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In Praise of Stress Tests

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A. Introduction

Bank regulation is necessary, but difficult to do well. It is necessary because the social costs of bank failures exceed the private costs, i.e. there are externalities. It has proven difficult to do such regulation effectively because there are a number of generic problems with the conduct of bank regulation. In this note we will deal specifically with two such failings.

First, regulation has historically and, even still currently, been based mainly on ratio controls, initially mainly cash and liquidity ratios, more recently on capital ratios. But there was, until recently, never any graduated ladder of sanctions as the ratio levels held declined towards the acceptable minimum. Instead ratio control operated as a cliff edge device. Fall below it, and either the authorities or market forces (reputational) would require either speedy repair, or closure. But once above, by whatever small buffer, and the bank conformed. Moreover, given that the required ratio was set above that which a bank would voluntarily choose to keep on its own account, (if not so, why have a regulatory ratio), the effective buffer above the required minimum was generally kept at fairly minimal levels, (Milne and Whalley, 2001).

Second, whenever a bank gets into difficulties, it would be preferable if it could take steps on its own accord to recover its function as a going concern, rather than proceed into resolution. Banks are often too important, too large and too central as utilities, just like other utilities, such as electricity, water, gas, etc., to close down and liquidate. Indeed, both bail-out and bail-in mechanisms are means of keeping banks operating as going concerns, under different management. But there are inherent problems both with bail-out and bail-in techniques (Goodhart and Avgouleas, 2014). It would be usually preferable if a bank, running into difficulties, would put its own house in order, rather than having to go through an external support mechanism. The EU banking directive is called the Bank Recovery and Resolution Directive. But far more effort and attention has been given to

Resolution than to Recovery. Nor can we expect banks to be keen to initiate recovery programs on their own. To do so is tantamount to a confession that the previous strategy had not worked, and would, very likely, involve a major management reshuffle. Bank CEOs, such as Fuld and Goodwin, are no more likely to call time on themselves, than turkeys to vote for Christmas.

It is the thesis of this note that the regular conduct of stress tests will help to mitigate these generic shortcomings. Anyhow, in Section B we rehearse some of the problems of ratio controls. In Section C, we review some of the difficulties of getting banks to initiate recovery programs. Then in Section D, we briefly discuss some of the remaining problems of stress testing and conclude.

B. Some Problems with Ratio Controls

One of the most astute macro-economists ever was D.H. Robertson. In his customary, gently humorous, way, he saw several of the problems with such ratio controls in his early textbook on *Money*. Thus in his textbook on *Money* (17th Edition, p. 57) he wrote,

“If a proportion fixed by custom is arbitrary and misleading, a proportion fixed by law seems at first sight to be positively mischievous. An iron ration which you must not touch even in the throes of starvation is something of a mockery. Against such criticism it may be urged (though not too loudly) that in finance as in war rules are made to be broken on occasion, and that their object is not to ensure that certain things shall never be done, but that they shall not be done without good reason.”

Then again (ibid, p. 62),

“But it is evident at once that the fixed fiduciary system is free from the defect which we noted, in connection with bank money, in the proportional system — namely, that it resembles the procedure of a certain municipality which tried to guard against a shortage of cabs by ordaining that there should always be at least one cab on the ranks.”

DHR also appreciated the point that, if the reserve ratio was required to be held (at all times), and the penalty cost in terms of interest foregone was sizeable, then the spare margin that the banks would voluntarily hold, above that required, would most likely be minimal. Again, he wrote (ibid, p. 56),

“A legal arrangement of this kind is open to the objection that human nature being what it is, the law is sometimes held to encourage what it does not expressly forbid, and a bank may therefore be tempted to keep its proportion of reserves very near the bed-rock legal minimum. Any unexpected demand for common money may then present the bank with the alternative of infringing the law, or declaring itself insolvent while its reserves are still far from exhausted.”

As a result, the use of required ratios, that could not be infringed without severe reputational damage, was accompanied by relatively small holdings of surplus capital (or liquid assets). So the potential buffering function of ratio controls was low, perhaps lower even than would have occurred without any such regulations. What such controls did do was to provide some extra support for bank creditors in the face of severely adverse conditions, and so *may* have reduced creditors’ propensity to run.

These problems with ratio controls have persisted, despite having been spotted many decades ago. Thus when he was Chairman of the Basel Committee on Banking Supervision, at the time of introducing the Basel I Capital Adequacy Requirements (CARs), Peter Cooke raised the issue, (Goodhart, 2011, pp 177/78),

“On the level of capital, Cooke raised the question whether the number was to be ‘a *minimum*, or target or standard’. ‘If the former, it will have to be set at a very low level. If the latter, it can be higher but will require a transition period for some countries and/or some banks in some countries’. Here I believe that the analysis can be faulted.* First, there was little appreciation that I found in the papers that if the regulators set a ‘target’ of X per cent, that banks, the market and ratings agencies would come to treat it as a reputational minimum. Second, if it was to be a target or standard, it implies that it is conceivable, indeed fully acceptable under some circumstances, that banks might fall below such a level. But there was no discussion at all of how national supervisors should react, and what sanctions they might apply, if the CAR standard was breached, but it would have been difficult or impossible for an international committee such as the BCBS to go into this latter subject.

[* Peter Cooke has responded to me, in private correspondence, that members of the Committee, in his recollection, were aware of both these points. On the first, it was realised that the target/standard would come to be regarded as a reputational minimum (although the degree to which this occurred was not anticipated). On the second, members of the Committee recognized that the standard could be breached in particular circumstances, but

it would be up to individual national supervisors to decide on the action which should then be taken.]”

The main problem was, and remains, that Central Bank officials felt that they had no locus for imposing sanctions on commercial banks, see Goodhart (op cit, Chapter 14). They could advise on the appropriate level of ratios, leaving it largely to market reputational factors to enforce their maintenance, and, if the required ratios were too egregiously transgressed, they had the statutory right to withdraw the banking licence, and hence shut down the bank. But this led to a cliff-edge system, with banks largely free to do as they chose so long as they remained (often just) on the right side of the requirements, but with most of them maintaining small spare buffers above the cliff-edge minimum. So the system as a whole was fragile in the face of any sizeable common shock.

The alternative, which many academic commentators would have preferred, would have been a ladder of sanctions, increasing in severity as the bank held less capital/liquidity, but probably with a lower absolute minimum level below which a bank would be shut. There are, however, now signs that the authorities have started to move in this direction. In particular, the Basel III capital adequacy requirement (CAR), as promulgated by the BCBS and FSB (Financial Stability Board), contains a ‘conservation’ range wherein a bank’s core equity tier one ratio (CET1) lies between 7 and 4½% of risk weighted assets (RWA), with 4½% being the absolute minimum level. Within this conservation range a bank would not be able to make certain payments, e.g. on dividends, equity buy-backs, acquisitions, etc. So, it *would* face sanctions, short of closure.

Perhaps even more important, however, the application of regular stress tests does, in principle, allow the regulatory authorities to test whether banks’ buffers would be strong enough to resist seriously adverse conditions, and to require strengthening additions to those buffers when they are assessed to be insufficient. There are, however, two shibboleths of political correctness in banking that complicate the issue. The first is the need for transparency. So, any bank that is deemed to fail the stress test must be named, and is consequently shamed, and will, therefore, have markets turned against it. This causes the whole process to become distorted; banks will try to game the exercise by setting their resources at levels that will just satisfy the authorities’ presumed requirements; and the authorities will try to set their initial shock assumptions at levels that will just find a preordained set of banks failing the test, not too many, nor too few. If the exercise was done behind closed doors, without fear of leaks, the stress tests could be done more honestly. As it stands, an outsider, like myself, reckons that there will be a modicum of stage management about

the whole exercise. Insiders will protest that everything is clean and straightforward, but we will remain sceptical.

Two economists, Alvarez and Barlevy, have recently written a, highly mathematical, paper, on 'Mandatory Disclosure and Financial Contagion (2015), coming to a similar conclusion, Thus they write (p. 2),

“our model does not imply disclosure is always desirable, even in the presence of contagion. To the contrary, in our benchmark model not only is disclosure sometimes undesirable, but it may be optimal to force banks to keep information hidden. This is because secrecy can sustain socially beneficial risk-sharing between banks. The notion that opacity is desirable for sustaining insurance dates back to Hirshleifer (1971), and has been recently applied to explain the tendency towards secrecy in the banking sector by Goldstein and Leitner (2013), Faria-e Castro, Martinez, and Philippon (2015), Dang et al. (2014). As in these papers, our benchmark model implies mandatory disclosure cannot improve welfare in normal times, in contrast to the view advocated in Bernanke (2013).”

The second shibboleth is that there must be no further bail-outs using 'taxpayer funds'. Given that the public failure of a stress test makes a weak bank even more fragile by turning markets against it, the most efficient way of rescuing the situation is for an immediate public sector injection of capital into such failing bank(s), as was done with the use of TARP funds in the first US stress test of 2009, bringing capital requirements back into line, without any need for further deleveraging. The terms on which such injections would be made should be sufficiently onerous so as to provide a clear incentive to the bank(s) involved to replace government funding with private sector funding as soon as reasonably possible. Indeed, if it was not sufficiently onerous, in the EU it would transgress the prohibition on State aid. Moreover, if the bank failing the stress test could commit to raising the required additional capital within a short space of time, it should be allowed to do so, rather than accept public funding. While a bank poised to fail a stress test might seek to raise new equity shortly before the results of a stress test were published, the market would draw its own cynical conclusions.

The combination of these two shibboleths, transparency of outcome and no public sector financing, leaves the stress test process in a more complex and delicate condition than would ideally be desirable. If banks go into the stress tests in a reasonably strong condition, as has been the case in the USA since 2010, then the shortcomings of the weaker banks can generally be fixed by a

temporary prohibition on pay-outs for dividends, buy-backs, excessive remuneration, etc., until retained earnings can fill the perceived hole. But if the banks are so weak as to need additional external finance, as may still be the case in some instances in Europe, then there is a problem. Weak banks would be further weakened by public test failure, and there is no clear way out of this problem. Raising further equity at a time when market values would have been trashed by the exercise would be enormously unpopular with both existing shareholders and management; merger with a stronger bank may raise concerns about competition and oligopoly; deleveraging will have adverse macro-economic effects, see Orphanides (2014).

Perhaps some further thought still needs to be applied to the question of how stress tests could best be arranged so as not only to identify, but also to encourage a resultant strengthening, of the position of the weaker banks in the system. This should be a situation where public funding for equity injections could be used efficiently and profitably to the benefit of taxpayers, but the blanket opposition to any further bail-outs prevents the adoption of sensible policy.

C. Recovery

In my view, (see Goodhart and Avgouleas, 2014), the bail-in proposals for resolving systemic banks, (G-SIBs) are seriously flawed. The resolution process will be triggered too late to prevent large-scale losses. Under the TLAC and MREL proposals, such losses will fall immediately, and in a concentrated fashion, on a much smaller group of creditors. If institutional investors, such as pension funds and insurance companies, are to be prevented from putting their clients at risk by investing heavily in such bail-inable debt, the residual buyers, e.g. hedge funds and sovereign wealth funds, may be thin on the ground and flighty. The potentiality for contagion and pro-cyclicality is clear.

But this train left the station some time ago; there is no prospect of reversal. The need, therefore, is to shore up the system so that the likelihood of a systemic bank (G-SIB) entering the resolution process is reduced as far as possible. There is such a possibility, in the guise of the Recovery stage of the Bank Recovery and Resolution procedure, as in the EU's Bank Recovery and Resolution Directive (BRRD). All systemic financial intermediaries, G-SIFIs, especially such banks (G-SIBs), are now required to write Living Wills, whereby they indicate how they would handle a condition of significant danger (recovery), and then how, if such fragility developed further into failure, (from going concern to gone concern), how the resulting resolution could be facilitated. The public has

been informed that the regulatory authorities have found the initial attempts by the G-SIBs in the USA to be unsatisfactory. Presumably some mutually acceptable program for each G-SIB's recovery and resolution planning will eventually be obtained, though, for confidentiality reasons, the details will presumably be kept secret.

So, I assume that all G-SIBs and G-SIFIs will, in due course, develop a Recovery program acceptable to their regulator, the home regulator when the G-SIB has an SPOE, the college of regulators for G-SIBs with an MPOE. The problem, therefore, is not so much WHAT (recovery consists of) but WHEN (it is triggered). At present there is no clarity on this. Indeed the EBA appears to be inviting banks to select a trigger for initiating recovery for themselves. But, for rather obvious reasons, no bank's CEO is going to start such a process himself.

In the absence of any such effective trigger, I, with Miguel Segoviano, have written a paper ('Optimal Bank Recovery', 2015), proposing that the trigger should depend on the probability of default, as estimated from observable market data, e.g. of bank equity valuation and volatility, using various alternative formulae. There is reason to expect, however, that the use of market data in this way will not prove acceptable either to the regulators or to the regulated. The regulators will not want to give up discretion, and the regulated will argue, sometimes justifiably, that such market valuations are distorted, manipulated and inaccurate, especially during panics and crises, and under the influence of short sellers. Moreover, linking the initiation of recovery programs to market valuations could lead to certain 'cliff edge' problems.

Be that as it may, much more emphasis should be placed on the determination of, and threshold for, the Recovery stage. There are several reasons why this needs to be done. First, bankers, if left to themselves, are likely to enter the Recovery stage voluntarily far too late. A concern about reputation, should the news leak (reputational stigma), and the likelihood that top management will be overly self-confident in their ability to keep going successfully, (think of Fuld and Goodwin), will combine to make management reluctant to call time on themselves.

Second, the authorities are pressing banks to hold significant quantities of contingent convertible bonds (CoCos), but seem to want to keep discretion over the occasion and timing of them being triggered. Such discretion makes their pricing much more problematic. If this trigger was related instead to a well-defined principle for initiating Recovery, this problem would be lessened. But it

seems unlikely that the authorities will be prepared to cede their discretionary powers, in favour of any quasi-automatic trigger mechanism.

But if the authorities want to use discretion in order to initiate a bank's Recovery program, how can they get sufficiently up-to-date and reasonably accurate data to do so? Once again, the answer would seem to be that this could be obtained courtesy of the annual stress tests. These stress tests *should* provide the authorities with an early warning signal of which banks were flirting perilously close to the danger area, should a severe adverse shock occur. Put another way, if a bank collapsed in year t having sailed easily through the prior stress test in year $t-1$, there would have been something amiss with that test. Of course the chosen scenario for the stress test in any year may diverge considerably from the shock that actually occurs to weaken the bank, but doing a new stress test each year, with changing parameters, should give the authorities an increasingly rounded picture of each bank's strengths and weaknesses.

Moreover, the accounting/statistical basis of a stress test, i.e. mark-to-crisis, is exactly that which regulators should want to use, *not* the misleading mark-to-market measure, see Caccioli, Bouchaud and Farmer (2012).

D. Some Remaining Problems

Of course, much can go wrong with stress tests. They cannot, or cannot easily, take account of second, and subsequent, round interacting, amplifying, effects. The particular set of stresses imagined for the purpose of the test may be far removed from those that actually occur. In part this could be because those setting the tests do not want to consider the possibility that their own policies could fail (e.g. a break-up of the Eurozone). They are time and resource consuming, and so can only be done occasionally, usually once a year. There are a range of other problems (some technical) with both the design and conduct of stress tests, which it is not our purpose to pursue here, e.g. that the tests have focussed primarily on risk-weighted-assets rather than on the more encompassing, and better predictive, simple leverage ratios.

Instead, the conclusion here is that, fallible as they may be, the conduct of annual stress tests give the regulatory authorities their best available chance of dealing with fragile banks while there is still enough time to avert a, potentially contagious, failure. The key requirement is to have ready-made

plans on the shelf in advance about how best to back-stop the weakest banks. This could be by some combination of forced retained earnings, forced raising of additional external equity, injection of public sector funding or initiation of the Recovery program. How this might be done needs to be considered and reviewed before the exercise is completed.

Assuming that this latter can be done, then stress tests may become the most effective tool available to regulators. Thus Cecchetti (2015) writes:-

“Stress tests may be the most powerful prudential tool we have at our disposal for safeguarding the resilience of the financial system. They take seriously the fact that, when a large common shock hits, there is no one to sell assets to or raise capital from. By ensuring that each individual institution can withstand significant stress, we ensure the system can, too. And, importantly, by adjusting the stress scenarios, prudential authorities can maintain resilience. At least in principle, they can both account for changes in the distribution of the shocks and ensure that the amplification potential of the propagation mechanism does not increase.....

By changing the stress scenarios, prudential authorities are changing the level of capital that banks are required to hold. Passing tests with higher stresses necessarily requires more capital. And, the target is a given level of systemic resilience – resilience that requires both being able to withstand larger shocks and being able to mitigate the extent to which a given shock is transmitted to the economic and financial system more broadly.

I should note that some people would view this as simply a way of implementing a countercyclical buffer. That is, rather than rely mechanically [on] an indicator like credit growth, authorities would instead use stress testing as a way to calibrate the required amount of capital. There is clearly a sense in which the objectives are the same – maintaining systemic resilience – just the method of getting there is different. My sense is that stress testing is more flexible, faster, and less politically contentious than Basel III’s countercyclical capital buffer.

We are still early in the process of developing prudential policy aimed at reducing the harmful impact of the asset price or lending busts that inevitably follow the booms. Over the years, through a combination of thought and experimentation, we can hope to develop

a better articulated set of models that help us to understand what tools to bring to bear and when. But until we do, I believe that stress tests will be the most powerful tool we have in our effort to maintain systemic resilience.”

While I strongly agree with Cecchetti’s claim about the potential powers of the use of stress test, it does, by the same token, raise a question about how such additional powers may be made accountable and proportionate. At present, the relevant authorities can choose any scenario for the stress test that they think fit, apply proprietary and undisclosed modelling to assess the outcome, and use the results to jack up required capital (and liquidity) to whatever level they prefer without a by-your-leave from either the affected banks or the legislature. On the other hand, giving a right of appeal to the banks, (and appeal to what body?), would both lengthen the whole process and make it much more expensive. Perhaps the relevant authorities should be required to report the conduct and outcome of each stress test to a Select Committee of the legislature, and be prepared to justify their actions resulting from such testing to that same Committee. This process would preferably mostly be in public, but might have to be in private and confidential when referring to developments of a particular tested institution.

Be that as it may, stress testing is likely to remain such a central and powerful tool in the armoury of the regulatory authorities that its constitutional and legal setting deserves further thought.

Of course, the main problem that many expert commentators see with the *current* conduct of stress tests, e.g. Dowd (2015) and Goldstein (book forthcoming) is that these tests, especially the European ones, have not been rigorous and tough enough. But this is primarily, in my view, because the European authorities have not yet fully resolved the question, raised earlier in Section B, of how to provide back-stop funding to recapitalise the weaker banks. But when this hurdle is, we would hope, eventually overcome, the opposite problem, of going too far, may hail into sight.

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