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MICROPRUDENTIAL VERSUS MACROPRUDENTIAL SUPERVISION: FUNCTIONS THAT MAKE SENSE ONLY AS PART OF AN OVERALL REGIME FOR FINANCIAL STABILITY

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I have been asked to address the question of how micro-prudential supervision and macro-prudential supervision fit together.

My answer is that neither of these activities, and especially micro supervision, is well-defined as a self-standing activity. Since that would, to put it mildly, seem to be at odds with decades of micro-prudential supervision here in the Federal Reserve and elsewhere, it is obvious that I must think either that supervision lost its bearings somewhere along the way or, alternatively, never had any bearings. Looking back, I think both of those propositions are true, although in different degrees for different supervisors at different times.

But history aside, if I am broadly correct, then we face major questions about the design of regimes, including the delegation of authority to agencies of various kinds.

In what follows I am going to say something (non-exhaustive) about the nature of the problem of financial stability, what that entails for the high-level architecture of a regime for preserving stability, and the implications for institutional design in liberal democracies, where powers must be legitimate as well as effective in a narrow sense. The route to the essay question set by the Boston Fed about potential conflicts between micro and macro supervision will be circuitous. I believe that we need to step back and think about financial stability as a common-resource problem afflicted by hidden actions. This leads me to separate three components of a stability regime: the articulation of a standard of resilience and its application across different parts of the financial system taking account of the different threats they pose to stability; micro-supervision of firms, funds and

structures to unearth and deter hidden actions designed to step around that standard for resilience; and macro-prudential dynamic adjustment of core regulatory parameters to maintain the standard for resilience in states of the world not reflected in the base regime's calibration. Only then, with each of micro and macro supervision defined within a coherent overall regime for stability, can I turn to the Fed's question. It will turn out that if legislative reform is beyond reach, authorities need to adapt their internal organization and processes.

I should say upfront that in pursuing this course my focus is not especially on the *inputs* to micro and macro supervision or their day-to-day activities in the office, but much more on their *purposes* and *outputs*: ie what they are for and the types of action they entail.

Stability: a common-resource problem that cannot be solved only by a better allocation of 'property rights'

It is often said that, like price stability, financial stability is a public good. I think that misses something important.

Price stability *is* a public good. No one can be excluded from the benefits of low and stable inflation, and nobody can consume those benefits leaving less for others. Put another way, no economic agent can undermine price stability provided that the monetary regime remains intact.

It is not quite the same with the stability of the financial system. It *is* non-excludable: no one can be kept out. But it is *not* non-rivalrous. In an environment of stability, individual firms (or households) can be tempted to take more risks than otherwise. If each firm has an incentive to increase their leverage or liquidity mismatch *in hidden ways*, the resilience of the system is consumed. What lies behind this is a familiar collective action problem: if I think that everyone else is choosing to be sound, then I have an incentive to free ride and choose to be less sound. If I think others are choosing to be unsound, I have incentives to join the party.

Lest the attribution or metaphor of 'common good' seems odd, let me unpack it a bit. Think of the common resource as systemic resilience, and of the flow of benefits stemming from stability as coming via, for example, a lower systematic risk premium for borrowing in a capital market. The common resource, resilience, can be thought of as being 'produced' by the exercise of restraint. That is to say, restraint produces the common good, and lack of restraint at a later period consumes it. Putting state intervention to one side, participants in the market are, through their conduct, either producers or consumers of stability. We might call the posited restraint 'prudence', to use the traditional language of the authorities. So a central question is the incentive they have to exercise restraint or prudence.

It is typical to think of financial stability as being jeopardized by beneficiaries of a government guarantee (for example, deposit insurance, or the prospect of bailout more generally) losing their incentive to control their risk. That is true, but the underlying problem of hidden action goes much wider. Any individual or firm has an incentive to participate in the market taking more risk than is identified: general moral hazard. That way they not only benefit from stability, they consume some of it because the system has lost some of its resilience.

With everybody faced with that incentive, the common resource of systemic resilience is depleted. Whether that is noticed before the balloon goes up or not is a separable question. The common resource of stability (or systemic resilience) had been depleted some time before the crisis of 2007/08 was ignited. On this way of thinking about things, the crisis was waiting to happen. That it was triggered by the relatively small US subprime-mortgage market revealed that the system's resilience was wafer thin.

I don't want to say that the only problem is *hidden action*. There is plainly a tendency towards underestimating observable risks: *myopia*[1]. But we don't know the cause of the myopia, and we cannot rule out wilful blindness playing a part

[1] Nicola Gennaioli, Andrei Shleifer and Robert Vishny, "Neglected Risks, Financial Innovation, and Financial Fragility", Working Paper No. 16068, June 2010, NBER

given the collective action problem in leaving the dance floor once the party is in full swing and resilience is fatefully eroded.

To repeat, financial stability is a *common good*. How much this matters depends on the social costs.

Transactions costs and the scale of the problem

The financial-instability problem is driven by a bunch of externalities. An important question is whether those externalities could be remedied by a clearer/better allocation of property rights that could be effected via markets and, where necessary, adjudicated and enforced via the courts. That is, why is it not enough to tackle this as a problem of 'transactions costs', a la the Coase Theorem[2]?

In fact, on one vital front, that is exactly the course charted and taken by policymakers: resolution. The central idea in the new policies towards resolution of large and complex firms is to make clear (or at least hugely clearer) which creditors will absorb losses (in the jargon, be bailed-in) in what order once a firm's equity is exhausted or it is otherwise unviable. The holders of bank bonds are put at the front of the queue, and so have incentives to charge, ration, monitor, and thus to demand more information on financial-firms' risks etc, potentially mitigating the problem of hidden information. All of that is about reducing transaction costs, by making it credible that resolution will be enforced[3].

That is one, probably the most important, example of policymakers taking a *Coasian* approach. But that has not been seen as sufficient (including within resolution policy itself, where the minimum buffer of bailinable debt will be prescribed by regulation).

[2] "The Problem of Social Cost", Ronald Coase, 1960.

[3] Tucker, "The Resolution of Financial Institutions without Taxpayer Solvency Support: Seven Retrospective Clarifications and Elaborations", European Summer Symposium in Economic Theory, Gerzensee, Switzerland, 3 July 2014.

The reason for not relying entirely on better designed property rights is fundamental. A pure Coasian approach, harnessing the forces of the market, works only when transactions costs can be reduced materially. But financial instability is associated with the ultimate type of transactional obstacle.

One option, in theory, would be to give households and regular businesses 'property rights' which, in the event of a systemic crisis, could be enforced, via the law of torts or whatever, against the banks and others whose imprudence had eroded the system's resilience or otherwise led to the meltdown. But in that state of the world the banks and dealers are bust: they are *not there* to pay compensation.

Worse, the wider economic disruption brought on by a collapse in the financial system can be so deep that the economy moves onto a (persistently) lower path. In consequence, there is not enough wealth to redistribute to leave everybody where they 'should' have been --- for the 'winners' to compensate the 'losers' --- as society is simply poorer. The state could set up arrangements for today's losers to be fully compensated only by taking wealth from future generations. If they do so, the moral hazard problems tomorrow are increased.

In those circumstances, the collective action problem inherent in the 'common good' is best met by the state seeking to intervene to define and enforce prudence *ex ante* rather than relying entirely on enforcement of property rights *ex post*.

That approach, while unavoidable, itself faces two challenges.

First, if an external agent, the state, sets rules and/or standards for prudent behavior and balance-sheet choices, the problem of private sector incentives morphs into one of rule avoidance or evasion: *regulatory arbitrage*. Another way of thinking about this is that everybody can 'eat the stability grass,' shadow banks and others as well as *de jure* banks.

For example, imagine that the optimal instrument for addressing the problem of the 'financial-stability commons' is, say, a leverage-ratio constraint. (I am not taking a position on the substance here; a maturity-mismatch constraint would serve just as well to make my point.) The logical structure is as follows: first, leverage is banned amongst a specified population, none of which is allowed onto

the commons; then 'private property rights', to leverage up to X-times, are granted to that population or a subset of it (*de jure* banks). But, as anyone listening to/ reading this is thinking: if others can gain access to the 'stability commons' and there is no restriction on their leverage, the problem is not addressed. Thus, one way of thinking about the problem of regulatory arbitrage, broadly conceived, is that the regime and, in particular, the specified property rights would have to apply to any class of firms, funds who could eat sizeable parts of the grass.

That is the first problem with resorting to state regulation via *ex ante* rule-books. The second is the risk of replacing or even compounding 'market failure' with 'government failure'. This makes the design of financial-stability regimes and institutions of first-order importance. Central to that is getting the objective broadly right. And that in turn requires a focus on where the big social costs lie.

The objective of a regime for financial stability: resilience

The costs of the problems we are concerned with can be thought of as falling into two broad buckets: allocative inefficiency during booms, and inefficiency and hardship (through the destruction of wealth and jobs) during busts. I assert that while both matter, the latter matters more.

The dotcom bubble helps to illustrate the judgment. No one doubts that resources were allocated inefficiently during the bubble in technology-company equities in the late-1990s, but few would argue that those costs compare with those of the 2007-09 crisis. In a world in which, partly to reduce the risk of government failure, societies must prioritize the problems the state should seek to mitigate, I put 'bust' ahead of 'boom'.

That requires not only price stability, but also stability in the banking system (broadly defined as the private monetary system) and in the financial sector more generally. The system must be *sufficiently resilient* to continue providing the core financial services of payments, credit and insurance in the face of big shocks.

Given the problems of hidden action afflicting the 'stability commons', we need to frame the objective in terms of a 'standard for resilience', and then we need to find ways of making that standard monitorable and enforceable across the whole of the financial community with access to the commons.

A resilience standard has three components

A standard for resilience might be expressed in practice as, let's say, a minimum capital ratio for a particular type of firm, eg *de jure* banks.

Such a standard reflects, at least implicitly, three things: (a) a tolerance for systemic crisis; (b) a picture (or model) of the structure of the financial system through which losses, shocks are transmitted; and (c) a view of the underlying stochastic process generating those shocks/first-round losses.

Something like Basel 3 (including the 'systemic surcharges') *reveals* the underlying standard, rather than being its definition. Once specified for one part of the financial system (in my example, banks), the same underlying standard can be translated into equivalent measures for other types of firm, fund, structure etc. That entails taking into account the risks they pose to the system given the model/picture of its structure ((b) above), but holding constant the taste for systemic crisis and the posited underlying stochastic process.

Such transpositions do not necessarily entail applying the traditional tools of 'banking supervision' to other parts of the industry. Elsewhere, transparency requirements might suffice in some cases. Thus, complaints from securities regulators and others that central bankers are on some kind of imperial project miss the point, as I at least conceive of it, which is that the same standard of system resilience should be delivered to any parts of the industry that have access to the 'stability commons'.

There is an important distinction between the first input to a standard for resilience and the others. Inputs (b) and (c), the model/picture of the system and the loss-generating process, are properly objects of scientific inquiry. Input (a) is different, as it reflects a society's tolerance for systemic risk. In democracies, that requires a majoritarian process and public deliberation of some kind.

The possibility of a long-run trade off means politicians must bless the resilience-standard

There is an important difference here from monetary policy. Perhaps the central belief of monetary economics relevant to the design of monetary institutions is that there is no long-run trade-off between growth and inflation. In consequence, we generally support a lexicographic objective that prioritizes low inflation; and although we have good democratic reasons for the people's elected representatives to set, in today's regimes, the inflation target, we generally do not think it outrageous if 'price stability' is defined by central bankers themselves, as in the euro area. (I leave to one side that the regime for the Federal Reserve does not meet this standard.)

In the financial stability field it is different. We do not yet know whether or not there is a meaningful *long-run* trade-off between prosperity and the risks that threaten periodic bouts of instability[4]. We know that we don't like instability, but we are sufficiently unsure not to ban the risks or structures that can lead to it. Concretely, society has not banned any of leverage, maturity mismatches or short-term debt.

For this reason, it is vital that elected politicians choose or bless the standard of resilience that financial-stability authorities are required to maintain. In Europe, something like that happens, through the Council and Parliament's formal

[4] For a comparatively rare paper exploring possible long-run trade-offs, see Romain Ranciere, Aaron Tornell and Frank Westerman, "Systemic Crises and Growth", *The Quarterly Journal of Economics*, February 2008.

endorsement of the incorporation into EU law of the Basel standard for banking. In the US, where the standard is effected via agency rule-making, through processes complying with the Administrative Procedures Act, a majoritarian imprint comes indirectly via the executive branch's membership of the G20, which signed off the post-crisis Basel standard at a Leaders' Summit[5].

That last point is important beyond the United States. Given the spillovers from problems in one country's financial system to others' systems, a global regime in which each jurisdiction unilaterally chose its own standard of resilience would not be sustainable. Either we have degrees of financial autarky or the 'stability commons' is a global commons and we need a common minimum standard for resilience. Absent cosmopolitan democracy, any such standard needs endorsement collectively from national democratic leaders.

With that background, we can sketch the elements of a financial-stability regime. To be clear, this is still not about institutional architecture, but about the functions the state needs somehow to deliver.

The high-level components of a financial-stability regime

As I see it, a finstab regime has four high-level components:

1) A statement of requirements for the various parts of the system designed to deliver a standard of resilience that has a democratic pedigree.
2) Micro-prudential supervision of individual firms, funds, structures etc
3) Dynamic macro-prudential policy
4) Crisis-management tools and policies.

[5] Paragraph 29 of the communique of the Seoul Summit, November 2010.

I am not going to say much at all about (4) today, except that the behavior of the system will be influenced by the incentives created by policies for the 'end game' and how credible they are[6]. In other words, the resolution regime will be part of the picture/model of the system under (b) in the previous section.

That aside, I hope it is beginning to become clear why I said that there is *no such thing* as a self-contained micro-prudential regime or a macro-prudential regime: these terms are almost meaningless, and certainly fuzzy concepts, *except* in the context of their being components of a broader regime for stability.

The abject failure almost everywhere of prudential regimes was, on this view, attributable largely to muddled or misconceived objectives, which became detached from their roots in a broader stability policy. Without being anchored within a broader regime for preserving stability, agencies (and departments within agencies) were free to drift. In a few countries, that might not have happened. In most, including the US and UK, it did happen.

Financial stability policy: the base regime

The big action is in (1): a statement of requirements for all parts of the system. Policy must be made in the light of the authorities' best picture/model of the structure of the system --- including incentives and agency problems, informational asymmetries or black holes, etc --- and their assessment of where intervention is warranted given the objective. This would take into account the sources of systemic risk and, thus, the various 'market failures' or 'externalities'. It is absolutely the job of a stability authority to identify the remedies to socially costly externalities.

This merits one important qualification and an elaboration.

The qualification is that the market failures that the stability authority seeks to remedy should be big, ie with major welfare costs. The literature on pecuniary externalities sometimes needs scrutinizing on that score, because the welfare losses in some of the models seem to be quite small. A generation of monetary

[6] For a discussion of lender-of-last-resort regimes, see Tucker "The lender of last resort and modern central banking: principles and reconstruction", Bank for International Settlements, September 2014.

economists and policy makers misled themselves by devoting so much effort to refining models for getting ever closer to the frontier. The same should not happen here. The state can only do so many things: preserving stability without choking off growth or technical progress should be one of them. Policy makers need help from researchers in identifying the really big distortions that drive really big costs for society.

The elaboration flows from the point already made that, absent ring fencing and/or restrictions on cross-border finance, the resilience standard needs to be agreed internationally. The 'resilience common resource' is a global commons. As such, the problems of hidden action amongst firms are compounded by a problem of hidden actions amongst national regulators: will they faithfully implement and hold 'their' firms to the global standard when they face incentives to free ride, in order to promote 'national champions' or due to local capture problems? This is the backdrop to Basel's introduction of peer reviews covering the first-stage implementation of the standards for banking and market infrastructure. There is more to say about this set of problems, but not here.

If financial-stability policy articulates the application of a standard for resilience, what, then, are *micro*- and *macro*-prudential policy?

Micro-prudential supervision

Attempts at solving/ameliorating the 'common resource' problem I described are afflicted by the impossibility of writing and of enforcing a completely specified, unambiguous rule-book that can cater for everything. That leaves the financial-stability authority facing problems of opaque idiosyncracy and of regulatory arbitrage. In other words, I cannot easily tell who is surreptitiously eating the stability grass; and each time I design a new constraint for animal X, it seems to morph into X'.

Micro-prudential supervision is called into existence to address the first problem (and also to help spot the second). The nature of the first problem --- opaque

idiosyncracy --- means that notions that micro-supervisory policy is only about banks and is about writing rules are both fundamentally misconceived. Properly thought of, micro-supervision starts where financial-stability rule-writing or, more generally, policy-making leaves off[7].

For banks and near-banks, this entails making judgments about the prudence with which a firm is being managed. The micro-supervisor has to be ready and able to make judgments of the kind: "firm X is managed so imprudently that there is no reasonable prospect of its meeting the *ex ante* required standard of resilience in the states of the world it is likely to confront". Where that judgment is reached, the micro-supervisor needs to be ready (and so legally empowered) to revoke the firm's license, or place (monitorable and enforceable) constraints on its risk-taking.

The basic criteria underpinning the supervisor's findings --- eg, prudence, competent management ---have to be established in statute. In other words, the legislature needs to lay down the criteria for action by the supervisor against firms, funds etc.

Thinking about the purpose of micro-supervision in this way --- as being to uncover and deter hidden actions or information --- sheds light on an incoherence in the long-standing debate about different supervisory models. Is it better, US-style, to place large numbers of examiners on-site or to hold old-style Bank of England 'prudential meetings' with management? Our framework highlights that the former, on-site examination, is about *ex post* moral hazard. (At least as practiced, it didn't remotely work.) The latter, forensic meetings with top management, is partly about remedying problems of *adverse selection*, ie the risk of approving individuals as top management who in fact won't know what they are doing. Unfortunately, that model wasn't put to the test since UK supervisors had jettisoned the 'prudentials' held by the Bank up to 1997. As it happens, I think old-style BofE supervision could have revealed that some top bankers didn't know much about banking and so could not properly pass a continuing statutory test of

[7] A possible exception to this stricture on micro-prudential rule-writing arises if rules are warranted on internal organizational structures in the face of problems of hidden action *within* firms. I do not get into that here, but it entails exploring why top management would not themselves face incentives to remedy such problems, and whether the firm rather than the market is the best locus for managing such transaction costs.

being a ' fit and proper person' to hold positions of power in banks. But the more important point I want to underline is that a debate that persisted from the 1970s into the 1990s about the best model was mixing apples and pears: there are *both* adverse selection problems and moral hazard problems. Any supervisory model needs to address both.

As it happens, I am a sceptic about the ' on-site examiner' model but, my priors aside, the central test is whether it or other, newer models can be expected to reveal and so deter hidden actions that would materially endanger a firm's meeting the specified standard of resilience.

When such problems are detected at individual firms, the micro-supervisor is called up on make what, in the language of administrative law, are called adjudicatory judgments, subject to canons of procedural fairness. But we also want a micro-supervisor's judgments and actions to be fair in the sense of being consistent across different cases and over time. This makes it important that the supervisor should articulate how it plans to apply the statutory criteria for authorization, consistent with the over-riding standard for resilience[8]. I go through this because, as I hope will be clear, it is not the same as writing legally binding *rules* for each and every dimension or facet of banking bearing on safety and soundness[9].

It is nothing short of tragic that this basic conception of prudential of banking supervision was lost for a generation. It is precisely why in the UK when planning for the return on banking supervision, Mervyn King and I, to name only those of us who have left central banking, talked so much about a return to 'judgment-based supervision' centred on statutory criteria for authorisation.

But it is also tragic that micro-supervision --- and please note that I am leaving out 'prudential' --- is seen to be relevant only to banking and insurance, given that other parts of the financial system can deplete the common resource of system

[8] Elsewhere, I call these 'Operating Principles'. They are a vital part of any independent-agency regime.
[9] In case all that is thought fanciful, I might mention that I helped draft documents on the application of statutory authorization criteria during the early-mid 1980s.

resilience and have equally powerful incentives to hide or camouflage their actions.

So to be clear, standard setting is about financial stability (and, jumping ahead a bit, for a financial-stability authority). There is not one set of 'macro' regulatory standards and another set of 'micro' regulatory standards. To sum up,

- Micro-prudential supervision is to do with the problem of hidden action. In this sense, prudential supervision as traditionally conceived and parts of securities regulation address the same problem.
- Bank supervisors should lay more stress on requiring regulated firms to reveal information; and securities regulators should attend more to whether their disclosure requirements are effective in delivering a standard for systemic resilience
- Regulatory arbitrage is a problem of hidden action. Just as regulated firms will seek to avoid the standard they are intended to meet, so unregulated entities will seek to stay outside the *de jure* perimeter of the regulated regime by obscuring the extent to which they are mimicking its economic substance. The problem of the 'stability commons' means that anybody who could materially deplete the system's resilience needs to be *within* the scope of the broad regime for stability. As with banks, they then need to be subject to micro-supervision of some kind to ensure that they are not avoiding the spirit of requirements applied to them in order to deliver the resilience-standard. Such micro-supervision is, I would suggest, almost non-existent.

Macro-prudential policy

If that is micro-supervision's place within a regime for stability, what is macro-prudential?

I define 'macro-prudential policy' to be a sub-regime under which policymakers can dynamically adjust regulatory parameters to maintain the desired degree of resilience in the financial system. The adjustments are state-contingent, not time-contingent[10].

That does not mean that they must vary a lot. The better the design and calibration of the base regulatory regime and the better the contribution of micro-supervisors in preventing regulatory arbitrage from undermining that base regime, the less cause there will be temporarily to vary the core regulatory parameters. But where necessary, they can be varied to sustain the financial system's resilience.

The question that begs about the financial-stability regime is whether the stability rulebook can be static. I think that a static set of requirements cannot be relied upon, for reasons going back to our uncertainty about longer-term trade-offs.

I want to suggest that, big picture, the underlying risk process in the financial system as a whole can be thought of as being at any time in one of three broad modes -- normal, exuberant, and depressed. In exuberant phases, risk will be underpriced and debt builds to levels that stretch budget constraints.

If that is right or helpful as a picture, then a very important policy question is whether or not to calibrate the base regulatory requirements designed to keep the system safe and sound -- minimum capital requirements, minimum collateral requirements on derivatives transactions, and so on --- to exuberant states of the world. An argument against doing so is essentially ignorance and uncertainty about whether there is in fact a long-run trade off that matters. We do not know enough about the properties of the financial system to be confident about how the supply of credit and other core financial services would be affected by calibrating the base regulatory requirements against the most vicious exuberant states of the world.

[10] Some people use the term 'macro-prudential' for wider financial-stability policy as well as for dynamic policy, but we can easily avoid this unnecessary and confusing usage. See Tucker, "Macro-Prudential Policy Regimes: Definition and Institutional Implications", IMF Macro3 conference, 15 April 2015, forthcoming.

If, however, a regime is calibrated to a 'normal' underlying risk-generation process, then we know that those regulatory requirements will be insufficient when the world moves into highly exuberant mode. In those circumstances, capital requirements or margin requirements or haircut requirements or whatever need to be changed in order to sustain the desired degree of resilience.

There is another set of circumstances where a temporary recalibration of regulatory parameters might be warranted. If the system becomes materially more interconnected, policymakers face a choice between enforcing simplification of the network and strengthening its atomistic parts. The best policy in the longer term will often be the first, but the second might sometimes be warranted as a shorter-term palliative.

To be clear, in *neither* case --- and, in fact, exuberance and heightened interconnectedness sometimes come together --- is dynamic policy about changing the goal posts. They stay fixed: the goal posts are driven by the tolerance for crisis as specified in the resilience standard.

If the watchword for micro-prudential supervision is adjudicatory and judgmental fairness, the watchword for dynamic macro-prudential policy is that it should be *systematic*. In this it is akin to routine monetary policy decisions.

*Macro-prudential policy is **not** about managing the credit cycle*

It is worth adding a few words on what this conception of macro-prudential policy is not. In particular, given the prevalence of papers devoted to assessing the 'effectiveness of macro-prudential instruments' in dampening credit growth or asset-price appreciation, I should underline that I am *not* talking about a regime directed towards *fine-tuning* the credit cycle[11]. That would be too ambitious. It is hard to know whether temporarily raising, say, capital requirements for banks would tighten or relax the supply of credit in the short run. Any such measure will reveal not only the action itself, but also information on the state of the financial

[11] This means, incidentally, that the Basel 3 'counter-cyclical buffer' is ambiguously named. 'Buffer' is good, but 'counter-cyclical' is misleading.

system. In contrast to monetary policy where the data on the economy are in the public domain, a prudential policy maker has lots of private information about vulnerabilities in individual financial institutions and the linkages amongst those institutions. If the market is surprised that the policymaker is concerned enough to act, credit conditions might tighten sharply if market participants conclude, on the basis of the information newly available to them, that the actions taken are insufficient. If, by contrast, the market has been ahead of the authorities in spotting a lurking threat to stability and so is relieved that the policymaker is finally waking up, credit conditions generally might even ease. There are many scenarios in-between[12].

My proposed focus is less on trying actively to manage credit conditions, and more on aiming to sustain a desired degree of resilience in the system. As I said, that has the merit of concentrating on the big issue in this field. It means that more research effort should go into thinking about the sources of market failure that create the need for stability regimes and rather less into applying standard monetary policy time-series techniques to the new set of instruments.

The institutional architecture of a stability regime

Against that background, I can make some comments on the institutional design of a stability-regime.

Under the schema above, I distinguish between (1) financial stability policy; (2) micro-prudential supervision; and (3) dynamic macro-prudential policy. This is reflected in some jurisdictions' regimes.

In the UK, for example, the first and third were allocated to the Bank of England's Financial Policy Committee; the second partly to the Prudential Regulation Authority, which is a subsidiary of the central bank, and also to the Financial

[12] See Paul Tucker, "Banking Reform and Macro-prudential Regulation: Implications for Banks' Capital Structure and Credit Conditions", SUERF/Bank of Finland Conference, Helsinki, June 2013, Bank of England.

Conduct Authority. While important parts of the stability regime are formally decided by Parliament or in the EU, the FPC has a statutory responsibility to keep the whole under review and make Recommendations to other bodies (some of which are on a 'comply or publicly explain' basis).

It is harder to say how the US regulatory architecture maps into this structure. Micro-supervision is allocated to a number of agencies, but everything else is a bit fuzzy. That is because, for understandable reasons given the number of 'veto points' in the US legislative process, Dodd Frank was passed soon after the worst of the crisis and so before thinking on stability regimes had got beyond the vital points of 'more capital, more liquidity, less interconnectedness, solve Too Big To Fail'.

Particular regimes aside, I would advance the following propositions on institutional architecture:

I. There should be a single body responsible for determining or making public recommendations on the 'rules of the game' for stability that effect the standard for resilience. Its mandate should cover the entire sector.
II. It is not absolutely necessary that all three functions be located within the same agency, but where they are in separate agencies freely flowing exchanges of information must be incentive compatible.
III. Where they are located within the same agency, micro-supervision and macro-pru policy (and, where relevant, monetary policy) must be under the control of separate committees
IV. Dynamic macro-prudential policy should be delegated to a body that is highly insulated from day-to-day politics as this field faces big challenges of credible commitment[13]
V. Outputs should be visible and so monitorable.

I will elaborate here on just three of those propositions: I, III and V.

[13] There might also be a strict time-inconsistency problem in the narrow sense of a social-planner with unchanged preferences departing from a long-run optimal plan because they can improve on it in a single period. This question is under-researched.

A financial-stability regulator

A stability regulator need not *control* all instruments. Indeed, if it is an independent agency, it should not do so because it should not control the tax code. Where remedies might cut across distributional choices, they have to be relayed to the elected government/legislature rather than decided by independent policy makers insulated from day-to-day politics.

But the stability regulator must be free and, indeed, under a duty to make public recommendations to other bodies. Further, it should probably be able to direct rule changes at the micro-regulators where otherwise there would be a material threat to stability.

This alone would obviously be a major change, as it implies that the current regulatory architecture is fundamentally flawed in many jurisdictions.

If a single agency has responsibility for different stability functions, separate committees and sub-regimes are vital

The second point I shall elaborate on concerns the structure of agencies with multiple functions serving stability, including perhaps monetary policy. Concretely, why are distinct committees/boards --- in the UK, the FPC and PRA --- warranted if financial-stability policy, micro-supervision and dynamic macro-pru policy are not separable in any deep sense? The answer revolves around guarding against 'government failure' given the incentives of multiple-mission agencies.

The skill sets and dispositions are, of course, distinct. Good micro-prudential supervision focused on hidden actions requires a forensic, associative, even skeptical cast of mind. Good financial-stability policy --- ie articulating how the standard for system resilience should be applied in different sectors and activities --- requires an analytical cast of mind spanning macroeconomics as well as finance and the microeconomics of information, incentives etc.

That just says the skillsets are different. The purpose of separate committees is about mitigating a problem of incentives in multiple-mission agencies. As formal papers by Holmstrom and Milgrom and more observational work by J Q Wilson showed and demonstrated a quarter of a century ago, agencies struggle to do a good job at delivering more than one function, as they tend to orient their effort to the more visible, salient activity. As for a while became enshrined in *New Public Management* orthodoxy, that is often seen as making a case for allocating only one function, one mission to any agency. But as I have argued, in the stability arena we have different functions but a common objective: neither can deliver without the other, and so information flows must be seamless. Separate agencies tend to be beset with incentives to compete rather than cooperate. The UK structure of separate policy bodies within one agency is designed to thread its way through that, the key ingredient being that each committee has a majority of members who are on only that committee and so incentivized to deliver *its* contribution to stability.

The visibility and monitorability of outputs: the political economy of stress testing

That organizational structure seeks to address the incentives around effort. But it gets traction only if the outputs of each committee/activity are visible and so can be monitored against a reasonably clear objective or standard.

In terms of our schema, the outputs under (1) and (3) --- the base stability regime and its dynamic adjustment --- are easily observable.

The outputs under (2), micro-supervision, have traditionally been highly opaque. This problem has plagued *prudential* supervision in particular for almost as long as it has existed, giving rise to a mindset or doctrine amongst practitioners that the work of prudential supervisors *must* be confidential: that the world would not be safe otherwise. Although I understand why people came to believe that, I think it is dangerous nonsense and completely at odds with a parallel belief that prudential supervisors should be independent, that is to say insulated from day-to-day politics. Quite apart from the blunting of incentives and so the associated risk of capture, opacity is at odds with the necessity, in a democracy, of being able

to monitor the exercise of delegated authority. If prudential supervision *must* be opaque, then either it should be under political control or, alternatively, subject to oversight by a committee of the legislature whose members, like committees overseeing security and intelligence, are subject to very strict duties of secrecy.

Fortunately, the beginnings of a solution to the opacity problem are emerging.

We have already described an objective: a standard for resilience.

At last, one big output of supervision can now be observed: stress testing. Both the scenario and the results are published. The 'models' used by the authorities are not published, because they might be gamed. I don't know what the solution is to that, except perhaps very harsh penalties against gaming and arbitrage. But the big point is that the single most important output of micro supervision can now be observed, debated, criticized and, most important, inform public debate on whether the chosen standard for resilience is appropriate.

Micro-prudential versus Macro-prudential

I am now, finally, in a position to offer answers to the essay questions that I was set by the Boston Fed. Unusually, I am going to set it out in Q&A form so as to be sure I cover the ground specified by the conference organizers.

(1)What is the objective function that supervision is currently attempting to maximize?

It should be the systemic resilience of the financial system as a whole, so that it can maintain the provision of core services in the face of big shocks.

Society therefore needs to choose what 'size' of shock it wants the system to be able to withstand given its tolerance for crisis and the authority's picture of the structure of the system and the way big losses would be transmitted.

Such a judgment is implicit in the Basel 3 capital standard, but needs to be carefully unpacked.

The standard of resilience needs to apply across the system, but would take on different shapes for different activities or functions.

(2) In particular, are the objective functions for micro-prudential supervision and for macro-prudential supervision different? If so, how are they reconciled within overall supervision when they conflict?

No, they are both directed towards maintaining the desired degree of system resilience.

It is vital to construct the regime so that they do not conflict. That entails:

- *Framing the statutory objectives accordingly. Thus, for example, if the objective of micro-pru has been specified in terms of the 'safety and soundness' of individual firms, then 'safety' and 'soundness' each need to be specified in terms of how they relate to systemic risk. (The UK's 2012 statute does precisely that.) Also, micro-supervision should not have any other equally ranked statutory objectives.*
- *The micro-supervisory body should not decide the parameters of the regulatory regime. Or if it does, they should be subject to a statutory power of override from the financial-stability policy body.*
- *If those conditions are not met, the jurisdiction concerned is heading for trouble.*
- *Within the Fed, this means that regulatory policy should be made (really) by the Board of Governors, with minutes of meetings as per FOMC etc.*

(3) Does supervision try to minimize the losses from systemic financial institutions?

It does not try to prevent the failure of individual firms, funds, or structures. The desired degree of resilience of individual firms should be determined by the threat they pose to the stability of the system.

Thus, the desired degree of ex ante resilience depends, amongst other things, on the quality and credibility of the resolution regime.

(4) Does it try to stabilize financial markets?

Absolutely not as a central or direct objective. The authorities don't know how to do that; and even if they did, it might not be desirable. Maintaining the flow of financial services, through a system that is resilient enough to withstand shocks up to the level desired by society, should help to reduce ex post volatility in market prices following shocks of up to that severity.

(5)Is it minimizing the losses from a hypothetical insurance fund?

The important thing here is to have a time-consistent policy on, broadly, 'insurer of last resort' interventions and to frame them so that the costs are, so far as possible, internalized cross-sectionally within the industry, their investors and customers, as opposed to being spread across generations.

At this point perhaps I should make a confession. I have answered the Boston Fed's questions, but in doing so I have set aside their definitions of micro- and macro-prudential supervision. They were famed in terms of reaching judgments about individual firms and about the system as a whole:

> *"While micro-prudential supervision should incorporate the effects of macroeconomic events on the health of individual institutions, macro-prudential supervision incorporates additional dimensions. Financial stability concerns require policies to be more forward looking, have additional focus on potential market failures and externalities, and apply increased attention to the interactions among financial intermediaries and financial markets."*[14]

In a nutshell, I have departed from those definitions at two levels. First and most important, we should define regimes, and sub-regimes, in terms of *outputs* not *inputs*. Second, but consistent with that, the regime governing the micro-supervision of individual firms and funds etc also needs to be forward-looking, needs to reflect externalities etc, as well as --- and here I agree with the Fed--- the impact of macroeconomic events on firms.

Given the possible response that my view stems from spending too much time thinking about large and complex firms, these days known as SIFIs, all I would say is that common exposures or herding by small firms can cause great damage, as the UK discovered to its cost in the 1970s' Secondary Banking Crisis and later re-discovered in the Small Banks Crisis of the early-1990s. The first chair of the Basel Supervisors Committee, George Blunden, came close to capturing the pervasiveness of the stability problem when, in the mid-1980s, he said:

[14] Taken from the original conference programme sent to speakers.

"…[i]t is part of the [supervisor's] job to take [a] wider systemic view and sometimes to curb practices which even prudent banks might, if left to themselves, regard as safe"[15].

None of what I have said entails that the Fed's underlying question about the potential for conflict is misplaced where the overall regime is poorly designed. Everyone here knows about the cultural distance between micro-supervisors and macro-researchers/analysts that characterised some central banks, including the Fed itself, for many decades.

Where the overall regime is poorly designed, public servants have a duty to identify the faultlines, publicize them, and seek help from the legislature in remedying them.

Lest that be thought the naïve daydreams of someone from a Parliamentary democracy who does not grasp the US's legislative process, I would add that officials have another duty: to organise their own institutions in ways that, as far as possible within the law, synthesize a more nearly optimal regime. We can think of the annual stress-testing exercise as a big step of that kind: forcing supervisors and macroeconomic analysts to work together, focussed on a forward-looking assessment of threats to the system manifested in individual firms, taking account of their interconnections. Cross-agency benefits of a similar kind can be reaped once stress-testing of CCPs commences, involving as it should securities, derivatives, banking regulators and macro-supervisors.

In synthesizing a less suboptimal regime, there are issues around the organization of decision-taking procedures and transparency too. I will touch on those as I wrap up.

Summing up

[15] Blunden had by then retired as chair of the Basel Committee but was Deputy Governor of the Bank of England.

I have described a financial-stability regime as having three components:

- The articulation of a standard of resilience applied, *mutatis mutandis*, to all relevant parts of the system.
- Micro-supervision of firms, funds, structures against that standard, given idiosyncratic opacity and incentives for hidden actions.
- Macro-prudential dynamic adjustment of core regulatory parameters in order to sustain the desired standard of resilience as the world changes.
- *Ex ante* crisis-management arrangements.

Broadly speaking, the first is about general policy manifested in rule writing, designed to cure/mitigate externalities and must be cast widely given the 'common resource' problem; the second is about seeking out hidden actions and making adjudicatory case-by-case judgments; the third is about maintaining a systematic policy so as to deliver a standard for resilience time-consistently; and the fourth, which I have not addressed here, is a vital shadow that helps shape incentives.

How far real-world regimes approximate that structure varies enormously across jurisdictions. I am not sure that the lessons for how micro-supervision should be framed have been fully debated or acted upon, although one can see evidence of exactly that in some of the Fed's internal reforms. And I am not convinced that many advanced-economy democracies have financial-stability authorities or macro-prudential bodies as I have specified those functions.

But as this is a conference hosted and organized by a central bank, I will conclude with a just a few, incomplete thoughts on what all this means for central banking and for this central bank in particular.

It is more than half a century since Richard Musgrave separated out three purposes of the state: allocative efficiency, distributive justice, and macroeconomic stability[16]. We typically think of central banking as being devoted to the third: macroeconomic stability. That is true. Even with extra responsibilities for prudential supervision (micro and macro), we can think of them as engaged in inter-temporal stabilization of the monetary system as a whole.

[16] Musgrave omitted security, possibly on the grounds that he was concerned with the 'fiscal state'.

But where they are given responsibility for financial-stability policy more generally or a duty to make recommendations on policy to other bodies in order to deliver stability --- the first of my four functions --- then they enter the 'allocative branch' as well. That is because one of the central ingredients to any decent stability policy will be diagnosing and prescribing remedies for the externalities that drive the stability problem. Central banks should be involved in that only in so far as inefficiencies are very materially relevant to stability, not in the pursuit of efficiency more generally.

Second, where central banks have responsibilities for different facets of a stability regime, they should petition their legislature to give them a single, holistic objective. That is to say, the objectives of any micro-prudential responsibilities *must* be completely consistent with any broader stability role.

Third, where they have different types of function --- as any central bank combining stability with monetary policy does --- they should where necessary petition their legislature to establish separate statutory policy committees, with the very top brass being responsible for ensuring frictionless flows of information amongst them.

Fourth, they should ensure that their core outputs on each front are transparent and can monitored against a comprehensible standard.

This is part and parcel of designing robust regimes for the new world. And that is all before one even gets to questions of international spillovers and cooperation, given that the 'common pool' with which I began is, as I have said, absent financial autarky a global pool.

If something like that is even broadly right, then the Fed has some fortuitous advantages but also faces some challenges. On the positive side, it starts off with the Board as a regulatory-policy body that is separate both from line supervision in the Regional Feds and from the FOMC. The Board is in a position to develop stability policy for the domain of firms over which it has jurisdiction, consistent with domestic legislation and international standards. On my account, the published minutes of the Board would be as interesting in this field as those of the FOMC can be in monetary policy.

Amongst challenges, I would mention two. The Board is also a body that makes adjudicatory decisions in particular cases, and needs to operate differently for that function than when articulating the resilience standard. More seriously, the US does not clearly have a financial-stability body that can apply a resilience standard across the system, which is liable to make regulatory arbitrage (hidden actions to consume the 'resilience commons') particularly active and problematic here. Nor does the US have a macro-prudential body as I have defined it (other than for the 'counter-cyclical buffer' for banks).

In a nutshell, then, from the perspective of the Fed --- and, it should be said, there are other important perspectives --- it is faced, in house, with trying to develop its micro-prudential responsibilities and role into a shape fit for today's (and, in fact, as we know to our cost, yesterday's) world. And out of doors, as we English like to say, it is faced with trying to forge financial-stability collectively via a body, the FSOC, with limited powers and not all of whose member organizations find it easy to recognize the imperative of stability given their own unchanged statutory mandates. This cocktail should worry people here as much as, I suspect, it worries counterparts in the rest of the world.

To conclude, the Boston Fed's question of whether micro-supervisors and macro-supervisors can be at odds could be a good question only in a system whose design is flawed. Maybe, therefore, it *is* a good question. But it is still one that public officials can do a lot to meet.