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Dynamic Inconsistency of Capital Forbearance: Long-Run vs. Short-Run Effects of Too-Big-to-Fail Policymaking

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ABSTRACT

This paper begins by reviewing the costs and benefits that fully informed creditors would consider in deciding whether to recapitalize or liquidate an insolvent corporation. It goes on to identify the additional concerns and conflicts of interest that incompletely informed taxpayers face when short-horizoned government regulators manage the insolvency of giant banks. Regulatory decisions may exhibit dynamic inconsistency because opportunistic forbearance offers personal and bureaucratic rewards and officials who confront bank insolvency in a timely way are threatened with substantial reputational and career penalties. However, the model also indicates that dynamically inconsistent capital forbearance could emerge because current taxpayers believe they can shift the costs of resolving bank insolvencies to future taxpayers.

During the last 20 years, concepts taken from the fields of corporate finance and efficient contracting have thrown new light on issues of bank regulation. Corporate-finance theory portrays regulation as a multiparty chain of asymmetrically informed principal-agent relationships (e.g., Kane, 1999). Optimal-contracting theory emphasizes the desirability of minimizing the coordination costs that these multiparty chains of agency contracts generate (Jensen and Meckling, 1975).

Applying these ideas to the case of a monopoly regulator faithfully maximizing social welfare in a stationary economy, theorists have established a series of related economic rationales for bailing out rather than wiping out the stockholders of large insolvent banks in troubled times. This paper shows that examining private creditors' technology of insolvency

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resolution and introducing regulatory or taxpayer incentive conflict diminishes the practical relevance of the models this literature features.

As a corporation enters insolvency, creditor claims are transformed into investments whose returns and maturities become more and more uncertain. Because stockholders retain less and less stake in the downside of the firm, their incentive to avoid negative present-value projects is greatly attenuated.

To control the agency costs of debt as a debtor's insolvency deepens, creditors need to have previously negotiated two capacities. First, they must make themselves able to monitor corporate activity well enough to understand how incremental activities affect the value of their claims. Second, they must hold a well-defined right to take control of corporate affairs when the debtor corporation's insolvency becomes sufficiently deep. We call the insolvency threshold at which uninsured private creditors would take control the "private takeover point." We contrast this threshold with the respective takeover points at which perfectly faithful and incentive-conflicted regulators would take charge.

The first section of the paper depicts insolvency resolution as a process that allows creditors to limit their exposure to future loss in a troubled firm. This stop-loss capability may be defined as a compound option that creditors seek to imbed in the covenants of any loan contract. The first leg of the option specifies a range of adverse circumstances that give creditors the right to take control of the firm. The second option grants creditors who take control the further right to minimize their ongoing loss exposure by deciding whether to liquidate the firm or operate it as a going concern. The section goes on to identify additional concerns and incentive conflicts that arise when creditors cede their loss-control options to government regulators.

The second and third sections develop an algebraic model of how, in the face of regulatory incentive conflict, on-budget and off-budget costs of loss control evolve over time. If losses due to incentive conflict grow slowly enough, many generations of opportunistic regulators and/or taxpayers can capture personal benefits by shifting costs of insolvency resolution to successor generations. When benchmarked by a multigenerational index of social welfare, the timepath generated by these loss-shifting decisions is dynamically inconsistent.

Technology of Insolvency Resolution

A corporation becomes insolvent when the market value of its tangible and intangible assets (MV_A) falls below the unconditional value of the contractual obligations (L) the firm owes its creditors. Insolvency transforms creditor claims into investments with increasingly uncertain returns and maturities. If creditors regularly received accurate information on the positions and prospects of every troubled firm, they would at all times perceive the market value of their claims (MV_L) to conform to their realistically "recoverable net value" (V_R).

Insolvency resolution is the process of formally writing down individual stockholder and creditor claims against an insolvent corporation's assets to a set of recoverable values. The evolution of the process is constrained by two propositions. The first is that, under a system of limited liability, the value of ownership claims cannot be negative. The second is that, in a situation of explicit or implicit corporate default, creditor rights are costly to enforce.

Insolvency resolution need not –and often does not—entail the closure of the firm and the shift of its assets into entirely new uses. If we assume the firm's debt contracts are well-covenanted, creditors would be able to wrest control of the firm from shareholders before MV_A would fall far below L. For an insolvent firm, when a difference between MV_A and V_R exists, the difference is limited by the sum of various "workout costs" (C_W) that creditors face in gaining control of the firm, in restructuring their claims against the firm, and in reoptimizing their overall portfolio position. C_W may be compared to the bid-asked spread investors pay a securities dealer to provide immediacy.

The Perfect Information Case

We can simplify the analysis by making four assumptions. First, variations in asset value follow a random walk and stockholders and creditors are risk-neutral. Second, the corporation has a capital structure that unless and until creditors take control has precisely one class of debt and one class of stock. Third, creditors know the value of workout costs and can costlessly monitor variation in the value of firm assets[2]. Fourth, we assume that insolvency gives creditors the right to force default by accelerating their debt.[3]

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[2] When asymmetric information exists, creditor undervaluation is apt to be corrected. If stockholders believe creditors have greatly undervalued firm assets, they can forestall negotiations by producing additional evidence or injecting more capital into the firm. We relax this third assumption in analyzing the case in which government officials supervise bank solvency and conduct the insolvency-resolution process outside of the bankruptcy rules that apply to nonbank corporations.

[3] For banks, the fourth assumption can be finessed by focusing on debt is due on demand.

The balance-sheet identity tells us that at any time the market value of a firm's stock (MV_S) may be calculated as:

$$MV_S = MV_A - MV_L. \quad (1)$$

As MV_A changes, limitations on creditor rights bound how much of any losses can be shifted to creditors. Until and unless creditors' stake is converted to equity, MV_L is restricted to the following interval:

$$L = MV_L = L - C_W. \quad (2)$$

These equations clarify that even without government guarantees, an insolvent corporation's stock continues to have a positive market value until the shortfall $L-MV_A$ exceeds C_W. In practice, some of this value comes from stockholders' ability in distressed circumstances to shift new risks onto their creditors. The threshold where $MV_A=L-C_W$ may be defined as the creditor takeover point (T_C) (cf. Acharya, 1996). When T_C is reached, stockholders' stake can be wiped out and the creditors' claim henceforth equals MV_A. Capital forbearance occurs when creditors choose –contrary to their apparent self-interest-- not to enforce their right to take over firm assets and allow MV_L to fall below $L-C_W$.

The size and relative composition of the costs creditors face in coordinating a workout vary with:

1. the enforceability of creditor rights in the particular legal system in which the corporation is chartered[4];
2. the liquidity of the firm's tangible assets;
3. the intangible going-concern value the firm has amassed through its past operations; and
4. the cost to creditors of rediversifying their portfolios as their claims on the firm change character.

Each of these variables defines an interpretable category of coordination costs.

The first category is the enforcement cost (C_{SB}) creditors face in actually or potentially forcing the firm into a contractual default and battling (either in court or over a settlement table) with management and shareholders to scale back shareholders' claim on the firm's future earnings. These costs have two components: the costs of coordinating individual-creditor interests and negotiating with agents for stockholders (C_{NS}) and the residual value stockholders might be allowed to retain in the upside of the firm (C_{RS}) in order to close the deal. Creditors typically can reduce the time and out-of-pocket costs of battling

[4] Bebchuk and Guzman (1999) analyze the complications that arise when the firm's creditors reside in a different jurisdiction from the firm's assets.

stockholders by allowing stockholders to retain a minority interest in future earnings or liquidation proceeds. To the extent that a country's bankruptcy laws or indiscriminate central-bank loans support the control of corporate assets by an insolvent debtor, C_{NS} can be very high. In these circumstances, new lenders take collateralized positions senior to the old debt and help stockholders to block the original creditors' from seizing the firm's best assets.

Although creditors can convert their debt to equity in many ways, it is sufficient to envisage two approaches. The first is for the corporation to dilute the position of previous stockholders by issuing a preponderant amount of new stock to the creditors. The second is to give the creditors warrants that authorize them to buy substantial amounts of new stock for a nominal fee in the event that the stock price were to move above its current insolvency-impaired value. Either way, creditors incur the costs of converting their debt into a formal equity position sufficient to control the firm.

Once creditors exercise their option to take control, the second leg of their option comes on line. Assuming creditors expect no benefits from delaying resolution, their problem becomes to choose between two mutually exclusive alternatives: recapitalizing their firm or liquidating it.

If and when shareholders accept a recapitalization agreement that allows the firm to continue operating, two other coordination costs emerge:

- the costs of identifying and contracting with an effective set of managers to take over the firm (C_{MC});
- the opportunity costs to creditors of reoptimizing their own portfolios to accommodate their equity claim on the restructured enterprise (C_{PC}).

For example, if the creditors allow the firm to be absorbed by a stronger competitor, C_{MC} equals the costs of negotiating and executing the merger transaction and C_{PC} represents the cost of liquidating or absorbing the package of assets the acquirer offers in exchange for creditors' aggregate equity claims.

When C_{MC} and C_{PC} seem very high, closure and liquidation may be creditors' best workout option. But to decide what is the best way to manage their postnegotiation ownership position, creditors have to assess two final categories of potential workout costs:

- the transactions costs of liquidating the firm's tangible assets (C_{LC}); and
- the intangible going-concern value that would be sacrificed by closing the firm (MV_{IA}).

Because liquidation turns a firm's tangible assets into cash, we assume that the post-transaction cost of reoptimizing creditor portfolios [C_{PC}(LIQ)] is negligible.

Whether it is optimal for creditors to liquidate or recapitalize the firm may depend on the cost of stockholder negotiations C_{NS} if stockholders can be made to surrender control more cheaply when creditors promise not to close the firm[5]. Otherwise, the choice depends entirely on which disinvestment option is cheaper for creditors to exercise at the time they secure control. The exercise price of the liquidation option is given by the sum of contingent workout costs:

$$C_W(LIQ) - C_{NS} = C_{LC} + MV_{IA}. \quad (3)$$

For the recapitalization option, the contingent workout costs are:

$$C_W(RECAP) - C_{NS} = C_{RS} + C_{MC} + C_{PC}(RECAP). \quad (4)$$

Suppose L=\$1,200 and C_{NS}=\$200. Creditors could take control of the firm when MV_A fell to \$1,000. Let us suppose that the cheapest way to recapitalize the firm requires creditors to allow stockholders to retain residual rights worth \$50 and to expend another \$60 to contract with new managers. Assuming it would cost creditors an additional \$15 to reoptimize their portfolios, we may calculate the exercise price of recapitalization as:

$$C_W(RECAP)-C_{NS}=C_{RS}+C_{MC}+C_{PC}(RECAP)=\$50+\$60+\$15=\$125.$$

If liquidation threatened transactions costs of \$50 and promised to destroy intangible assets worth \$100, the incremental costs of exercising the liquidation option would be \$150:

$$C_W(LIQ)-C_{NS}=C_{LC}+MV_{IA}=\$50+\$100.$$

In this case, creditors would prefer recapitalization over liquidation.

In different circumstances, different results could ensue. For instance, if a jobber could be found who was willing to liquidate the firm's tangible assets for less than \$25, the creditors would prefer to liquidate the firm. On the other hand, if creditors were satisfied with the firm's existing management, recapitalization costs would only be \$65.00 and liquidation would be avoided even if the jobber's charges fell to zero.

Insolvency Resolution at Government-Supervised Banks

Hawkins and Turner (1999) make it clear that, in real-world economies, creditors' monitoring and coordinating costs are never zero. We presume that these costs make it efficient in most countries for government examiners to centralize the function of monitoring and policing bank solvency on behalf of depositor-creditors (Sheng, 1996). When insolvent firms try to hide material losses, government officials can use the police powers of the state

[5] In this case, $C_{NS}(RECAP) < C_{NS}(LIQ)$.

to force quicker and more accurate disclosure of adverse developments and to exercise protective rights more cheaply (i.e., at lower C_{NS}) than an array of private creditors can. Moreover, government officials can produce additional social value by taking into account damage to third parties that would not otherwise be directly incorporated into creditors' choice between liquidation and recapitalization (Aghion, Bolton, and Fries, 1999).

Equations (3) and (4) clarify that imperfect information and third-party benefits are not the principal reasons for avoiding the liquidation of important banks. Even if regulators were not in the picture, well-established banks would seldom be shut down. This is because well-established banks are apt to have accumulated substantial intangible value in the form of office locations, trained personnel, longstanding customer relationships, and a valuable brand name. We may assume that every bank has a core of indispensable personnel whose knowledge of the character and affairs of longstanding customers can help new managers to efficiently sort out the lemons among a bank's assets from the rest of its portfolio. This implies that the net value of the troubled assets that drove the bank into insolvency would be higher if they could be managed in a going concern by the bank's best and most-knowledgeable staffmembers than if they were put into the hands of an outside liquidator.

Recognizing this makes it clear that defending large-bank bailouts on the grounds that some banks are simply "Too Big To Fail" misrepresents the coordination-cost issue that economists need to analyze. Incentive compatibility requires that creditors (or their guarantors) obtain the right to control their loss exposure in an insolvent firm. This means that, although a bank's characteristics affect the size of workout costs, no bank's asset portfolio can be too large or complex for creditors to control once the extent of its insolvency exceeds aggregate workout costs. Still, large banks might typically be too costly for either creditors or taxpayers' regulatory agents to shut down and liquidate. A door-closing "failure" of a large bank would usually be avoided even if private creditors were completely in charge of resolving bank insolvencies. The public-policy issue is how stockholders and managers of insolvent banks ought to be treated and how problem banks ought to be managed as an insolvent bank's insolvency approaches and passes through private creditors' takeover point (T_C).

What we may call the "socially optimal takeover point" (T_S) takes account of costs and benefits beyond those that accrue to the legally designated stakeholders of an insolvent firm (Cordella and Levy Yeyati, 1999; Hanc, 1999; Freixas, 1999; Santomero and Hoffman, 1998). Although officials routinely overstate the social benefits of delaying takeover, it is clear that negative externalities might be generated by aggressive efforts to discipline important banks. Government officials cite two reasons for delaying the resolution of individual-bank insolvencies beyond T_C (Goodhart and Huang, 1999). First, putting aside their power to compel more informative reporting (Kane, 1995), they raise the possibility that the imperfect information available to them might lead officials to underestimate the value of bank assets. Second, officials worry that quick action might disrupt healthy credit flows and spread socially costly doubts about the solvency of other banks. Countervailing social costs are generated by looser takeover discipline through its effects on moral hazard. Policies that focus on minimizing the threat of contagious runs against large portions of the banking

system subsidize opportunistic risk-taking by individual banks that understand how to exploit relaxations in takeover discipline.

The socially optimal takeover point T_S occurs when the marginal benefit from reducing systemic risk equals the marginal cost of the undesirable risk-taking forbearance induces. Although many economists believe the risk of contagion to be small (e.g., Furfine, 1999; Kaufman, 1994), everyone can agree that, by definition, the social welfare that attaches to the creditor takeover point, $W(T_C)$, ought to be less than that which attaches to the socially optimal point $W(T_S)$. However, to be realistic, economic assessments of regulatory takeover policies must compare T_C not with T_S, but with a third "incentive-conflicted takeover point" (T_{IC}) that incorporates the influence of regulators' private interests. To optimize the supervisory process, the performance-reporting and managerial-compensation schemes under which regulators operate must be designed to assure that $W(T_{IC})>W(T_C)$. In purporting to justify government domination of the process of resolving bank insolvencies without introducing controls on regulatory agency costs, recent efforts to model optimal government bailout policies misfocus the public-policy debate.

As a measure of incremental social welfare, the difference between $W(T_{IC})$ and $W(T_C)$ divides into two pieces: (1) the net public benefits that incremental regulatory leniency (i.e., "capital forbearance') generates by reducing systemic risk and (2) the agency costs that taxpayers experience from allowing opportunistic regulators to benefit privately from insolvency-resolution decisions (Kane, 1989).

In principle, government officials face different incentives in monitoring and disciplining banks than private creditors do. First, regulators must take into account not only the welfare impact of making the general citizenry supply risk capital to insolvent banks, but also effects on their own welfare and on the welfare of interested political and bureaucratic constituencies. Regulators who might otherwise selflessly curtail the claims of bank stockholders on taxpayers' behalf know that dutiful behavior is not likely to go unchallenged. Active resistance by aggrieved managers and stockholders of insolvent banks slows the supervision process, and by enlisting politicians and public opinion on their side, distracts regulators by forcing them to expend resources to defend their motives in political arenas.

By forbearing, top regulators minimize the reputational damage that can be done to them by industry resistance and may benefit further if random improvements in the bank's net worth occur. The U.S. S&L mess illustrates how easy it is to persuade a populist press and venal politicians that regulatory takeovers of "nominally insolvent" institutions would abuse governmental power. Opportunities to use politics and propaganda to extend their time in the driver's seat makes it profitable for bank stockholders to routinely exaggerate the adverse effects that prompt resolution would have on individual-bank customers and on the aggregate flow of credit. In practice, top regulators' short-run reputational interest in delay is reinforced by the bureaucratic stress that public criticisms introduce into the budgetary and CEO reappointment processes (Todd and Thomson, 1990) and by understandings about postgovernment career opportunities (including remunerative speaking engagements) that

accrue to officials who manage to leave their high posts in good standing with the industry they regulate (Kane, 1989).

As the title of this paper suggests, a final difference is generated by the frequent turnover of top regulatory positions. This turnover creates a gap (g_H) between the horizons of taxpayers (H_T) and the horizons of the top regulators (H_R) they empower to act in their behalf. This gap makes officials overly sensitive to information about their job performance that surfaces during the particular period during which they plan to stay on the job and relatively insensitive to information that promises not to surface until the follow-on interval $g_H=H_T-H_R$. The larger this gap, the more officials can benefit personally both from covering up emerging large-bank insolvencies and from delaying the resolution of known-to-be-insolvent institutions beyond the socially optimal takeover point (T_S).

Incentive Conflict in a Multiperiod Context

It is instructive to model regulatory incentive conflict in a dynamic context. Let $C_R(x_t)$, $0 \le t \le H_T$ represent the net opportunity costs taxpayers accrue from regulatory efforts (x_t) to discipline insolvent banks. At each date t, $C_R(x_t)$ may be interpreted as a production function whose vector of planned regulatory input x_t is restrained by unexpressed budgetary and statutory limits on regulatory resources. If top regulators had the same horizon as taxpayers and sought no private benefits [$B_P(x_t)$] either for themselves or for their organization, they would choose nonopportunistically from the set of feasible control and cleanup plans the plan x_t that minimized the discounted present value of consequent taxpayer costs. If i represents the interest rate at which taxpayers would discount continuous costs and benefits over $0 \le t \le H_T$, the optimal plan x_t^* would minimize (5):

$$\int_0^{H_T} e^{-it} C_R(x_t)\,dt\,. \qquad (5)$$

However, the plan actually chosen would be the plan $\hat{x}_t$, that maximized the regulators' intertemporal utility function $U[C_R, B_p]$ employing regulators' personal discount rate r:

$$\int_0^{H_R} e^{-rt} U\left[C_R(x_t), B_P(x_t)\right]dt\,. \qquad (6)$$

By choosing to maximize (6), perfectly opportunistic regulators would myopically disregard consequences of the plan that accrue after their watch ends. Moreover, even within their compressed decisionmaking horizon, opportunistic regulators would be prepared to tolerate increases in social costs as long as the banking industry offers them adequate incremental compensation for doing so.

Working through a numerical example can clearly illustrate the long-term and short-term consequences of choosing $\hat{x}_t$ rather than x_t^*. To keep the algebra manageable, it is helpful to define the regulator's horizon as the unit period. Hence, we rewrite H_T as nH_R and note that by hypothesis n is greater than 1.

To gain additional simplicity, we assume that i=r. Setting r higher (lower) than i would reinforce (mitigate) the welfare loss occasioned by the horizon gap.

We hypothesize that the plan x_t^* that minimizes (5) entails a high baseline level of explicit regulatory expenditure on prevention and insolvency resolution at the outset (C_0). To model the benefits of prompt loss control and insolvency resolution, we assume further that the plan's evolving expenditure rate falls continuously at a "cleanup" rate g>0. This implies that (5) may be rewritten as:

$$PV_0(x_t^*) = C(x_t^*) = \int_0^n C_0 e^{-(i+g)t} dt = \frac{C_0}{-(i+g)}\left[e^{-(i+g)n} - 1\right]. \qquad (7)$$

If taxpayers have an unlimited horizon, the date-0 present value of taxpayer costs from x_t^* converges to:

$$\lim_{n\to\infty} C\left(x_t^*\right) = \frac{C_0}{i+g}. \qquad (8)$$

For example, if C_0 were \$10 billion and i and g each .05, the nonopportunistic cost of preventing and cleaning up insolvent banks would be \$100 billion.

An opportunity cost for financing the implicit value of noncurrent expenditures accrues during each period. In period one, the funding cost F_1 for the optimal plan can be approximated as (e^i-1) [≈5.127% in the numerical example] times the average value of the present value of taxpayer obligations at the beginning and end of the period.

$$F_1(x_t^*) \approx (e^i - 1).5\left[\frac{C_0}{i+g} - PV_1(x_t^*)\right].$$

By myopically permitting an additional number of banks to operate in the short run as insolvent "zombie" institutions, the incentive-conflicted cleanup plan $\hat{x}_t$ entails a higher off-budget cost than this. However, we assume that bank creditors do not worry about the off-budget costs of either plan as long as the unbooked implicit liabilities (U) the zombies shift onto the government remain within the government's recognized fiscal capacity.

To extend our numerical example, let us assume that in $\hat{x}_t$ the opportunistic baseline rate of supervisory activity is j=.1 of C_0 and that deferrals of loss control due to forbearance are expected to accrue further losses at a positive rate h. The extent of future insolvency must be expected to become higher under $\hat{x}_t$ because opportunistic capital forbearance distorts insolvent banks choice between low-risk, low-return loans and those that offer negative expected returns but high positive skewness (For a discussion, see, e.g., Kane, 1995).

In the numerical example, the first-period cost of optimal insolvency control is:

$$C_0^* = \int_0^1 C(x_t^*)dt = \frac{10}{-.10}\left[e^{-.10} - 1\right] = (-100)(.9048 - 1) = \$9.52 billion.$$

Funding cost F_1^* may be expressed as the interest rate times the within-period average present value of plan costs:

$$F_1^* = (.05127)\left[\int_0^n C_0 e^{-(i+g)t}dt - \frac{1}{2}\int_0^1 e^{-(i+g)t}C_0 dt\right].$$

Assuming again that n is indefinitely large:

$$F_1^* = (.05127)\left[100 - \frac{9}{2}\right] = \$4.90 bil.$$

$$F_1^* + C_0^* = \$9.52 bil. + \$4.90 bil. = \$14.42 bil.$$

The explicit first-period loss-control cost of $\hat{x}_t$ would be less than the $9.52 bil. expended under x_t^*: $\hat{C}_0^e = jC_0^*$ = only $.952 billion. However, $\hat{x}_t$ generates substantial increments in implicit costs for financing forbearance $(\hat{C}_k^i)$ in each period. The baseline rate shrinks during any period only for the j percent of the industry that is being treated appropriately. For this industry segment, the baseline expenditure rate falls in period one by $[1-jC_0e^{-g}]=.049$, to $jC_1^*=.951$. The baseline rate for the rest of the industry rises to $(1-j)C_0e^h$. This higher rate raises the present value of taxpayer obligations and of the plan's funding costs relative to x_t^*.

To express the implicit first-period cost of the myopic plan numerically, we must specify a value for h. We arbitrarily assume h=.02. The incremental implicit cost of opportunistic forbearance in period one may be expressed as $\hat{C}_1^i$:

$$\hat{C}_1^i = (1-j)\int_0^1 C_0 e^{(h+i)t}dt = \frac{9}{.07}[e^{.07} - 1] = \$9.32 bil. \qquad (9)$$

The differential total cost of $\hat{x}_t$ in period 1 equals the sum of the differences in the explicit and implicit costs of the two plans:

$$\hat{C}_0 - C_0^* = -8.568 + 9.320 = \$.752 \text{ bil.}$$

The higher per-period opportunity cost of $\hat{x}_t$ traces to the expenses caused by the slower (here, negative) amortization of taxpayer liabilities. Opportunistic forbearance increases funding costs and reduces the expected value of the assets the government can salvage from insolvent institutions.

At any date k>0, our model cumulates the incremental influence of each period's forbearance on the expenditure rate for $\hat{x}_t$ (C_k^f) as a homogenous first-order difference equation with coefficient f:

$$C_k^f = C_{k-1}^f[je^{-g} + (1-j)e^h] = [f]C_{k-1}^f = C_0[f]^k = C_0 e^{[\log f]k}. \qquad (10)$$

In our example, C_0=10 and f=[(.10)$e^{-.05}$+(.9)$e^{.02}$]=1.0133041. When the forbearance parameter f is greater than unity, taxpayer obligations grow exponentially until either taxpayers object or depositors begin to doubt that the government's fiscal capacity is sufficient to guarantee the debts of zombie institutions.

However, in principle, if forbearance were milder than (1-j)=.9 or the deterioration of undercapitalized banks were slower than h=.02, f might not exceed unity. For example, with h=.02 and j=.5, f would equal .5[$e^{-.05}$+$e^{.02}$]=.5[1.9714]=.9857, so that C_k^f would vanish in the limit.

Even when f does not exceed unity, the incentive-conflicted plan is dynamically inconsistent because each successive regulator would have an easier job if his or her predecessor acted differently. Forbearance leaves bank stockholders in control of forbearance assets. This inefficiently raises the baseline expenditure rate for incoming regulators.

Equation (10) expresses the baseline cost rate for forbearance institutions at the start of the second period as C_1^f :

$$C_1^f = [(1\text{-}j)C_0]e^h = (.9C_0)e^{.02} = 9.182.$$

A useful way to benchmark the cumulative effects of forbearance is to look at the baseline expenditure rate $(\hat{C}_k^*)$ that would apply at date k if an unconflicted regulator were somehow to take office at some date k≥1. The initial condition $\hat{C}_0^*$=C_0 is contained in this definition. We may calculate the second-period rate $\hat{C}_1^*$ as the sum of $jC_1^* = .951$ and $(1-j)(C_0)e^h = 9.182$. Adding these components gives $\hat{C}_1^*$=10.133 and $\hat{C}_1^e = 1.0133$.

$$\hat{C}_k^* = C_0[f]^k \int_0^1 e^{-.10}dt \approx 10[1.0133]^k \left[\frac{1-e^{-.10}}{.10}\right] = 100[1.0133]^k[.0952] = 9.52[1.0133]^k . \quad (11)$$

The siren song of forbearance is that, in a situation where one's predecessors have successfully confused depositors and taxpayers about opportunity costs, any official who moves to the optimal plan x_t^* is going to pay a substantial reputational price for doing so.

Table 1 tracks explicit and implicit expenses under x_t^* and $\hat{x}_t$ over ten periods. Though growing, the explicit costs of the opportunistic plan $(\hat{C}_k^e)$ remain, period by period, markedly lower than either C_k^* or $\hat{C}_k^*$. As long as bank and regulator disinformation can keep f from surging out of the neighborhood of unity, the game can continue for many periods more. In our numerical example, the implicit drain on the country's fiscal capacity from bank insolvency after ten periods has increased the cost of a dutiful cleanup only from $100 bil. to $112.63 bil.:

$$\lim_{n\to\infty} PV_{10}(x_t^*) = \lim_{n\to\infty} \int_0^n C_{10}^f e^{-(i+g)t} dt = \frac{C_{10}^f}{(i+g)} = \frac{11.263}{.10} = \$112.63 bil. \qquad (12)$$

Figure 1 projects relevant expenses out to 40 periods and shows that, in the absence of parameter shifts, the explicit costs of the forbearance program would not exceed those of the optimal plan until period 22. In practice, opportunistic forbearance does not break down at the glacial speed implied by the steady passage of time. It breaks down because the government's hidden liabilities eventually begin to increase the interest rate i that must be paid on government debt, the rate h at which zombie banks deteriorate, and depositor concerns about the government's ability to make good its guarantees. These increases raise the explicit costs of the forbearance program above those projected by our fixed-coefficient model and make it increasingly difficult to credibly cover up the drain the program is imposing on the government's fiscal capacity.

Kane (1989) portrays regulatory incentives as switching from forbearance to at least partial cleanup when the odds that top officials face in striving for a reputationally clean getaway become too low to sustain the private benefits of forbearance. Typically, the deterioration of these odds is triggered by a mutually reinforcing combination of depositor doubts and taxpayer resistance. Growing concern about taxpayers' ability or willingness to pay off zombie banks' debt feeds depositor runs. In turn, these runs increases the per-period explicit costs of regulation beyond the planned level $j\hat{C}_k^*$ and more fully alert the subset of taxpayer-voters who have little stake in bank assets to the distributional costs of bailing out bank stakeholders.

The Distributional Costs of Bailing Out Banks

Like many four-letter words, "bail" has multiple meanings. One may stand bail for someone else; one may bail out of a plane or difficult situation; or one may bail water out of a leaky boat.

In financial usage, the naval metaphor applies. For an insolvent bank, the equivalent of leaks are bad loans or investments that have bled enough red ink into the bank's balance sheet to swamp the net worth shareholders have contributed. When red ink is bailed out of a bank's balance sheet, it must be dumped into someone else's accounts. Parties to whom the red ink flows are compelled to give their wealth away. When an insolvent bank is bailed out, government "bailers" give away other people's money. The less straightforwardly taxpayer capital is transmitted, the more important it becomes to hold officials accountable for showing that the donors—taxpayers and healthy banks—receive sufficient benefits to justify the costs of rescue they are made to bear.

Accountability Resistance

We have explained that authorities are reluctant to take control of the affairs of insolvent large banks at the socially optimal takeover point. In principle, this reluctance

introduces another intangible asset into large-bank balance sheets. This asset represents the value derived from the market's interpreting these banks' access to forbearance as an implicit government credit enhancement (E) of their deposits and other debt. This guarantee reduces incentives for creditors to discipline bank managements because they can count on E to surge in value when and if declines in the worth of other assets threaten to render the bank insolvent.

Ideally, to mitigate the incentive conflict, authorities should be required to demonstrate to their taxpayer principals that they use realistic cost-benefit calculations to price and size E optimally. However, in practice, one cannot find an information reporting system that establishes this degree of accountability anywhere in the world.

When challenged, authorities typically rebut calls for opportunity-cost measures of their performance on the grounds that it would be exceedingly difficult to assess accurately the outcomes in question. However, accountability can accommodate a tradeoff between the verifiability and accuracy of performance measurements. By incorporating reasonable allowances for error, society could make effective use of fairly constructed approximate measures.

Theoretically, banks may be too big to fail and unwind (TBTFU), but they should never be too big to fail (TBTF). The defect of the current reporting system is that it tempts stakeholders in very large banks to use political pressure and laundered side payments to persuade top regulators to extract at a subsidized price hard-to-document implicit guarantees against loss from poorly informed taxpayers. A growing body of empirical evidence indicates that this theoretical concern has the important practical consequence that TBTF subsidies exist and distort the structure of banking competition. For example, Hughes and Mester (1993) find that the very largest U.S. banks pay a lower risk-adjusted price for uninsured deposits than smaller institutions do. Similarly, Morgan and Stiroh (1999) conclude that bondholders price the publicly traded bonds of giant U.S. banks more favorably than these firms' risk characteristics would otherwise indicate.

Regulators' resistance to providing verifiable measures of forbearance costs and benefits may be explained in many ways. It may reflect in different degrees taxpayer apathy, sensitivity to Monday-morning quarterbacking, lack of foresight, shirking, or the corrupt rechanneling of TBTF subsidies. Whatever mix of reasons applies, authorities' incentives to provide reliable information on their job performance are skewed. Favorable information is shouted from the rooftops, while unfavorable information is routinely spun or covered up.

Officials may feel especially free to circumvent their common-law duty to verifiably measure the effects of forbearance that is directed toward giant firms or substantial industry segments whose recapitalization threatens to spread losses throughout the economy. In such cases, it has been easy to convince a gullible public that the economic disruptions that would attend prompt insolvency resolution could be horrific.

However, the horrific wealth effects cited in support of TBTF policies presuppose a mindless liquidation of troubled institutions. We may have seen that liquidations of large banks and mass liquidations of smaller ones are likely to be avoided no matter who controls the insolvency-resolution process. This means that the absence of systemic runs cannot establish the optimality of regulatory policies for managing large-bank insolvencies. The costs of winning this benefit must be evaluated as well. The benchmark for efficiently resolving a bank's insolvency is not just to allocate its accrued losses in ways that conserve the intangible assets and real options the bank has accumulated. A dutiful regulator must simultaneously minimize the net losses that the bank's rescuers have to absorb.

Taxpayer Myopia

In not reporting quantitatively on the distribution of the costs and benefits of instances of TBTF forbearance, authorities might be accused of subreption: i.e., assuring approval for their actions by concealing from the press and public pertinent facts about the effects of capital forbearance in the distribution of income between large-bank stakeholders and other taxpayers. However, recognizing that the identities of individual taxpayers shift over time introduces an additional layer of agency costs and an alternative reinforcing justification for the survival of myopic decisionmaking and inadequate reporting systems in bank supervision.

Principal-agent theory implies that if taxpayers could costlessly keep themselves perfectly informed about program costs and regulatory motives and could coordinate their activities perfectly, subreption could not occur. Voters could and would devise employment contracts that eliminated both the horizon gap and the possibility of side payments to regulators from undercapitalized institutions. These contracts would use opportunity-cost principles to measure regulatory performance and would, in principle, lengthen H_R by linking the compensation that each top regulator received to an index of how actions taken during each managerial regime affected the present value of net social costs over taxpayers' longer horizon H_T.

However, it is likely that the horizons of current generations of taxpayers (H_C) are shorter than the horizon (H_F) that future taxpayers would prefer. This raises the possibility that the horizon of regulators is disciplined politically only by the politically active taxpayers of the day. In this case, current taxpayers might understand the loss-shifting game and share to some degree regulators' interest in not informing subsequent generations of taxpayers about the cynical intertemporal tradeoffs that lenient insolvency-resolution policies entail.

The simplest case occurs when $H_C=H_R$. In this case, H_T would be a weighted average of 1 and H_F. The unit period in equations (7) to (12) would become the horizon of current taxpayers and n would become the number of periods that authorities would track if they gave due weight to the welfare of future taxpayers.

If we suppose that coordination and information costs are prohibitive for future taxpayers, then regulators and current taxpayers would be tempted to devise contracts to shift

the incidence of current regulatory costs forward to future generations. In this version of the model, informed current taxpayers would applaud opportunistic forbearance as an incentive-compatible gamble that agent regulators make on their behalf.

Summary Implications for Reform

Although taxpayer interests are harmed by capital forbearance, real-world information systems render the damage hard to perceive. The particular set of informational and coordination problems that taxpayers face in a given country limit the kinds of reforms for which researchers could hope to find a supporting constituency. If current taxpayers are nearly as uninformed and as difficult to partner up as future taxpayers, then improved performance measurement and deferred compensation employment contracts could better align the incentives confronting agent government regulators (Kane, 1999). However, it is possible that informed current taxpayers find it profitable to gamble alongside regulators that random economic events can cure the insolvency of large zombie institutions before the guarantee system breaks down. In these circumstances, it would be hard to mobilize public opinion against TBTF policymaking per se. Nevertheless, even when current taxpayers are acting opportunistically, they should value reforms that would better measure and control the flow of explicit and implicit private benefits $B_P(x_t)$ that officials derive from regulatory decisions.

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TABLE 1
ILLUSTRATING THE INCREMENTAL COSTS OF OPPORTUNISTIC FORBEARANCE

	Per-Period Loss-Control Expense Incurred in:			
	Optimal Plan (C_k^*)	**Forbearance Plan** (C_k^f)	**Switching to Optimal Plan at date k** $(\hat{C}_k^*)$	**On-Budget Per-Period Cost Recorded with Continued Forbearance** $(\hat{C}_k^e)$
First Period	$100[1-e^{-.10}] = 9.52$	10	9.52	.952
Second Period	$100[e^{-.10}-e^{-.20}] = 8.61$	10.133	9.65	.965
Third Period	$100[e^{-.20}-e^{-.30}] = 7.79$	10.268	9.77	.977
Fourth Period	$100[e^{-.30}-e^{-.40}] = 7.05$	10.404	9.90	.990
Fifth Period	$100[e^{-.40}-e^{-.50}] = 6.38$	10.542	10.04	1.004
Sixth Period	$100[e^{-.50}-e^{-.60}] = 5.77$	10.683	10.17	1.017
Seventh Period	$100[e^{-.60}-e^{-.70}] = 5.22$	10.825	10.31	1.031
Eighth Period	$100[e^{-.70}-e^{-.80}] = 4.73$	10.969	10.44	1.044
Ninth Period	$100[e^{-.80}-e^{-.90}] = 4.28$	11.115	10.58	1.058
Tenth Period	$100[e^{-.90}-e^{-1.0}] = 3.87$	11.263	10.72	1.072

FIGURE 1
COMPARISON OF EXPLICIT COSTS OF OPTIMAL AND INCENTIVE-CONFLICTED PLANS