The bigger they are

Robert M. Solow

The bigger they are...

Any discussion of financial policy and regulation should begin with an urgent reminder that the financial system is a means, not an end. Otherwise, it is all too easy to become wholly engrossed in the hopes and fears, successes and failures, of financial enterprises and the people who love them, as if that were what really matters.

One socially useful function of the financial system is to intermediate between savers and investors. Many diverse individuals, enterprises, and other institutions save – spend less on their current needs than they take in – and it is economically important that their savings be made available to those firms, governments, investors, and other units in the financial system that can make the most profitable (or otherwise valuable) use of such savings. Because most savers lack the information and understanding they would need and because they cannot easily diversify, financial institutions perform this function for them. When something hinders the performance of the financial system, the "real" economy of production and employment suffers. The economy invests too little or too much, or it invests in the wrong industries. If it is true today that many viable businesses are unable to obtain credit on reasonable terms, the system most likely is not functioning well.

The other socially useful function of the financial system is more complicated and recondite. In the course of real economic life, an enormous variety of risks arises. Bank A may have made a large loan to company B, with the survival of both of them depending on the uncertain success of B's new line of products. A retired couple with no heirs has to allocate their accumulated savings over their uncertain lifetimes; if they spend too much, they may run out of funds and suffer, and if they spend too little, they may die with useless wealth, having skimped their golden years.

Some individuals and institutions don't mind bearing economic risk because their attitudes, their wealth, the nature of their incomes, or their ability to diversify makes it relatively easy. There are also those whose circumstances make substantial risk-bearing painful or intolerable. The financial system can arrange to transfer many risks from the second group to the first, with appropriate compensation all around. Consequently, the real economy works better. Company C may have the ideas and the skills to undertake some-

thing potentially very valuable but cannot bear the inevitable risks; something useful may happen only if the risks can be off-loaded.

But a complication arises: a financial system that is elaborate enough to do this job of reallocating the risks of real economic life is also capable of *creating* risks that have no connection to real economic life, rather like gambling at a casino or betting on football games. For instance, recall the "credit default swap" (CDS) that played such a central role in the AIG debacle. Suppose that lender D has made a large loan to the company C mentioned earlier. The loan seems worth making, but the risk of default is more than D can bear. The CDS is a way of spreading that risk around. D pays E, F, G, and so on a fixed annual fee, and E, F, G each agree to pay something to D if and only if C defaults. The risks associated with C's business have been transferred to a willing home with E, F, G. This form of insurance allows the real economy to take advantage of opportunities that might otherwise go to waste.

Once the concept of the CDS is available, there is nothing to prevent H and J from writing the same contract: H pays J a fixed premium and J pays H if C defaults on its loan from D. Now H and J are simply making a bet on the outcome of the C-D transaction, though neither of them has any connection with C's business venture. This is called a "naked CDS," and there have been many of them. The functioning of the real economy is in no way improved by this transaction, which has merely created a risk that was not there before, and would go away if this transaction were canceled. Moreover, such a transaction would likely not be valid in a normal insurance context. I could not buy insurance against the possibility of a fire destroying someone else's house; I have no "insurable interest" in the house, and the contract could not be enforced. The dictionary definition of "insurable interest" is an interest (as based on blood tie or likelihood of financial injury) that is judged to give an insurance applicant a legal right to enforce the insurance contract against the objection that it is a wagering contract and therefore contrary to public policy.

The bigger they are...

With this background in mind, I turn to policy issues and the "too big to fail" (TBTF) question. Economic policy is often more complicated than it looks. Any significant policy action creates winners and losers, even if the distributional effects are not part of the intended purpose of the policy. For analytical purposes, economists usually avoid these distributional side effects by imagining that they can be canceled by a well-chosen set of lump-sum taxes and transfers. Lump-sum taxes and transfers are those that cannot be avoided or enhanced by any deliberate act of the taxpayer or beneficiary; there are no incentive effects on behavior. But this is a purely imaginary fix. Lump-sum taxes and transfers are implausible in practice.

The vehement backlash provoked by the taxpayer-financed bailout of large financial institutions in the course of the recent meltdown and the ensuing recession illustrates this problem. Even if the bailout was necessary to fend off a much more damaging economic collapse, innocent bystanders resent seeing taxpayers' money in the pockets of the very bankers, stockholders, and creditors whose greed, shortsightedness, and overconfidence brought on and deepened the recession. Such political-economy considerations are an ever-present constraint on practical economic policy.

All of this is relevant to a discussion of the issue familiarly summarized by the catch phrase "too big to fail." In the run-up to the recent bailouts, the responsible

federal agencies were faced with the potential failure (inability to meet contractual obligations) of some very large financial institutions that were interconnected with other large and small financial institutions through lender-borrower and analogous relations. The threat of their falling into default can so threaten the solvency of their creditors (and *their* creditors, and so on) that much of the financial machinery might grind to a halt, and with it much of the economy. These institutions, and some nonfinancial corporations, were regarded as so central to the economic life of the country that they could not be allowed to fail.

How can the likelihood of such situations be eliminated or minimized in the future? A necessary first step is to consider closely what makes a financial institution TBTF.[1] Size, certainly, is part of the picture. The insolvency of a few small banks or nonbank financial institutions does not threaten a breakdown of the system that provides credit for viable businesses and redistributes the risks of real economic activity. Given the existence of federal deposit insurance, the potential losers in the failure of a smaller bank are mainly the stockholders and the nondeposit creditors; prudence should impel these parties to take into account the possibility of such contingent business losses when they buy stock and make loans. In practice, the regulator of a "problem bank" often arranges for it to be taken over by a stronger neighbor, thus minimizing disruption.

Should nature be allowed to take its course in the case of very large banks and nonbanks? If they are too big to be taken over, should they just be allowed to go broke? A practical obstacle has stood in the way, at least in the past. Large banks often operate with large leverage; in other words, they borrow a lot in order to acquire assets in amounts that far exceed their own capital. They hope to profit from the difference between the cost of borrowing and the higher return on the assets they acquire. Since higher return usually goes along with greater risk, there is potential for trouble. Suppose that a bank with thirty-to-one leverage – unexceptional by recent standards – has $1 billion in capital and has borrowed $29 billion to acquire $30 billion in at least slightly risky assets. It takes only a $1 billion loss to wipe out the owners of the bank; a loss of $2 billion renders the bank insolvent. On the upside, a gain of $1 billion doubles the owners' money, which explains why leverage is so attractive.

As part of their function in mediating between savers and investors, banks are typically engaged in "maturity transformation." They borrow at short term because savers generally want quick access to their money. But they make longer-term loans because they are financing real business investment. The persistent question, then, is about liquidity, or the ability to convert even sound assets into cash when necessary. In parlous times, liquidity problems can become solvency problems when the soundness of assets is uncertain. Even without much leverage, troubles may arise; greater leverage signals a clear possibility of cascading disaster.

The difficulty with very large banks is not only that they are big, but that they are interconnected with other financial institutions. When large institutions are highly leveraged, the interconnectedness looms as a danger to the whole system. The lenders to a large bank regard those loans as assets. If bad news about the borrowing bank's assets threatens its solvency, then its lenders see their own balance sheets deteriorating; the value of those putative "assets" becomes

uncertain. But the lending banks have also borrowed, and so a third layer of banks is caught up in uncertainty and pessimism about asset values.

This combination of sheer size, interconnectedness, and leverage can endanger the financial system's ability to perform its socially useful functions. The temptation for large, highly leveraged financial institutions to engage in "wagering contracts contrary to public policy," using borrowed money, adds to the potential for systemic instability without contributing anything to the efficiency of the real economy. These circumstances impel – or force – governments to bail out the banks, essentially to guarantee the value of the assets of financial institutions that are considered TBTF.

It is now widely understood that this kind of situation is fraught with "moral hazard." Highly leveraged purchases of risky assets create opportunities for spectacular profits on the relative small amount of own capital invested. They also create opportunities for disasters so large and extensive as to threaten the functioning of the system. If this threat forces governments to bail out the occasional disasters to protect the creditors, then the opportunities for large profits belong to the risk-takers and the worst of the occasional losses belong to the taxpayers. Banks are encouraged, or rather driven by competition, to take those system-threatening risks, and other banks are encouraged to lend to them for that purpose. They have little or nothing to lose, and a lot to gain. *And the successes probably add little or nothing to the efficiency of the real economy, while the disasters transfer wealth from taxpayers to financiers.* This reality is "heads I win, tails you lose" writ very large.

There is another cost of the TBTF phenomenon that is even less visible, although it occurs regularly, even in the absence of crisis. A bank or other financial institution that is perceived as TBTF can borrow in the market at a lower interest rate than other, otherwise similar, banks. Compensation for default risk is built into any interest rate; default-free U.S. Treasury bonds, for instance, carry a lower interest rate than corporate bonds of the same maturity. Thus, TBTF banks are subsidized every day by the taxpayer. The subsidy is not borne by taxpayers in the form of a continuing cash outlay; it takes the shape of an implicit promise to bail out a TBTF bank when it might otherwise have to default.

The bigger they are...

This experience, now so clear in the collective memory, is not only costly to taxpayers, but also hair-raising to workers and small businesses whose livelihoods hang by a thread when the economy threatens to dissolve, and irritating to those who do not like to see high-level vice and stupidity rewarded. Attempts to improve the regulation of the financial system are in development in the United States and Europe. Included in these blueprints for reform are various proposals for dealing with the TBTF problem.

It may be useful to start with the (hopelessly) idealized laissez-faire solution. After all, this is what former Chairman of the Federal Reserve Board Alan Greenspan famously believed in, only to be shocked by the grim reality. Suppose nothing were TBTF; suppose the government could credibly state that it would bail out no failing bank, no matter how big or how interconnected with others. In principle, this stance warns potential creditors that lending to a large (or small) bank with a risky balance sheet is itself an act with considerable downside risk. If the borrowing bank defaults, the creditors will take the loss. Lenders to banks, especially big lenders to big banks, are

sophisticated, knowledgeable people. They know how to read a balance sheet and understand complex securities. They will not endanger their own capital by lending large amounts to a large bank that will use the borrowed capital to buy excessively risky assets. In this view, banks that are too big to fail will not fail or, if they do, their failure will not endanger the system.

There are a few problems with this picture. Perhaps the most important is that governments cannot credibly abjure bailouts. In a capitalist system, even a reasonable balance sheet will carry some risks. When a large bank is on the verge of defaulting, thereby threatening the viability of the financial system, a responsible government cannot step aside – *c'est la vie!* – and let the real economy tumble into depression. Preventing the collapse of the financial system does not imply weakness; the government is doing what has to be done. The notion that the long run is best served by letting two or three catastrophes happen cannot be taken seriously.

Second, there is evidence that those potential creditors are not always as sophisticated and knowledgeable – or as effective – as presumed. They may be prone to act on foolishness, incompetence, laziness, greed, overconfidence, and the herd instinct. Granted that our observations come from a world of moral hazard induced by the TBTF doctrine, one would not be quite comfortable betting the health of the real economy on the unfailing intelligence and self-discipline of real-world financiers. The laissez-faire solution, therefore, is probably a nonstarter – and for good reason.

The most direct solution to the TBTF problem would be to disallow the existence of banks that are TBTF in the first place. A regulatory body could require a bank either to divest or sell off some risky part of its business, or shrink its balance sheet to an acceptable size in some other way, once the bank exceeded a predefined limit. The goal would be to achieve a landscape in which any bank that seems about to fail could be allowed to fail because, by definition, that failure would not threaten the satisfactory functioning of the system.

This proposal is premised on the belief that the expansion of a bank beyond the acceptable size limit brings at best negligible gains in efficiency for the real economy: even if the achievement of TBTF size adds to the private profitability of a financial institution, this private gain does not correspond to any net contribution to society. This argument seems plausible. Indeed, recent history suggests that the main consequence of megasize may be unmanageability. I, for one, have not seen any convincing arguments for real economies of scale at extreme size.

The unmanageability of very large banks reflects something deeper than mere bureaucracy: there is a fundamental incentive problem. Individual traders in a large institution can enrich themselves fantastically by taking on risks whose downsides endanger not themselves but the firm. Not many individual bankruptcies have made the headlines. Better-aligned incentives would help, but such restructuring is not easy in a large, variegated organization run by clever individuals.

Nevertheless, there are genuine problems with this approach to TBTF. If the largest acceptable size is still fairly large, as I imagine it would be, then even if no single bank is TBTF, the threatened failure of two or three large banks would still require the bailout response that the scheme is designed to prevent. Alternatively, the cut-them-down-to-size proposal may be interpreted as the partitioning of a large bank into many small

banks. In that case, (a) some genuine economies of scale in saving-investment intermediation and risk allocation may be lost; and (b) the failure of many small banks – as happened in the 1930s – can be a problem as well. Deconstructing a large financial institution into a number of small ones does not create a cluster of statistically uncorrelated banks, such that mass failure is unlikely. The danger is not analogous to tossing a separate success-or-failure coin for each bank; rather, it stems from the fact that all or most of them are hit simultaneously by a common shock – such as the burst of a housing bubble – and tend to fail together. In this context, imposing a size limit on banks that would otherwise be TBTF can be a helpful and not very costly assist, but is unlikely by itself to solve the problem.

The difficulty is that size is functioning as a symptom of something else, and it is that underlying factor that really creates the problem. Imagine a bank or financial institution that simply invests its owners' wealth or capital in a collection of business ventures of varying risk. The owners' profit is the return on those investments minus any administrative costs. The size of such an institution is of little consequence. It would not "fail" unless all or most of its investments failed. Even if that unlikely event were to happen, the only consequence would be that the owners (shareholders) would have lost their stakes. That might be hard on their heirs, but not on the financial system. The bank is interconnected in the sense that it has lent to many enterprises, but not in the relevant sense that its debts appear as assets on the balance sheets of other banks. In the limiting case that it has no debts, its leverage ratio would be one to one.

In fact, it is leverage – borrowing in order to buy risky assets – that is the fundamental problem. Extreme leverage underlies extreme bigness. The mega-banks would not be nearly as oversized, or as interconnected in the relevant sense, without leverage ratios of twenty-five to one, thirty to one, or greater. Therefore, the best way to control the TBTF problem may be to control leverage – which is no easy task.

The bigger they are...

In principle, limitations on leverage should be conditioned on the riskiness of the assets to be acquired. Any assessment of riskiness will inevitably contain a large element of judgment, presumably to be exercised by a changing cast of regulators: some strong, some weak, some strict, some lax. Practice is likely to be even more unreliable. Any collection of specific criteria and regulations, especially if embalmed in statute or code, will be vulnerable to the attentions of clever lawyers and creative accountants. Regulators are usually unable to keep up with the athleticism of the highly motivated. Thus, controlling leverage necessarily involves three steps: it must be cut back sharply, regulated closely, and safeguarded against evasions and loopholes.

What form could those fail-safe preparations take? This is perhaps a good place to mention the Volcker Rule, which has been on the radar since it was proposed by Paul Volcker, Chairman of the Economic Recovery Advisory Board under President Obama. The general idea of Volcker's proposal is that "true" banks, that is, institutions that accept deposits and make loans, should be prohibited from trading in securities for their own account (though they might be permitted to do so as agents for their customers). This proposal has implications for "true" commercial banks.

First, if implemented, the Volcker Rule would effectively control the leverage assumed by depositary institutions. Some leverage is necessary: a bank that subsists

by taking deposits and making loans earns its profit only through the difference between the interest rate it charges for loans and the (lower) rate that it pays its depositors. Unless its earning assets (its loans) exceed its capital, it probably cannot earn a high enough return on its capital to keep itself in business. But such banks are thoroughly regulated already; an overextended bank would be reined in by its regulator. In any case, what tempts a bank to leverage itself excessively (that is, to borrow in the capital market) is the prospect of large trading profits, which would be forbidden under the Volcker Rule. There is not much profit in borrowing at risk-adjusted capital-market rates in order to lend at what would be roughly risk-adjusted capital-market rates.

Second, there is particular reason to limit the leverage of commercial banks. The danger of high leverage is that a small adversity can bankrupt a highly levered institution. If that institution is a commercial bank, there is automatic disruption of an important channel through which ordinary businesses – and consumers – routinely obtain credit to carry out standard activities. Thus, adverse effects on the real economy are immediate. When Gary Stern, then-president of the Federal Reserve Bank of Minneapolis, published his book *Too Big to Fail* in 2004, he was thinking entirely in terms of commercial banks. Today, the TBTF problem is much more a matter of nonbank financial institutions – investment banks, insurance companies, and so on – which would not come under the Volcker Rule. The Volcker Rule would be a useful part of a comprehensive attempt to protect the real economy from financial instability, but it cannot be the whole story, nor did Paul Volcker intend it to be.

Suppose we accept the inevitable: regulators are fallible or worse, and statutory requirements can be gamed. So from time to time banks that are TBTF will be headed for failure. The real economy has to be protected from damaging disruption. Is there an alternative to bailing out the banks' uninsured creditors at the expense of the taxpayers, with all the moral hazard problems that a bailout entails?

There is broad agreement that nontrivial costs must be routinely inflicted on creditors to take away their free ride and induce them to exercise some discipline on the risk-taking of large banks to which they lend. Ordinary bankruptcy serves as a deterrent – in the laissez-faire process mentioned earlier – but it is plausibly argued that ordinary bankruptcy is a process so lengthy and its outcome so uncertain that it makes the real economy vulnerable to disruption. Several schemes have been suggested that would deal with TBTF by prepackaging and automating a form of bankruptcy-equivalent that would progress quickly and predictably.

One class of such schemes comes under the picturesque heading of a "living will." This provision would require that every large financial institution – and maybe some nonfinancial firms – file a detailed, binding statement of how its assets will be allocated in case of impending default: after allowing for insured creditors, like ordinary depositors, the firm would designate which party has first claim on the remaining assets, which party comes next, until the common equity shareholders bring up the absolute end of the line and presumably get nothing at all.

If sufficiently large, leveraged, and interconnected banks were to fail, even with living wills, the TBTF problem would not quite go away. Many creditors would find their own balance sheets damaged, and therefore so would *their* creditors, and so on. Healthy financial activity could be

inhibited. The idea behind the living will is that with the consequences defined in advance and without ambiguity, potential creditors would shy away from highly leveraged, risky borrowers and either refuse to lend or demand such high interest rates that the borrowers themselves would find the game unprofitable. The proposal is fundamentally an attempt to make market control of leverage more effective.

Another version of this general idea is sometimes called "bailing in." Instead of the government holding the bag, each class of creditor, preferred-stock owner, and so on would be contractually obligated in a certain order and under certain conditions to convert its claim to common equity. When the original common stockholders are wiped out, the next designated class would walk the plank. Eventually, the lowest-ranked surviving class of creditors would become the equity owners of the business. Again, as with the living will, the procedure is presumed to have adequate clarity and visibility to discourage the capital market's willingness to accept highly leveraged risk-taking.

Yet another version would require banks, in addition to holding a certain proportion of equity capital against their liabilities, to issue a certain proportion of contingent bonds – contingent in the sense that they automatically convert to equity shares when the wolf appears at the door. This proposal has the advantage that such contingent bonds would certainly bear a higher rate of interest than bonds without the contingency. Borrowing banks with higher leverage would incur a higher cost of finance.

The last proposal of this general class differs from the others because it involves the federal government directly. In this scheme, a regulatory body would have the "resolution authority" to step in early in the case that a "systemically important" (that is, TBTF) bank were moving toward default. The authority would essentially take over the bank, replace some or all of the management, wipe out some or all of the equity, and impose necessary losses on creditors.

The bigger they are...

The goal would be a quick dispatch that would keep the bank operating with little or no interruption and allow it to emerge as a viable institution. To this end, the authority might need to have the resources to inject new capital into the bank, acquiring an ownership interest in return – preferred, convertible, or even common shares – that could later be sold in the market when the resolved (that is, newly solvent) bank's prospects have been restored. The authority would need money, perhaps in hefty amounts. The bill that originally passed the House proposed to fund the resolution authority by levying a fee on the (risk-adjusted) assets of large financial institutions. In that way, the financial system would bear the costs of its own risk-taking. This stipulation would make borrowing more expensive for all firms. Why not? Those extra borrowing costs are a measure of what taxpayers are bearing now.

The House proposal has attracted much opposition; at this writing it looks as if it will disappear. The Obama administration did not favor it. Critics have argued that the very existence of such a fund, even a very small one, appears to validate the idea of bailing out the TBTF banks. My own hypothesis is that this fund is not important enough to justify the uproar (which may be mainly decoy, anyway). The point of the fund is that once a really big domino – a TBTF domino – is about to fall, enough money will be found to prevent collapse of the real economy. If that outcome is to be avoided, the real defense must occur at an earlier stage. A functioning resolution authority seems

like an excellent idea. At a minimum, it could backstop the more market-oriented schemes described earlier.

My own (weak) preference is for a combination of the contingent-bond device *and* a federally operated resolution authority. It would be useful to have the interest cost of risky behavior quoted daily (rather than having to be inferred) as a clear signal to lenders and borrowers. In addition, wherever a fail-safe is possible, it should exist, provided that a resolution authority enforces the measure in a somewhat orderly way.

The above discussion centers on only one aspect of stabilizing the financial system, not on the full range of considerations. Still, the TBTF phenomenon was a critical part of the recent economic downturn and, as a result, deserves careful attention. What are the main lessons to be gleaned from the TBTF problem?

Excessive leverage appears to be the key destabilizer, and limiting it is the main remedy. Limiting leverage will tend to shrink the financial system, but if, as I suspect, there is a sizable amount of financial activity that adds little or nothing (or perhaps less than that) to the efficiency of the real economy, then we should cheerfully let it shrink. (If a reduced financial sector leads more clever graduating seniors to materials science and fewer to investment banking, all the better.)

There are several kinds of regulatory reform that could place limits on leverage, preserve the essential functions of finance, and diminish the burden on taxpayers. Some of them are more market-oriented, others more state-oriented. A well-designed system could make use of several of them, as long as priority is clear. One reason for welcoming the presence of several layers of protection is that laissez-faire won't do, paper regulations are vulnerable to the creation and exploitation of loopholes, and the political process will sometimes lead to neurasthenic regulators. We are probably better off with defense in depth, even with the risk of some bureaucratic interference.

It is worth adding that international cooperation and alignment are necessary in a globalized world. The temptation to set up pseudo-shop in places where regulations are feeblest would be irresistible – in which case the alternative to tough international agreement could be the Cayman Islands.

ENDNOTES

[1] In this essay, I indiscriminately refer to financial institutions as "banks," ignoring the distinction between commercial banking – taking deposits and making loans – and investment banking, as well as differences between other kinds of financial firms that play a role in the economy's flow of credit, such as insurance companies. When the distinctions are important, I refer to them explicitly.

vised edition, 2007) and *Polarized America: The Dance of Ideology and Unequal Riches* (with Nolan McCarty and Keith T. Poole, 2006).

Robert M. Solow, a Fellow of the American Academy since 1956, is Institute Professor Emeritus at the Massachusetts Institute of Technology. In 1987, he was awarded the Nobel Prize in Economics in recognition of his contributions to the theory of economic growth; in 1999 he received the National Medal of Science for his creation of the modern framework for analyzing the effects of investment and technological progress on economic growth. His publications include *Capital Theory and the Rate of Return* (1963); *The Nature and Sources of Unemployment in the United States* (1964); *Growth Theory* (1970); and *Inflation, Unemployment and Monetary Policy* (with John B. Taylor, 1998).

Jeremy C. Stein, a Fellow of the American Academy since 2008, is the Moise Y. Safra Professor of Economics at Harvard University. His recent publications include "Rethinking Capital Regulation" (with Anil Kashyap and Raghuram Rajan) in *Maintaining Stability in a Changing Financial System* (2008) and "A Gap-Filling Theory of Corporate Debt Maturity Choice" (with Robin Greenwood and Samuel Hanson), *Journal of Finance* (2010).

Peter Temin, a Fellow of the American Academy since 1986, is Elisha Gray II Professor Emeritus of Economics at the Massachusetts Institute of Technology. His books include *Did Monetary Forces Cause the Great Depression?* (1976), *Lessons from the Great Depression* (1989), *Elites, Minorities, and Economic Growth* (edited with Elise S. Brezis, 1999), and *The World Economy Between the Wars* (with Charles Feinstein and Gianni Toniolo, 2008). He served as President of the Eastern Economic Association (2001–2002) and the Economic History Association (1995–1996).

Luigi Zingales is the Robert C. McCormack Professor of Entrepreneurship and Finance and the David G. Booth Faculty Fellow at the Booth School of Business at the University of Chicago. He is the author of *Saving Capitalism from the Capitalists: Unleashing the Power of Financial Markets to Create Wealth and Spread Opportunity* (with Raghuram G. Rajan, 2003). He codeveloped the Financial Trust Index, designed to monitor the level of trust Americans have in the financial system.