Towards Time-Consistency in Bank Regulation

Charles M. Kahn
Department of Finance, University of Illinois*

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Abstract

This paper presents a simple model of behavior of bank regulators when there is lack of commitment in crisis. Even if depositor insurance is priced properly, regulators forbear because of social costs of bank closures. In the model the forbearance takes the form of capital injections, which in effect protect the uninsured creditors. The primary inefficiency arises from the financial institution's borrowing from these creditors at subsidized rates.

The paper uses this model to illuminate the problems that arise when regulatory structures do not take into account lack of commitment.

1 Introduction

No plan of action survives first contact with the enemy—be the enemy an army, a tsunami, or a financial crisis. Still, at least in the case of financial crises, there are recurrent patterns in the failure of plans. The goal of this paper is to consider the implications of these recurring patterns within crises for the design of regulatory policy outside of periods of crisis.

In designing financial regulatory policy, primary attention is given to the effects on incentives of the financial institutions being regulated. Capital requirements, liquidity standards, and deposit insurance premiums are designed to make financial institutions internalize the social costs of the risks they undertake. Much attention has been given recently to methods for measuring the precise size of these risks, and in particular how complex interactions among large and important financial institutions can alter those risks.

The fundamental moral hazard problem is that the desirability of the investment choices made by financial institutions can best be evaluated by the results. We want the bank to make the "right" investments and hold the "right" portfolio of assets, properly balancing risk and return as valued by the society. In the end, all we see is the result. Limited liability, along with deposit insurance

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and leverage, naturally place limitations on the effectiveness of rewarding and punishing based on results. Thus the focus nowadays on requirements based on financial structure, notably capital and liquidity requirements, and on compensation limits, as ways of altering the incentives of the owners and managers of the institutions.

A few recent papers have also focused on the more nebulous but equally important effect of regulatory design on the incentives of the regulators. For example, Repullo [[12]] and Kahn-Santos [[9]] consider the effects on regulatory forbearance of division of regulatory responsibility-lender of last resort, deposit insurance, bank supervision-among independent financial regulators. Espinosa et al.[[4]] extend this analysis to take into account complications arising when some financial institutions are systemically important.

In fact much regulatory design is intended to induce certain kinds of behavior from regulators. The standards for "prompt corrective action" in the U.S. were imposed legislatively to make it more difficult for regulators to ignore or underplay deteriorating conditions of depository institutions, in effect forcing regulators to internalize the costs of their forbearance. In a sense "stress tests" for banks in the U.S. and Europe are intended to be as much an incentive mechanism for the regulator as for the regulated, making it more difficult for either side to ignore undercapitalization. Legislation may be devised, in extremis, to tie the hands of regulators to ensure that certain kinds of activities cannot be engaged in at all. Consider the provisions within Dodd-Frank limiting Federal Reserve Emergency Lending under 13(3). The goal is to prohibit outright emergency programs which target a single lender—and the legislation in effect makes it extremely expensive to do so, by forcing the program to give the same benefits to all similarly situated firms.

Such regulations are often instances of closing a barn door after the horse has bolted. The concept of the regulatory dialectic is fundamental to understanding the history of financial intermediation in the U.S. (See for example Kane [[11]], Hester [[5]]): A regulation attempts to bar a particular activity by financial institutions, a new form of activity (or a new institution) arises to bypass the regulation, and a new regulation follows. But the dialectic also applies to the relation between governments and regulators: a pattern of regulatory behaviors is prohibited by legislation, a financial crisis arises, regulators improvise workarounds to undermine the prohibitions (often with the tacit acquiescence of the government), and, when calm is restored, new legislation is instituted to block the workarounds.

Critics often blame these workarounds on lack of proper incentives for regulators. While it is certainly the case that the incentives of regulators do differ in systematic ways from some ideal social welfare function (whatever that in fact might be), an even more fundamental dilemma that this paper will focus on is the time-inconsistency of optimal regulatory policy.

Financial structure requirements serve a dual role: Ex ante they are intended, as described above, to reshape the incentives of the decision makers at the bank. But they have a second role ex post: they become the proxy for more fundamental measures of success or failure of the institution's efforts. If

the bank's capital ratio falls below the critical level, it is a signal of the failure of the bank to act prudently. The required topping up of capital is not just a re-optimization of the incentives; it is also a sanction.

As a sanction, however, it is costly for the regulator as well as for the regulated. In crisis environments, the regulator may well find itself unwilling to enforce mandated levels of capital. If the institution is unable to raise the required capital the regulator faces an unpleasant choice. Closing a systemically important financial institution (or a group of financial institutions which in the aggregate are systemically important) has real costs; even a regulator which focused solely on some ideal economic measure of social value might on occasion prefer to let an institution survive temporarily under relaxed standards.

Note moreover that this is an issue beyond the current discussion on desirability of "macroprudential regulatory policies" (the desirability of relaxing standards in general when times are difficult and tightening them during booms). If that were all that were involved, the problem would simply be a technical one of adjusting the capital standards appropriately—a problem readily left to the regulatory agency itself. The political heat associated with the post-crisis regulatory changes signals that, in some quarters at least, dissatisfaction with the objectives of the regulators contributes to the changes. Legislators are not just clarifying objectives, but attempting to constrain the behavior of regulators who would not naturally be allied with those stated objectives.

So the regulatory dialectic indeed applies to the regulators as well. Regulations will not be able to constrain regulators when crises arise; when short-term considerations become paramount, the regulators' objective function cannot be artificially reinforced. If the immediate spillover costs of the failure of the institution are too high, then the regulators will find a way to keep the institution from failing. Attempts to harden the will of the regulators, to maintain financial discipline, to buttress the seawalls against the financial inundation, will not succeed. Far from being successful at reinforcing regulatory willpower, legislators will only tend to undermine it.

Clearly the financial community expects precisely this kind of behavior. Markets are cynical about regulators' ability to maintain harsh standards, and adjust accordingly. Nonetheless, we tend to model the regulation of financial institutions without regard for time consistency. But if we focus on modeling the objectives of regulators, taking this inherent softness into account, what are the implications for regulation? That is the topic of this work.

We begin with a simple model where we can examine the implications of time consistency restrictions in the case of the choice between winding down a bank and providing a capital injection when a financial crisis is imminent. We then step back to see the implications for regulatory policy in non crisis periods.

Popular opinion frequently associates regulatory spinelessness with "bailouts." This accusation misses the point if it assumes that bailouts are designed to protect shareholders and top bank management. Instead our regulators' objective function includes the costs to the regulatory agency of regulatory activity, protection of insured debtholders (which category to be sure may extend beyond officially insured deposits), and the value of the financial sector, including values

of spillovers which may be high if the financial institution in question is regarded as "too big," "too complicated," or "too systemically important" to fail, but the details of which are not modeled. In the pursuit of these goals, nonetheless, it is possible for a regulator to end up inadvertently protecting other stakeholders in the financial institution, even if there is no desire to do so directly.

The next sections develop a simple model of this process. At the end we will return to the question of applications: considering some examples of how regulatory policy can adjust to cope with the lack of regulatory commitment in crises.

2 The ex post model

Ex post, a large financial institution consists of a loan portfolio (assets) with realized value A_i, government insured liabilities D, and de jure uninsured liabilities B. The net value of the financial institution is $V_i = [A_i - (D+B)]_+$ is owned by shareholders; for simplicity we assume no split in incentives of managers and shareholders.

A variety of claims in the economy as a whole are dependent on the value of the institution; on net the value of these claims in the economy is $U(V)$, an increasing, concave function of V. This is the systemic component of the bank's social value. We will assume that $U(0) = 0$.[1]

If the financial institution fails (if $A < D + B$) then the regulator must compensate the insured liability holders. In terms of social costs, this is simply a transfer valued at zero.

The government regulator regards any publicly observed expenditure of funds as a political cost. The regulator's objective function differs from that of the social planner by this amount. In other words, the regulator's ex post payoff is

$$A - \alpha(D - A) \qquad \text{if } V < 0$$

where α is the marginal political cost to the regulator of funds spent. If the bank does not fail, the payoff to the regulator is the social value

$$A + U(V).$$

Instead of paying insured depositors, a regulator could elect to keep the bank solvent through a capital injection. A capital injection could take several forms; we'll assume it takes the form of a debt for equity swap. Assume that α is also the marginal cost to the regulator of the debt for equity swap (this cost stems, from both political costs and the tax wedges associated with debt financing).

If the firm would otherwise be insolvent, then the regulator could bring it to solvency by injecting enough capital to purchasing the following amount of

[1] This is the natural baseline; considering the effects of varying the value of $U(0)$ would allow us to extend the analysis to compare firms or lines of business which are inherently more systemic or non-systemic.

debt

$$B + D - A$$

at which point it would be the sole owner of the firm.

On the face of it, this is more expensive—it means insuring the uninsured liabilities. However, if the regulator presses on to increase the recapitalization even further, then the institution's value becomes positive. The regulator (and the society in the short run) then benefit from the value of the claims that are dependent on the institution's value. In fact it would choose a level of recapitalization I in the interval $[0, B + D]$ to maximize

$$A - \alpha I + U(A - B - D + I)$$

In other words, in this simple structure, given that the regulator decides on a capital injection, it will aim for a particular equity value for the firm; if debt levels in the firm are decrease or asset values increase it will reduce its injection one-for-one. If however the uninsured debt exceeds a critical level, the regulator will prefer not to inject capital and will instead simply shut down the firm and pay off the insured depositors.

If A is small enough, then the regulator is constrained by full recapitalization (we assume that the regulator does not have the ability to increase the value of the institution's loan portfolio, but see section 5.1). Thus for extremely small values of A, recapitalization cannot increase equity value sufficiently and it is rejected by the regulator in favor of winding down the bank. For extremely large values of A, no recapitalization is desired, and since the bank is solvent anyway, depositors do not need to be compensated. For intermediate values, however, a regulator may find it valuable to expend public funds for a recapitalization (at prices that no private investor would desire). This becomes more likely the lower the costs associated with recapitalization (the lower α)—that is, the lower the tax wedges and the lower the political costs of the expenditures—and the greater $U(.)$—that is, the greater the perceived positive spillovers for the rest of the economy from high equity value in the institution.

Let V^* denote the value of the institutions equity which satisfies the first order conditions for maximizing the objectives of the regulator. In other words,

$$U'(V^*) = \alpha.$$

Intuitively, then, if the equity value of the firm were less than V^* the regulator would wish to inject its own capital; if the value were greater then the regulator would not wish to inject capital, and in fact would prefer to remove capital it had injected.

Whether the regulator decides to recapitalize or not ex post depends on a comparison of the payoffs under the two possiblities.We divide the problem into separate cases:

Case 1 $A > D + B$ *(the firm is solvent ex post)*

In this case, an injection of capital will be in the short term interest of the regulator if

$$U'(A - D - B) > \alpha.$$

In this case, the capital injection need not cost the regulator anything in the short run; the regulator can provide it in return for fairly priced shares in the firm.

Case 2 $D < A < D + B$ *(the firm is not solvent, but has enough assets to pay insured depositors)*

In this case, an injection of capital will be in the short term interest of the regulator if

$$U'(0) > \alpha$$

and

$$U(V^*) > \alpha(V^* - A + D + B)$$

Since the firm is insolvent, the regulator can end up as the sole owner of the firm, but the arrangement entails a loss for the regulator equal to $B + D - A$.

Case 3 $A < D$ *(the assets of the firm are not adequate to repay insured depositors; even if the regulator does not inject capital, it will suffer a loss due to deposit insurance).*

$$U'(0) > \alpha$$

and

$$U(V^*) > \alpha(V^* + B).$$

Combining the last two cases, we have

$$U'(0) > \alpha$$

and

$$U(V^*) > \alpha[(V^* + B) - (A - D)_+]$$

3 Discussion

Where does the systemic component come from? Financial institutions are interdependent; they develop a variety of contractual and non contractual relationships whose value depends on the continued viability of their counterparties. (see Baias et al. [[3]] for an interesting example of a model of this). Markets develop whose functioning depends on the existence and solvency of large institutions who guarantee their working. In the middle of a crisis, there is inadequate time to restructure these relationships without widespread economic damage and so a regulator must take them as given, and must treat their disruption as a costly consequence.

Note that when the regulator desires to inject capital ex post, it cannot hope to induce a private agent to do so on its own: the rationale for the injection is to increase the social value of the systemic component; while this benefits the economy as a whole, no individual investor can capture these benefits.

In the long run, however, these relationships are not fixed. Institutions have a choice as to whether to set up these insurance contracts in the first place. Markets can be established with a variety of different underlying guarantees. If these are set up differently then it is possible that the ex post externalities associated with the failure of one institutions might not be as large. The essence of the "too big to fail" criticism is not that these interdependencies arise—it may very well be desirable to have them. It is not even that they require regulators to rescue stranded counterparties after the fact by rescuing the large institutions. Again, if the failures are rare, it may not be sensible to worry about ensuring that is specified in arrangements. It is not even that it distorts the likelihood of failure of the firms themselves—when they fail, they can be charged for the failure. Instead, the real problem arises from the mispricing of uninsured debt, which now gains insurance in the process of recapitalization, precisely because the regulator cannot commit not to engage in recapitalization.

4 The Ex Ante Model

Let r be the fixed (riskless) rate of return between period 0 and the terminal period. In period 0 the financial institution has available to it the choice among a set of investment portfolios j where associated with each portfolio is a cost C_j and a distribution of payoffs $A_{j,i}$. It designs its capital structure as a mixture of equity, and insured and uninsured debt. Since the problems associated with inadequate charges for publicly provided deposit insurance are well known, we will assume that the institution pays the actuarially fair price for the deposit insurance it receives. Finally, we will allow the institution the choice of how systemic it will become: We will take an extreme case: by paying a fixed amount S in period 0, the bank generates a technology which permits others in the economy to make investments today at a cost of U_0 which will yield them in aggregate a value of $U(V)$ ex post, where the value will be contingent on the realized value of the institution. If the initial costs S and U_0 are small, then such an institution can have large positive social values—suppose for example that the financial institution is the inventor of an important new financial market which allows participants to reallocating risks in new and exciting, and efficient ways. The expected benefit of the innovation to the participants must be non negative; otherwise they would never sign up for it. On the other hand, we can make that difference small and then by adding the costs for the financial institution we can make the total social value of the enterprise negative. In this case the only reason for its adoption will be for the responses it can impose on the regulator.

(We will go further: when the realization of A_i is stochastic, we will, with malice aforethought, assume a distribution where the U function only becomes

positive for intermediate vales of A_i, so that it only becomes active in states of the world where the regulator will, ex post, prefer to invest in rescuing the firm. This will allow us to see as clearly as possible the consequences of the regulator's inability to commit to a policy.)

The objective of the firm is to maximize equity value. In the absence of regulatory complications this would simply be described by

$$E_i[(A_{ji} - D - B)_+]$$

where the choice of the investment portfolio j would be separated from the financing decision:

Problem 4 *(Investment Decision). Choose j to maximize*

$$E_i(A_{ji}) - C_j$$

The allocation of the initial investment costs among equity, insured debt and uninsured debt, in a world without regulatory complications is a matter of indifference, provided that the charge for deposit insurance is actuarially fair. All achieve the same expected return; insured deposits get the return r with certainty. Uninsured debt gets a higher return adjusted for the probability of bankruptcy. Meanwhile the institution pays the deposit insurer up front an amount which is equal to the present value of the insured losses.

The complication arises when the regulator adjusts its policy ex post according to the systemic value of continuing the firm. Let the states of the world be divided into three: the states where the regulator ex post prefers to close the institution (and pay any insured depositors) (Δ) the states where the regulator ex post prefers to inject capital (Γ) and the remaining states where the firm survives and no subsidized capital is injected. Only in the first of these situations are non insured debt holders not repaid. Thus the funds that can be raised from the uninsured depositors by issuing B in face value is

$$\frac{(1 - \Pr\{\Delta\})B}{1 + r}$$

But the cost to the equity holders is

$$\frac{(1 - \Pr\{\Delta + \Gamma\})B}{1 + r}$$

The difference is the subsidy extracted from the regulator. It seems clear (and it can be demonstrated) that the shareholders will prefer to finance with subsidized, formally uninsured, deposits rather than with unsubsidized, insured deposits, and we will continue the analysis assuming that D is set to 0.

4.1 The Case of No Insured Deposits

As long as $A > B$, the regulator recapitalizes to the point where $U'(A-B+I) = \alpha$, or until the debt is exhausted. If $U'(A - B) \leq \alpha$ no recapitalization takes

place; but in any case, no subsidy occurs, since the regulator can swap debt for equity at market rates.

If $A < B$, the regulator finds it optimal to recapitalize if

$$U(V^*) > \alpha(V^* - A + B)$$

or in other words only if

$$B \geq \frac{U(V^*)}{\alpha} - V^* + A$$

will the regulator find it optimal not to recapitalize the bank. Under our assumptions, the right side is larger than A; the regulator will have the incentive to subsidize recapitalization even if the firm is insolvent as long as the level of obligations are not too great. Thus the states of the world Δ where the bank fails is represented by the above inequality. The states of the world Γ where subsidized capital is injected are represented by the following inequalities:

$$\frac{U(V^*)}{\alpha} - V^* + A > B \geq A.$$

The value of the subsidy when it is given is

$$B - A$$

since the regulator is obligated to guarantee the bondholders in full in order to continue the firm as a going concern. The institution maximizes its value to shareholders by choosing the capital structure which maximizes the expected value of the subsidy: on the one hand, increasing the obligation to debtholders increases the value of the subsidy when it is given; on the other hand, if realizations of A are too small, then this will mean that the regulator prefers to walk away ex post.

If the level of A were deterministic ex ante, then the firm would push the level of borrowing up just to this limit:

$$B = \frac{U(V^*)}{\alpha} - V^* + A$$

More generally, we have the following comparative statics results:

Corollary 5 *The firm's choice of level of indebtendness increases with*

1. Increases in distribution of asset size A (in the sense of first-order stochastic dominance)

2. Decreases in the regulator's political costs of funding α

3. Increases in the systemic value of the firm (in the sense of a proportionate increase in the function U).

It should also be clear that, were we to extend the model to size of assets a choice variable as well, firms would have a bias towards larger asset size, as a means of increasing the subsidy from the regulator ex post.

5 Implications

The inability of regulators to commit not to forbear when it is ex post socially desirable, has important implications for regulatory policy. In this section we start by considering examples of recent ad hoc government support, which the model most closely resembles. Then we will go farther afield and consider how lack of commitment affects some policies related to deposit insurance funding and to developing of centralized counterparties for financial markets.

5.1 Rescue Packages

As noted, the central aspect of so-called "bailouts" of financial institutions is not the rescue of shareholders or mangement, but the rescue of uncollateralized, uninsured creditors. The analysis described thus far, is therefore applicable to a variety of recent rescue packages whether they take the form of loans or guarantees. Even policies which legally placed the government agency prior to the other uninsured creditors can act as subsidies in several ways: 1. They can buy time for uninsured creditors to restructure their arrangements, drawing down some of the cash provided. 2. They can be taken as signals of the willingness of the regulator to intervene further down the line. 3. Strict priority rules may be readjusted ex post on legitimate incentive and liquidity grounds, and this may be anticipated ahead of time.

Perhaps the less-than-stellar performance of prompt corrective action needs to be re-examined in this light. The basic arguments explaining forbearance by regulators have been of the "gambling-for-resurrection" form: the regulator bears the consequences of a bank failure but not in proportion to the magnitude of the failure. Meanwhile he receives no advantage from an early closure. Thus he has the incentive to delay the closure in the hopes of the chance of it becoming no longer necessary. But the experience of recent times argues that this forbearance becomes even more dramatic when closure is perceived as expensive. If closure destroys the systemic value, it becomes desirable for regulators to devise means of providing the subsidy to maintain them. Explicit subsidies are politically costly: the cheapest subsidy to provide is an overly-rosy view of the institution's prospects. It is understood that the regulator may have to pay bailout costs in the future, but there is a chance that these will be avoided. Meanwhile the borrowing costs for the bank today fall as a result.

Another twist on this same story is for the regulator or the government to enhance the value of the financial institution's loan portfolio by providing guarantees or insurance for their repayment to the institution. In the first place, this works just like any other subsidy would: it reduces the likelihood of the costly bank failure and reduces the likelihood of the need for a costly intervention. The guarantees will in general require no upfront payment; thus the expense to the regulator is nil. However the consequences are more expensive than a direct subsidy, because the increase in the value of the assets of the institution, according to corollary 5, in turn increases the subsidized leverage of the financial institution.

The recently released Interim Report of the U.K. Independent Commission on Banking [[6]], devotes a section to financial stability in which it makes proposals to reduce to the effect of government subsidies on risk taking. In particular it proposes "ring fencing" of retail activities in universal banks as a mechanism for improving financial stability: retail activities would be housed in separate subsidiaries of the bank. The benefits include 1) the possibility of easier resolution, enabling rapid separation of retail activities from the rest in case of the bank's failure , 2) the ability to establish separate capital requirements for the retail activities, while still allowing various portions of the bank to support one another (an argument reminiscent of the "sources of strength" doctrine of the Federal Reserve, see Ashcraft [[2]]), 3) reduction in perceived government guarantees to the large institutions. To this list could be added the possibility of improved incentives from segregating risks in separate limited liability subsidiaries, as noted by Kahn and Winton [[10]].

Of these arguments, our analysis indicates that the questionable one is the claim that perceived government guarantees will be reduced by ring fencing. As the report admits, "One argument against separation is that perceived government guarantees do not apply only to retail banking." [[6],p.88]. In fact, in a financial crisis, it would seem clear that the costs associated with failure to protect the wholesale portions of the bank are likely to be at least as great as the costs associated with failing to protect the retail portions. The effectiveness of the argument relies on two parts: that at least in some circumstances there will be a higher political benefit to saving some functional portions of the bank than to saving others, and that by drawing a clear separation between subsidiaries with different functions the piecewise protection will become easier.

5.2 Deposit Insurance

An debate of recurrent interest with respect to the policy for deposit insurance regards the form which a country's deposit insurance should take: Should it be funded ex ante or ex post–that is to say, should the insurer rely on funds collected beforehand, with premiums risk adjusted for the contributing banks, or should the fund be "mutual," with surviving banks responsible for contributing the amounts needed to payoff the depositors of failed institutions? Many studies have emphasized the benefits of risk-based pricing and the disincentives of survivor-pays arrangements. In particular comparison with survivor-pays arrangements in other areas of financial intermediation emphasize the increased need to monitor and to provide membership standards for potential members of the arrangement (this phenomenon arises for example in payment and settlement systems; see Kahn and Roberds [[7]] for an overview). More recently the parallel issue has arisen with respect to proposals for liquidation funds. While Dodd-Frank provides for funds to be collected ex post in the event of a bank failure in the new resolution regime, Acharya et al [[1]] call for ex ante provision of the liquidation fund, arguing that ex post funding increases both moral hazard and systemic risk.

However, while previous studies have emphasized the effects of arrangements

on the behavior of the institutions participating in the insurance system, this current paper emphasizes the importance of regulatory design for regulator incentives. In this respect choices proposed in the debate also make a difference. Various arrangements will make it more or less expensive for the regulator to utilize funding for rescues. And for ex ante funding, it will be important to distinguish the source of the funding: funds earmarked separately for the use of the deposit insurer are likely to be less politically costly to use than funds that have been returned to the general revenues of the government whose redeployment for rescue will automatically create tighhter scrutiny. (Indeed for the purposes of discussion of incentives of the regulator as opposed to incentives of the financial institutions, the actual source of the funds is immaterial. An existing fund works in a manner similar to a line of credit as currently exists for the FDIC with the US Treasury. Pre-authorized funds are less expensive than those that are not pre-authorized).

In the model, the firm regards deposits as an inferior source of funding if the deposit insurance is risk adjusted. However if deposits give the institution access to funds from the deposit insurer, and the deposit insurer is not limited strictly to providing funds to depositors of failed institutions (that is, if it has discretion to engage in alternate resolution regimes, including subsidies to an acquirer) then the financial institution has an incentive to take in deposits, even when deposit insurance is correctly adjusted to the risk of having to repay depositors. The only way to prevent this from occuring is to adjust the deposit insurance to include the costs of subsidies to non-insured creditors that would arise from other resolution regimes. (In the case of multiple regulators as in [[9]], it would be necessary for the adjustment to include costs borne in the bank's resolution by all of the regulators, not just by the deposit insurer).

In any event, as long as the deposit insurer values the continuance of the bank ex post, the analysis proceeds as before: even if the bank has not already suffered a run, a deposit insurer may find it desirable to provide assistance if a run seems a significant possibility. The cheaper the funds are to the deposit insurer, the more likely the subsidized assistance is to arise. Thus, if it is desired to reduce the incentives for ex post subsidy, funds should *not* be provided beforehand to the deposit insurance scheme explicitly. Instead revenues collected from the financial institutions should be returned to the general funds. (More realistically, if we believe that small institutions will not trigger the lack of commitment problem, then this is an argument for limiting the amount of funding available to the deposit insurer to be below the scale likely to be needed by systemic institutions). The importance of the distinction will be reduced to the extent that forbearance and gambling for resurrection is an option, for then the comparison will not be between allocated and unallocated funds today but between allocated and unallocated funds in future contingencies. In general, however, these problems argue for the reduction of the powers and discretion of a deposit insurer when dealing with systemically important institutions.

5.3 Centralized Clearing in Financial Markets

One of the dramatic aspects of the recent financial crisis is the drying up of liquidity in the wake of failures of institutions and markets whose function was the provision of that liquidity. Observers have noted the fact that these markets were generally over-the-counter markets, without properly functioning collateral facilities and clearing mechanisms. In contrast, such markets and clearing systems—for example futures markets and payments systems—functioned well throughout the crisis, despite severe strains placed on them.

This experience has led to provisions in Dodd-Frank strongly encouraging the use of clearing mechanisms and centralized eschanges. Title 7 of the act mandates the movement of swaps contracts to exchanges where feasible, as determined by the regulators, along with centralized clearing and regulated capital and margin requirements for them (and even higher requirements for those which do not migrate to clearing arrangements)

Risk reduction in derivatives trading is important, and the consequent increase in systemwide financial stability are potentially great. Nonetheless a note of caution is required in considering these proposals. Kahn and Roberds [[8]] show that decentralized ("tiered") arrangements are sometimes helpful because they place the onus on informed agents for monitoring the quality of counterparties. Centralized systems instead substitute collateral arrangements for this monitoring function. Which system is appropriate therefore depends on the details of the dispersion of information about traders, and the ease of evaluating collateral quality in particular markets, and the extent to which the financial assets being traded are amenable to standarization. Forcing trading into centralized clearing will abolish the incentives of individual traders to monitor counterparty quality; if the contracts traded are too specialized then margin and haircuts may be an inadequate substitute.

If we take the fear of systemic consequences as the intractible source of forbearance by regulators, then there is nothing special about banks relative to other financial institutions. A centralized market itself is naturally a systemic institution, and it is one which will may not in general have sufficient incentives to monitor the quality of its membership, since it will not bear the full social cost of a failure of trading in its market. As long as contracts are easily marked to market and collateral easily obtained, the problem of member quality remains manageable. A too-rapid expansion of the sets of exotic contracts centrally traded and cleared could lead to a new institution whose failure is unthinkable, and to which the regulator becomes hostage.

6 Conclusion: Too Big to Withstand

When crises arise, systemically important institutions will be protected. "Never again," is the shout after each such crisis. In the political heat of the aftermath, such a cry is understandable. But new crises bring the same result. This is not because the regulators are ignorant of the consequences at the time of

protection. Regulators (and government officials) are fully aware of the long run costs of yielding in crisis, of the incentives to future moral hazard that regulatory weakness encourages. Nor can it really be argued that they are making a mistake in acting as they do in the middle of a crisis. For the fact is that the damage that will be inflicted by failure to save the institution is real, is large and is immediate. The remedies must be built in the post-crisis period, but they must be built intelligently enough not to depend on suddenly-developed backbone withstanding the next crisis.

There is some limited ability on the part of the government to design regulation to minimize discretion. Deposit insurance can be established without the regulator having facilities to establish special resolution regimes, or scrutiny can be imposed in such a way as to make every penny spent extremely high cost to the regulator. But not too much confidence should be placed in these measures. After all, the failure to take on the discretionary actions will be extremely expensive in the midst of a crisis. The only reason for imposing the restrictions was to change the behavior of actors beforehand. If those behaviors did not change (or worse even if they did change, and the draw still came out unlucky) maintaining a lack of discretion may be too high a price to pay. Even the attempt may be futile: the government may be able to bind the regulator, but it has no way to bind itself.

One alternative is simply to accept the consequence: there are systemic institutions; there always will be systemic institutions and they will be rescued. The superior alternative is to attempt to gauge the costs and benefits of the existence of systemic institutions: is the value of the institution worth the inevitable rescue? If not, how can the systemic importance of the institution be reduced? This in itself is a difficult task to consider. Institutions have incentives to make themselves systemic. Becoming systemic means doing something essential and valuable, and probably more than a little bit mysterious. It is going to be difficult for a regulator to withstand the pressure to allow that—particularly when a government decides to join in the pressure.

One imperfect, but at least tractable way to reduce systemic importance is to keep institutions small. Dodd-Frank contains provisions putting greater restrictions on mergers of large financial institutions. The Independent Commission's Interim Report on the other hand dismisses size limits as blunt tools. As it points out, they lead to incentive problems when institutions grow too close to the limits. If there are economies of scale out in the far reaches of financial institution size, then limits will harm efficiency. Still, the case against limits has to depend on one of two claims about the possibility of a financial institution becoming too big to withstand. Either it isn't a big enough problem, or it is one for which other techniques are adequate. For neither claim is the evidence sufficient.

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