of obligations.⁴ Such arrangements were sustainable only so long as they were understood and trusted by the public; the members were sufficiently diverse that they weren’t all frail at the same time; but the members were part of a homogenous community, so that each member was confident it knew about the soundness of the

² C. A. E. Goodhart, “The evolution of central banks,” 1988.

³ R. H. Timberlake, “The central banking role of clearing houses,” *Journal of Money, Credit and Banking*, 1984.

⁴ *Ibid*

others and, crucially, identified with a common interest.⁵ The creation of the Federal Reserve came when doubts about the resilience and legitimacy of the Clearing House mechanism accumulated.

Likewise, securities and derivatives clearing houses evolved as a solution to problems of asymmetric information amongst members of commodity and securities exchanges.⁶ Initially, the clearing houses simply calculated the obligations amongst exchange members after netting off offsetting amounts, *without* interposing themselves as counterparties. In the US, they typically moved to acting as central counterparties in the early part of the twentieth century. Europe didn't follow until sometime later. But by the time financial futures markets developed in the 1970s and '80s, CCPs were the norm. By then, of course, central banks had long been absorbed into the State.

The role of the State in the institutions of central banking and central clearing

Indeed, while the State has been an actor not a bystander in shaping both of these two central financial institutions, until recently there were profound differences in its substantive role. Arguably, the position is now converging. To make sense of this, we need to distinguish between laws giving institutions 'monopoly' rights; whether an institution is part of the State itself; and whether and how the State regulates the institution.

At various points in the nineteenth and early twentieth centuries, the legislatures of countries in the West gave a banking institution monopoly rights over the issue of legal tender. This underpinned the role of their monetary liabilities as a unit of account and means of exchange. It guaranteed that the State received, directly or indirectly, the seigniorage income. And, very important, it meant that the main private banks had little practical choice other than to settle claims amongst themselves in the central bank's liabilities, which became in the language of central bankers 'the final settlement asset.' In order to underpin the value of central bank money, legislatures initially placed requirements on the assets 'backing' central banks' money --- the gold standard being the canonical example. This was irrespective of whether or not the central bank was formally part of the State. For example, for a century after major legislative reforms in 1844 the Bank of England remained in private ownership, but with different legal restrictions applying to what were thought to be its public functions and private activities.⁷ By the twentieth century, the role of central banks in stabilizing business cycles saw them placed formally within the State rather than being only subject to legislative constraints. What's more, those legal constraints on central bank balance sheets were, by and large, progressively relaxed, the value of central bank money being underpinned instead by a statutory requirement to maintain price stability.

⁵ The last point was stressed by Fred Hirsch nearly forty years ago in the context of LOLR clubs; see "The Bagehot problem," The Manchester School, 1977.

⁶ Randall S. Kroszner, "Central counterparty clearing: history, innovation, and regulation," Federal Reserve Board, 2006.

⁷ I say "thought to be" because Prime Minister Robert Peel, who introduced the 1844 legislation in the House of Commons himself, and others of the Currency School failed to grasp that not only Bank notes but also bankers' reserve balances with the Bank were (and are) central bank money.

By contrast, central counterparty clearing houses remained entirely voluntary, private institutions, emerging or withering according to the demand for their services --- or rather, the demand for the services of their parent exchanges which, for many decades, insisted that their members use the in-house CCP in a vertically integrated architecture. As time passed, those CCPs were increasingly subject to a legislative requirement that they be authorized by a State agency, and so were subject to official sector regulation and supervision. This has something in common with way in which nineteenth century US banks, in a monetary system without a central bank, were subject to federal government regulation on minimum holdings of government bonds as a 'reserve asset.' In short, use of a CCP's services was not mandatory in law and they were private institutions, but they and their activities were regulated.

Since the global financial crisis, that set-up has changed somewhat. As the rules of the game for finance began to be recast, one of the earliest decisions of G20 Leaders was to *require* that standard over-the-counter (OTC) derivatives be centrally cleared via CCPs subject to globally agreed minimum standards. As I have argued elsewhere,⁸ it is distinctly odd that the new dispensation was cast in terms only of clearing OTC derivatives, with nothing said, one way or the other, about cash products or exchange-traded instruments. But, even so, this amounts to a profound change.

And it is a change that increases the similarities between central banks and central counterparties. Just as banks have no real choice other than to use central bank money, so market participants *must* now use CCPs for a large part of their derivatives business. No CCP has a *de jure* monopoly, but for many products there is no longer a choice between bilateral 'clearing' and central clearing.

Summing up, today *central banks* have a monopoly on the creation of legal tender; are part of the State; are typically subject to few restrictions on their balance sheets;⁹ but are given statutory purposes by legislatures, and pursue those objectives through the management of their balance sheets. Meanwhile, individual *central counterparties* do not have *de jure* monopoly rights; but market participants are legally obliged to use CCPs for many transactions, so they have what could be called collective monopoly rights; they are not part of the State, but fulfil public functions; and they are subject to statutory regulation and supervision by State agencies. In other words, society has made different choices about how the State should be involved in two central financial institutions providing two different kinds of financial insurance to markets and the economy.

Before coming down on whether this set up makes sense, I shall step back and review the functions of clearing houses from the perspective of various distortions and pathologies in financial markets: adverse selection, moral hazard, information asymmetries that affect liquidity, and the tendency of pro-cyclical risk management to amplify credit cycles.

Distortions bearing on whether clearing houses should be *within* the State

⁸ Tucker, "Regulatory reform, stability, and central banking," Hutchins Center on Fiscal and Monetary Policy, Brookings, 2014.

⁹ In the US, the Federal Reserve is subject to somewhat tighter statutory restrictions on the securities it can purchase and repo in open market operations than on the collateral it can lend against via the discount window.

One way of looking at the recent evolution of clearing houses is that a problem of adverse selection has been exchanged for a problem of moral hazard, bringing to a head the question of whether CCPs must be of *undoubted* credit standing (and what that means).

Adverse-selection problems

A start-up clearing house, competing in the market, faces the following challenge. To the extent that risks are being pooled, why would the strongest firms join? If the strongest stays out, then the next strongest may wish to stay out too. Joining then becomes an adverse signal about a firm's ability to assess the riskiness of its counterparties, its ability to manage those risks bilaterally and, most potently, its perception of the willingness of other firms to transact bilaterally with it. In other words, only the most risky firms might want to join. We saw a variant of this about a decade ago when some of the dominant houses in OTC derivatives delayed joining CCPs as they feared that the consequent homogenization of counterparty credit risk would damage their market share and power. This is no doubt the root of commodity and futures exchanges historically requiring all their members to clear centrally.

It is also the basis of early initiatives to clear OTC derivatives being based around a 'club' of global firms. But, of course, in their desire to address systemic risk sourced in the complex network of counterparty credit exposures that characterizes today's wholesale financial markets, the authorities want to see access to derivatives clearing houses extending beyond a club. By mandating central clearing of standardized derivatives, the G20 seeks to avoid these adverse-selection problems, just as in many countries some types of personal insurance are mandatory.

Moral-hazard problems: one route to a nasty question

The result is to increase the moral hazard risks entailed by CCP insurance of counterparty risk. There are two layers here, the second being the more potent.

First, with the clearing house standing behind their counterparties, individual members have weaker incentives to be careful about who they transact with and how much exposure they take. That can be mitigated by a combination of requiring members to put up collateral and by mutualizing a lot of the tail risk left when the collateral put up by an individual defaulting member is exhausted. I say 'a lot' of the tail risk rather than 'all' because there are agency problems *within* the clearing-house structure. If, as is commonly the case these days, the management company is independent of all or some of the CCP's members, it also needs 'skin in the game' to incentivize it to monitor and manage the CCP's risks effectively.

Second, if a CCP is thought by market participants and/or its management to be itself Too Important To Fail, there is an extra dimension of moral hazard: a perceived State backstop. That would tend to blunt the incentives of the clearing house's management and members to control tail risk (even if internal

agency problems had been solved). There has never been much doubt that a clearing house's failure would entail nasty spillovers (negative externalities). When the Hong Kong futures clearing house failed during the 1987 world stock market crash, clearing in futures and commodities was suspended and the cash stock market closed too. Basically, Hong Kong's securities markets all stopped, affecting households and firms well beyond the community who had had positions in stock-index futures.¹⁰

But even if the systemic importance of clearing houses has long been evident, the moral-hazard stakes are surely raised by G20 heads of government *making* market participants use CCPs if they want to transact standardized derivatives.

One response to this is for regulators to insist and ensure that CCPs have credible recovery and resolution plans, with absolute clarity about how losses will be allocated to creditors and members once margin and default fund are exhausted. An alternative response would be to say that, like central banks, clearing houses should be part of the State, with explicit taxpayer underpinning. In other words, embrace the moral hazard. A more direct route to that proposition runs as follows.

CCPs as information-insensitive institutions

For CCPs to fulfil their economic function, everyone --- and most of all their members --- must believe they are completely safe. In the jargon, they (or, rather, claims on them) must be *information insensitive*.

The importance of this quality is illustrated by the earliest phase of the 2007/08 financial crisis. A market will be more liquid if the instruments are so reliably free of risk that there are no private returns to investing time and effort assessing them.¹¹ A liquidity crunch can occur if investors and others flip from believing that an instrument is safe to thinking that, in fact, it is risky and so requires analysis : i.e. if it flips from being *information insensitive* to being *information sensitive*. That's more or less exactly what happened with asset-backed securities (ABS) in the summer of 2007. Sub-prime-mortgage ABS were revealed to be risky, shattering confidence in the integrity of the AAA ratings granted by credit-rating agencies to other types of ABS. ABS-repo markets closed, as a secured-money markets can't work on the basis of lenders slowly checking each and every collateral bundle.

Indeed, as others have observed, the ultimate information-insensitive financial instrument is money, whether that is the overtly public money issued by central banks or the private deposit-money issued by commercial banks. The State stands behind the central bank, and the State provides for statutory insurance of retail bank deposits (the FDIC in the US).

¹⁰ See "The operation and regulation of the Hong Kong securities industry," Report of the Hong Kong Securities Review Committee, 1988. I was a member of the team who wrote the report.

¹¹ The significance of the concept of information-insensitive securities, epitomized by money and money-market instruments, is stressed in a series of papers by Gary Gorton and Bengt Holmstrom. See, for example, Holmstrom, "The panic of 2007: comment on a paper by Gorton," Jackson Hole 2008.

In derivative (and repo) markets, an underlying contract and counterparty credit exposure are bundled together. The willingness to trade depends upon perceptions of both. A CCP is, by design, a mechanism for taking counterparty credit risk off the table. In other words, 'holdings' of CCP-exposure need to be information *insensitive* for central clearing to work. A thought experiment in which the creditworthiness of a CCP comes into doubt illustrates this. Buyers and sellers in the underlying market pause to assess whether they want exposure to the CCP. But they probably aren't equipped to do this. They can see its public rules and policies but they don't know whether the regime has been applied properly by the CCP's management, and they don't have sufficient information on the CCP's positions or the health of each and every other member. Trading dries up. And, arguably worse, members start buying proxy hedges against their cumulative stock of positions with the clearing house. Where they can, they withdraw surplus margin moneys or, going further, surrender their membership.

One possible response to this is: put the clearing house beyond doubt in the way a central bank's liabilities are beyond doubt (in nominal terms). Make it as information insensitive as is feasible in its jurisdiction (jumping ahead a bit, there's a clue there). Make it part of the State. And, it can be argued, that would help the State to monitor and manage exuberance in capital markets, which is the final step in the argument for socializing clearing houses.

Pro-cyclicality and system-risk management: another route to a nasty question

Let's get back to central banks for a moment. Think about what they do in conducting monetary policy. As well as their primary objective of preserving the value of money, they aim, in the language of macroeconomics, to 'stabilize' the path of output and employment. In other words, they aim to act *counter-cyclically*, supporting the economy through periods of weakness, and slowing it during periods of buoyancy.

This is echoed in the much newer discipline of *macro-prudential* policy. The macro-prudential policymaker will aim to have the financial system build resilience during a pronounced and stability-threatening boom. That will potentially dampen the boom itself, but crucially it will leave the financial system better equipped to weather the bust without collapsing. Thus, the amplitude of the credit cycle would be dampened, with deep recessions somewhat less likely. Like monetary policy, the macro-prudential policymaker acts *counter-cyclically*. And in both endeavours the central bank (or regulator) is explicitly seeking to act --- is under a statutory *duty* to act --- in the wider public interest, in the interests of *the system as a whole*.

Now let's turn to a clearing house managing its risks. Think about what a CCP's balance sheet looks like. It can be regarded as a special kind of securities dealer. So far as market risk is concerned, it has a completely matched book in normal circumstances. But that leaves it with a complex portfolio of counterparty credit exposures; if a member defaults, it is exposed to market risk through needing to close out and replace its positions with the defaulter. It hedges those risks through the two familiar measures mentioned above: bilateral collateral and a pooling mechanism, the default fund. One can think of the pooling as analogous to a portfolio of credit default swaps written by the CCP's members on

each other, partially collateralized with cash (their contributions to the default fund). Further, let's remember that the clearing house is typically part of a profit-maximizing group. So the CCP is like a private-sector securities dealer with a rather unusual portfolio. As such, we should expect it to behave in a *pro*-cyclical way in the management of its risks --- shading margins to the downside during normal times to help sustain market growth or market share, and tightening sharply as and when conditions deteriorate. As described, the clearing house will *not* behave like a system-risk monitor and manager.

If that seems over-stated, I might note that when, at a conference a couple of years ago, I introduced (or, more accurately, *re*-introduced) the proposition of clearing houses acting as system-risk managers,¹² the notion was met with bemused horror by at least some CCP managers present. This was a million miles away from my experience of talking to clearing house managers in the US a quarter of a century ago when I was helping to redesign Hong Kong's securities market infrastructure and regulation. Somehow in the intervening years too many CCP managers (their owners, boards and staff) drifted --- and were allowed by regulators to drift --- into thinking of themselves as providing IT services that deliver operational and capital efficiency. As a statement of what clearing houses are for, that is dangerous nonsense.

But to the extent that it persists, we cannot expect clearing houses to take a *macro-prudential* approach to their tasks. Indeed, it suggests society faces a choice between, on the one hand, the macro-prudential regulator being empowered, amongst other things, to set and vary minimum requirements for the initial margin and collateral-haircut requirements applied by CCPs and, on the other hand, making the CCP an agency of the State with a clear set of statutory objectives and accountabilities.

Two different models of CCPs

So as I have told the story, we appear to need to choose between two quite different models for the institutional structure and governance of central-counterparty clearing houses.

Under the first model, CCPs would remain private-sector institutions, but would be subject to a more exacting regime than hitherto. They would be required to maintain credible recovery plans; and the State would take resolution powers to be able to sort out a distressed CCP without any solvency support from taxpayers. Further, the macro-prudential regulator would be empowered to step in and set or reset CCP margin requirements etc.

Under the second model, CCPs would become State agencies. In the words of an imaginary advocate, "Quit pretending that clearing houses are something different from what they really are. They're designed to insure the system against one variant of financial market tail risk. They need to be completely safe, with no doubts. They're also in the business of managing externalities, and of leaning against the wind. If central banks should be part of the State, so should CCPs."

¹² Tucker, "Clearing houses as system risk managers," 2011.

Why does it matter whether CCPs are private or public institutions?

This choice matters a lot. The capital markets are becoming more important to financial intermediation. That, surely, will be fueled by the re-regulation of banking, which will see more business move to the markets.¹³ And *within* the capital markets, more types of activity are being centrally cleared. Not just standardized OTC derivatives and exchange-traded derivatives, but cash equities and, very important, government-bond repo (i.e. the core secured money markets). That trend also will surely be fuelled by regulations that incentivize multilateral netting to reduce balance sheet totals and collateral requirements.

Further, if ever a CCP fails and mayhem results, we can be confident that some commentators and politicians will ask, as they should, not only how it was allowed to happen, but what on earth policy makers were doing permitting CCPs to be *for-profit* institutions and, indeed, given their functions, why the CCP had been in the private sector at all. So it would be as well to think this through carefully in advance.

I will offer three reasons for keeping CCPs outside the public sector, and then conclude by outlining some proposed reforms to the regulatory regime under which they operate.

Three arguments for leaving CCPs in the private sector

First, we need to pause before assuming that public sector agencies are havens of virtue and expertise. It would be a *mistake to assume public agencies automatically have undistorted incentives and unblemished competence*. This isn't just about expertise. Although it could be argued that a private sector CCP might find it easier to hire staff with technically relevant experience, in my book that isn't a knock-out blow as the leading central banks succeed in hiring, growing and keeping staff to manage similar risks. The key arguments are, rather, at a higher level.

Unless very carefully constructed, public agencies can be turned to short-term political imperatives; be used to pursue distributional interests; and are hard to reform if they prove incompetent. A problem with second-rate public authorities is that they have a habit of surviving longer than equivalently hopeless private-sector institutions. On that basis, the test is whether the public services of a CCP can be produced in the private sector.

Second, the argument that CCPs should be State institutions contains a striking elision. For many CCPs, *it is not clear which country's State would provide the clearing service*. The core CCPs are serving *global* capital markets. They may be located in one jurisdiction, clear contracts dominated in the currency of other jurisdictions, and have clearing members that are themselves domiciled elsewhere. It is easier to devise arrangements for collective oversight of a global CCP than it would be to produce fiscal burden-sharing for owning and operating a public sector CCP. If it is hard to build effective national public

¹³ See Tucker 2014, *op cit*.

institutions, it is even harder to build multinational public agencies. Herein lies a crucial distinction from central banks. Central banks are intrinsically national (or federal) institutions; CCPs are not.

Third and most substantively, *it isn't true that CCPs can't be allowed to fail or wither away, so long as stability is maintained*. While they have much in common, unlike central banks CCPs are not *de jure* monopolists. And although they provide insurance services of economy-wide significance, they transact with a relatively limited number of counterparties. It is not like every citizen carrying round central bank money in their pockets and wallets.

The solution to moral hazard is not to embrace it by taking central clearing into the state, but to cure it by putting risk back on to the community of private sector firms that bring risk to the clearing house and onto the CCP's management company and senior executives.¹⁴ That can harness technical competence in the clearing-member firms, so that they work *with* the clearing house rather, as too often in the regulatory arena, as a vocal opposition indulging in rules-arbitrage. But it must be coupled with a completely credible resolution regime that allows the authorities to step in and, without any taxpayer solvency support, bring about either a reconstruction and resurrection of a stricken CCP or a transfer of its contracts to a different clearing house.

The response to the argument that CCPs must be information-insensitive is that the forces of regulation and clearing-member risk sharing must, in combination, keep them safe, but with "safe" meaning highly safe in life *and* orderly in death. That is not consistent with complete opacity, as transparency will occasionally be needed to dispel unwarranted concerns about clearing house losses.

Internalizing financial risk would not overcome the problem of pro-cyclical clearing house risk management. But the authorities can --- and should --- mitigate that through their own macro-prudential regulation.

Refining the regime for regulating central counterparty clearing houses as utilities

It would be odd simply to conclude with an endorsement of the status quo, and I shall not do so. Some vitally important initiatives *are* already in train. In particular, work is underway on recovery plans and, relatedly, on resolution strategies revolving around allocating losses when margin and default fund are exhausted. That work is pressing, and leaves no room for diluted ambition.

But more is needed, affecting clearing house management, their owners, their members, their regulators, and legislators.

¹⁴ A few readers will want to ask why the same argument does not apply to central banks; removing a State lender of last resort, leaving 'free' banks better incentivized to manage themselves prudently and, in some versions, underpinned by a requirement that private note-issuing banks back a specified share of their liabilities with gold. I think objections to this include the following. Getting rid of the LOLR would not solve the moral hazard problem stemming from a potential fiscal *solvency* backstop, and might even make it worse. Compared with a century or so ago, full-franchise democracies have got used to macro-economic stabilization policies that try to smooth cyclical fluctuations, whereas the gold-standard frequently generated violent fluctuations in activity and employment.

Where a clearing house is for-profit, the remuneration contracts of management must be designed to tie them to the public good. I doubt they should be rewarded for group or CCP earnings; a fixed salary sufficiently high to secure and nurture quality staff would be better. If, however, remuneration linked to group or CCP earnings were to be permitted by regulators, this should be constructed so that there can be claw back if the CCP fails. One way of doing this would be for any such profit-related pay to be delivered in long-term super-subordinated debt that gets wiped out in the event of the CCP going into resolution.

Where ownership has been separated from the clearing members --- i.e. it is not a mutual --- the owners must understand that owning and controlling a clearing house is a grave thing, a privilege given the public interest goes beyond the private interests of any associated exchange or other businesses. That must be reflected in the structure of the board and its audit committee. For example, an executive responsible for a trading platform or, more generally, for growth in group earnings should not be involved in CCP risk management, including its infrastructural underpinnings. The owners must have skin in the game if their clearing house fails. As well as financial cost, they should expect to account for their stewardship to the relevant legislature.

A theme running through this analysis has been that the clearing members must take risk beyond their paid-up default fund contributions.¹⁵ But the *quid pro quo* has to be involvement in risk policies and practices. *Some* of their staff, subject to Chinese Walls, need to be able to see inside the box of the clearing house's risk management and exposures. In other words, give them the risk and give them the information. The top management and boards of the big global banks and dealers should select their firms' representatives on CCP boards and risk committees with scrupulous care.

Regulators need to take a macro-prudential approach to CCP supervision, focused on systemic risk. For the globally relevant clearing houses, a *collective* approach is needed, whether or not the Financial Stability Board creates a list of systemically relevant clearers. That shared effort should involve systematic stress testing.

In addition, regulators need to adapt prudential oversight of the clearing members of CCPs to ensure that the risks they bring to the clearing house --- on their own account and on behalf of their customers -- is well managed, and that they could bear the strain of absorbing their share of a distressed CCP's losses. Putting those points together, stress testing for global banks and for CCPs will need to be joined up in some way.

Separately, regulators need to be prepared to set minimum margin requirements, and to vary them in the face of cyclical excess or otherwise upon realizing that the world is riskier than they had thought. In other words, minimum margin requirements need to be a macro-prudential instrument. The more prudently they are set for 'normal' times, the less likely margin policy will be pro-cyclical.

¹⁵ When, more than a decade ago, bank supervisors insisted that clearing houses drop the 'down to the last drop' rules that some had traditionally employed, the authorities as a whole erred in not ensuring that replacement arrangements were found.

Legislators have a vital role to play in all this. As well as holding hearings with regulators about stability, they should call clearing-house senior management to give evidence --- at least annually, and so not just when it's too late. That would help to make tangible the public good side of CCP services.

Further, where clearing houses fall under the jurisdiction of securities regulators, legislators must be sure to ask them about system safety and soundness issues. Where a distinct macro-prudential authority or committee exists, legislators should ask openly and directly whether they are satisfied with clearing house management, soundness and regulation. In this way, legislators can affect the incentives of all involved, whether in the public or private sector.

Are clearing houses the new central banks?

Insurance against counterparty credit risk is becoming an increasingly important part of underpinning systemic stability, vital to ensuring that the financial system can serve the wider economy through thick and thin. When the next crisis comes, as eventually it will, it will be nothing short of disaster if a CCP fails in a disorderly way. Clearing house leadership will be right up there in lights with the central bankers.

By making central clearing mandatory for such a large share of the world's capital markets, the G20 Leaders did a momentous thing. It can, indeed, simplify the network of counterparty credit exposures, make the transmission of risk in the global financial system more transparent, and provide tools for mitigating vulnerabilities and excesses. It is a good policy. But it should prompt economists, policymakers and legislators to pause on the question of what is the optimal --- or at least how to avoid a materially sub-optimal --- design of these now vital institutions.

Like central banks, clearing houses are part of the essential financial plumbing of modern economies. Like central banks, they are in the business of insuring against risk in the interests of the system as whole. Like central banks, clearing houses *should* be in the business of identifying and heading off threats to stability. They are, and must think of themselves, as system risk managers.

Unlike central banks, clearing houses don't have monopoly rights, and could be wound down or have their activities transferred in an orderly way. Whilst by no means a trivial task, it is a lot easier to resolve a clearing house than to change an economy's money at short notice. So CCPs should stay in the private sector, but as *regulated utilities*.

Great care needs to be taken to design contracts and mechanisms that generate the right incentives for clearing house owners, management, members and users. Authorities need to have some of their best people overseeing CCPs and their clearing members. Oversight by the legislature of the authorities in this area should be exacting, but they should require clearing house management to testify too. Although the distance from households to clearing houses is large, the public now depends on the safety, soundness and efficiency of CCPs. If this part of the plumbing were neglected, it would be a disaster.