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Government policy should not encourage firms to take actions that have large social costs and create little or no social benefit. This simple proposition is supported by both common sense and elementary economic reasoning. For a transparent case, consider a firm that wants to locate a uranium processing plant in the center of a densely populated residential area. Zoning laws and other regulations will prevent the firm from doing this and for good reason: there is no social benefit to locating a plant handling radioactive materials in a densely populated area, and there are significant social costs, including health risks and declining property values. It would be pure folly for the government to give this company a tax break only if it locates its uranium processing plant in a very populated area. It would be even greater folly for the government to provide this tax break and in addition agree to pay any health claims brought against the firm, but only if plant is located in a residential area.

Government Policy Perversely Distorts Banks' Funding and Creates Unnecessary Risk

While we don't have policies that perversely affect the location of uranium processing plants, we do have policies that perversely distort the funding choices made by banks and other

[1] What follows is largely based on a paper that I co-authored with Anat Admati, Peter DeMarzo and Martin Hellwig entitled "Fallacies, Irrelevant Facts, and Myths in the Discussion of Capital Regulation: Why Bank Equity is Not Expensive." That paper and related materials can be found at: www.gsb.stanford.edu/news/research/Admati.etal.html.

financial institutions. These policies make it cheap for banks to fund themselves with debt and expensive to fund with equity.

First, our tax system favors debt financing over equity financing. This is because interest payments are treated as a deductable expense in the computation of corporate tax, but payments to shareholders are not treated in this way. Debt provides a "tax shield" and, holding everything else equal, a company that uses more debt financing has a lower tax bill than a company funded with less debt.

Second, as is well known, banks, especially "too-big-to-fail" banks, benefit from implicit guarantees that the government provides for the banks' debt. By lowering the risk of holding debt, these implicit guarantees lower the interest rate banks must pay to their creditors and constitute a significant subsidy to the banks based on their using debt rather than equity. It is difficult to measure precisely the magnitude of this subsidy, but there are many reasons to believe that it is quite large. First, rating agencies explicitly account for the government support by giving two ratings for banks: a standalone rating and a support rating. The latter accounts for the implicit government guarantee, and the difference between the two ratings gives some indication of the importance of government support. Moody's recently gave five notches of "uplift" to Bank of America due to government support, four notches to Citibank, and three to Wells Fargo. In the case of Bank of America, this means that government support lifts the bank's credit rating on senior debt from Baa2 to Aa3, changing the category for its bonds from "minimum investment grade" to "very high quality." A study[2] conducted after the crisis looked at the differences between funding costs of smaller and larger banks and used these differences to estimate that the value of the "too-big-to-fail" subsidy for the 18 largest US banks. The

[2] See Dean Baker and Travis McArthur, "The Value of the "Too Big to Fail" Big Bank Subsidy," CEPR Issue Brief, September, 2009.

estimates put the aggregate value of the government subsidy between $6 billion and $34 billion per year, which accounts for somewhere between 9% and 48% of bank profits. Using a completely different approach, three researchers in a recent paper[3] examined the pricing of put options on financial firms and used these market prices to infer the market's assessment of the value of the subsidy to bank shareholders. They find that the subsidy substantially reduces the cost of capital for systemically important banks, and in their calibration the bailout guarantee accounts for at least half of the market value of the banks' stock. In addition to the "too-big-to-fail" subsidies that the government delivers through implicit guarantees and bailouts, bank funding can also be subsidized by the government through explicit guarantees such as deposit insurance. Banks pay premiums to the FDIC for this insurance, but if these premiums are too low, the insurance is underpriced and the banks benefit.

Both the tax system and the government safety net subsidize the banks' use of debt. These subsidies make debt cheap relative to equity. The distortions this creates are not innocuous. Encouraging banks to fund themselves almost exclusively with debt makes them much more fragile than they need to be. If this just affected a few small banks in isolation, it would not be a significant problem. Unfortunately it affects the whole banking sector and particularly the "too-big-to-fail" banks. When highly-interconnected banks and other financial institutions are funded with small slivers of equity, there is little margin for error and modest shocks to asset values can put the entire system on the verge of insolvency. Slightly larger shocks make the system insolvent. As was demonstrated in 2008, when a highly-leveraged financial system becomes distressed, the results can spill over into the rest of the economy with devastating consequences. A mere three years after the crisis we are seeing in Europe further

[3] See Bryan T. Kelly, Hanno Lustig and Stijn Van Nieuwerburg, "Too-Systematic-To-Fail: What Option Markets Imply about Sector-Wide Government Guarantees," NBER Working Paper Series, June, 2011.

evidence of the vulnerability of economies to a fragile, highly-leveraged banking system. There are clearly huge social costs to having thinly-capitalized banks. This might be tolerated if there were offsetting social benefits. There are not.

We are told that "capital is expensive" for banks and if we raise equity capital requirements by even modest amounts, awful things will happen. These claims and dire warnings are based on a number of fallacies and confusions.

Banks Do Not "Hold" Capital and Capital is Not Idle Funds

One pervasive confusion stems from the completely misleading notion that banks "hold" capital. This terminology gives rise to fundamental misunderstandings of what capital is and the role it plays. To explain the importance of capital and why banks do not "hold" capital requires that we look at a bank's balance sheet. Figure 1 presents a simplified version of a bank balance sheet.

Figure 1

Assets (left-hand side)		**Liabilities and Shareholder Equity** (right-hand side)	
Cash	100	Deposits	1,100
Trading assets	400	Non-deposit debt	800
Loans	1,500	Shareholder equity	100
Total	2,000	Total	2,000

On the left-hand side of the balance sheet are the bank's assets. Among these assets are its cash reserves, its trading account assets and the loans the bank has made. On the right-hand side of the balance sheet are the liabilities the bank has incurred in raising funds. These liabilities include

deposits and various forms of debt the bank has issued. Also on the right-hand side is shareholders' equity.

Capital is basically shareholders' equity. This means that the amount of capital a bank has is determined by how the *right*-hand side of the balance sheet is constructed. In Figure 1 the value of the bank's equity capital is 5% of the total asset value, i.e. 100/2,000 = 5%. It should be noted that before the crisis many major banks had capital that was as little as 2% or 3% of asset value.[4]

The right-hand side of the balance sheet can be understood in terms of the promises the bank has made to the providers of the bank's funding. When a bank funds with debt, it makes an explicit, contractual promise to pay the creditors specified amounts. When a bank funds with equity, it makes no explicit promise to pay a given amount; the shareholders providing the equity funding are simply entitled to what is left (if anything) after the creditors (depositors and bond holders) have been paid.

Financial crises and the need for government bailouts occur when banks suffer losses on their assets and become insolvent or close to insolvent. Insolvency quite simply means that the bank is unable to meet the contractually specified promises it has made to its creditors because its assets are worth less than its liabilities. Imagine the bank whose balance sheet is given in Figure 1 suffers a loss of 25 on its trading assets and a loss of 125 on its loan portfolio. Its balance sheet becomes:

[4] Throughout this discussion the capital ratio will be taken to mean the ratio of equity to total assets. In practice bank capital is measured in a number of different ways. Reported measures are generally based on "book" values of assets, which can be quite different from actual market values. In addition, reported capital ratios are often calculated in terms of "risk-weighted" assets. Since many types of assets receive risk-weights less than 100%, this and the use of book values can make capital ratios look high even when a bank is very thinly capitalized.

Figure 2

Assets (left-hand side)		**Liabilities and Shareholder Equity** (right-hand side)	
Cash	100	Deposits	1,100
Trading assets	375	Non-deposit debt	800
Loans	1,375	Shareholder equity	-50
Total	1,850	Total	1,850

The bank is now "underwater," and this is reflected in the fact that shareholders' equity is negative. Bank shareholders, like all shareholders, have limited liability. This means that they cannot be forced to kick in the 50 required to make up the shortfall between the value of the bank's assets and the contractual promises made to the depositors and other debt holders. If this were a non-financial company rather than a "too-big-to-fail" bank, bankruptcy would occur, the shareholders would be "wiped out," and creditors would be forced to take some losses. In the case of a systemically important, "too-big-to-fail" bank, the government will be under tremendous pressure to keep a bank from failing and will provide support to keep the bank afloat. The result will be something like what is depicted in Figure 3:

Figure 3

Assets (left-hand side)		**Liabilities and Shareholder Equity** (right-hand side)	
Cash	100	Deposits	1,100
Trading assets	375	Non-deposit debt	800
Loans	1,375	**Government claim**	**20**
Government support	**75**	Shareholder equity	5
Total	1,925	Total	1,925

By various means the government can "inject money" into the bank. For example, it can buy bank assets at inflated prices, provide additional guarantees that increase the value of some of the bank's assets, or provide funding at below market rates. However value is injected, the only way that the government can truly make an insolvent bank solvent is to increase the value of the bank's assets on the left-hand side of the balance sheet by more than the value of any claims (e.g. preferred shares) it gets from the bank on the right-hand side. In the example shown in Figure 3, the government increases the value of the bank's assets by 75 and only takes a claim worth 20. The difference is 55. Of this 55, 50 goes to filling in the amount the bank was underwater (the shortfall between the bank's assets and its liabilities) and the remaining 5 is a benefit to the shareholders.

Now let's start the story again, except in this case we will assume that the bank is much better capitalized. Instead of having only 5% equity capital to total assets, the bank has a much more prudent ratio of 15% equity to total assets. This is shown in Figure 4.

Figure 4

5% Capital

Assets (left-hand side)		**Liabilities and Shareholder Equity** (right-hand side)	
Cash	100	Deposits	1,100
Trading assets	400	Non-deposit debt	800
Loans	1,500	Shareholder equity	100
Total	2,000	Total	2,000

15% Capital

Assets (left-hand side)		**Liabilities and Shareholder Equity** (right-hand side)	
Cash	100	Deposits	1,100
Trading assets	400	Non-deposit debt	600
Loans	1,500	Shareholder equity	300
Total	2,000	Total	2,000

On the left we have the balance sheet of the original, poorly capitalized bank. On the right we have our much better capitalized bank. First note that the two banks are holding exactly the same assets. The better capitalized bank is not being forced to "hold" something that its

poorly capitalized twin is not holding. Claims such as the one made by Steve Bartlett (Financial Services Roundtable, September 17, 2010) that "every dollar of capital is one less dollar working in the economy" are simply false. *Our better-capitalized bank has the same assets and the same number of dollars working in the economy as the poorly capitalized bank.*

The difference between the balance sheets in Figure 4 relates to the contractual promises the two banks have made. The better-capitalized bank has only taken on 600 in non-deposit debt, not 800, and has funded itself with more equity. This means that it has much more equity to absorb losses. Assume now that both banks suffer the losses discussed above: a loss of 25 in trading assets and a loss of 125 in the value the loan portfolio. Figure 5 shows the balance sheets after the losses:

Figure 5

5% Initial Capital

Assets (left-hand side)		**Liabilities and Shareholder Equity** (right-hand side)	
Cash	100	Deposits	1,100
Trading assets	375	Non-deposit debt	800
Loans	1,375	**Government claim**	**20**
Government support	**75**	Shareholder equity	5
Total	1,925	Total	1,925

15% Initial Capital

Assets (left-hand side)		**Liabilities and Shareholder Equity** (right-hand side)	
Cash	100	Deposits	1,100
Trading assets	375	Non-deposit debt	600
Loans	1,375	Shareholder equity	150
Total	1,850	Total	1,850

With 15% initial capital our prudent bank remains strongly solvent after the loss in asset value that completely crippled the bank with only 5% initial capital. Unlike the poorly-capitalized bank, the better-capitalized bank requires no government bailout. In fact, even after the drop in asset value, our better-capitalized bank's capital ratio is 8.1% (150/1850 = 8.1%), higher than the initial capital ratio of the poorly-capitalized bank. The better-capitalized bank can sustain even further losses without requiring government support.

Because of the possibility of government support, shareholders will prefer that their bank be thinly capitalized. In other words, they will prefer the left-hand sides of Figures 4 and 5, not the right-hand sides. To see why, we must keep track of the money. Assume we start with the bank being well capitalized as shown on the right-hand side of Figure 4. The shareholders can either leave their bank well-capitalized at 15%, or they can have the bank borrow 200 and pay out the 200 in proceeds as a dividend to the shareholders. If they do the latter, they convert their well-capitalized bank into the bank with 5% capital shown on the left-hand side of figure 4. We can now compare their positions after the bank loses 25 on trading assets and 125 on its loan portfolio.

- If they had converted their bank into a thinly capitalized bank, they would have the 200 they received as a dividend plus the 5 in shareholder equity shown on the left-hand side of Figure 5.
- If they had left their bank well capitalized, they would end up with 150 in shareholder equity, as shown on the right-hand side of Figure 5.

In other words, they end up with 205 with the thinly capitalized bank and only 150 with the better capitalized bank. The difference of 55 is exactly what the government puts into the bank to bail it out.

Something very important is evident in Figures 4 and 5: losses are *socialized* on the left-hand sides and losses are *privatized* on the right-hand sides. As well as imposing unwarranted costs on the taxpayers, socializing losses creates all kinds of incentive problems. For example, socializing losses creates incentives for inefficient and excessive risk taking, since the shareholders get the benefits of the "upside" and the government and taxpayers bear the costs of the "downside."

Figure 5, however, doesn't reveal all the advantages of higher equity capital. The left-hand side of Figure 5 may lead to a financial crisis and collateral damage to the rest of the economy. This is much less likely on the right-hand side. The benefits of having more equity in preventing a crisis are widely recognized. For example, Alan Greenspan wrote in 2010,[5]

> "Had the share of financial assets funded by equity been significantly higher in September 2008, it seems unlikely that the deflation of asset prices would have fostered a default contagion much, if any, beyond that of the dotcom boom."

One Must Not Confuse Private with Social Costs

Requiring banks to have much more prudent levels of equity capital clearly produces many benefits, but bankers insist that "equity is expensive" and must be used sparingly. These claims are also based on confusions and fallacies. Perhaps most egregious among them is the confusion between private and social costs.

Consider again the uranium processing plant example discussed above. Assume that the government has a perverse policy on plant location: the firm will receive tax breaks and free government insurance against health risks *only if* the plant is located in a crowded residential area. The firm's managers can legitimately say that it would be costly for them to locate the processing plant far away from a crowded residential area. It would be costly *for them* because they would be giving up both the favorable tax treatment and the freely provided government insurance that is protecting them against health claims. But giving these subsidies up is a *private* cost to the firm, not a social cost. The tax benefits and insurance all come at the expense of the general taxpayer. What the firm loses in giving these up, the general public gains. Of course the

[5] See Alan Greenspan, "The Crisis," *Brookings Papers*, April 15, 2010.

general public gains much more because it is much safer to have the plant located away from a crowded area.

The situation is precisely the same for banks. If banks are required to fund themselves with more equity, they will give up tax benefits (the debt tax shield) and freely provided or underpriced government guarantees (particularly for banks that are considered "too-big-to-fail"). Giving up these subsidies is a *private* cost to the banks, not a social cost. And just like moving the uranium processing plant away from a crowded residential area produces a huge social benefit, so does moving the banks away from imprudent levels of equity capital with all the risks this brings to the economy.

It is clear that our system subsidizes banks by making debt cheap. It might be argued that these subsidies are good if the banks pass them on to borrowers in the form of lower lending rates. If we remove the subsidies that make it cheap for the banks to fund with debt, won't the banks increase the rate they charge to borrowers and won't this hurt the economy? Let us pose the exact analogue of this question in the context of the uranium processing plant: Won't forcing the uranium processing firm to locate its processing plant far away from a crowded residential area reduce the subsidy the firm gets, and won't this force the firm to charge more for processed uranium? Whether or not it makes sense for the government and its taxpayers to subsidize uranium processing, *it certainly does not make sense for a subsidy to be given in a way that requires the processing firm to locate its dangerous plant in a crowded residential area*. Now consider banks. Whether or not it makes sense for the government to subsidize banks' lending, *it certainly does not make sense for a subsidy to be given in a way that requires banks to fund themselves in a fragile way that is dangerous to the rest of the economy.* Arguments that bank capital requirements should not be significantly increased because this would remove a subsidy

that the banks use to keep lending costs low are completely unfounded. If bank lending needs to be subsidized, this should be done in a direct way that does not put the economy at risk.

Arguments Based on a Fixed Required Return on Equity (ROE) are Flawed

Another source of confusion and fallacious reasoning about equity capital requirements for banks is associated with the notion of a fixed, required rate of return on equity for banks. It is well established that investors are risk averse and they must be compensated for the risk they bear. Prices are set in markets so that securities that add more risk to investors' portfolios have higher expected returns than those that add less risk. There is absolutely no reason to think that investors ignore risk when investing in banks' equity.

The risk that a bank's shareholders bear depends on how that bank funds itself. Consider two banks of equal size. Assume that the first bank is funded with $40 billion in equity and $960 billion in debt, while the second is funded with $100 billion in equity and only $900 billion in debt. Now consider what happens if each bank suffers a loss of $8 billion. For the first bank this $8 billion loss is spread across a small equity base and results in a 20% loss for the shareholders (–8/40 = –20%). For the second bank the $8 billion loss is spread across a bigger equity base and results in only an 8% loss (–8/100 = –8%). By concentrating its losses on a smaller equity base, the first bank makes its equity returns much riskier than the second bank's equity returns. Because of this the first bank's shareholders will have a higher required rate of return on their equity to compensate for this risk.

The claim is often made that bank shareholders have a required return that is fixed and will not change when the bank funds itself with more equity and less debt, even though this reduces the riskiness of equity returns. This notion of a rigid required rate is used to argue that increasing equity requirements will increase banks' funding costs. The implicit assumption behind this claim appears to be that bank investors fail to account for the risk they are bearing or are somehow fooled. If this is true, we must seriously question the ability of markets to properly allocate capital in the financial sector. In fact, there is no reason to come to any drastic conclusions. A required return on (or cost of) equity that is independent of the risk of a bank's equity makes no sense and violates all we know about security markets. Arguments based on this reasoning are deeply flawed.

It should also be noted that return on equity (ROE) is often used as a performance measure and the compensation of many bank managers appears to be tied to ROE. This creates perverse incentives for funding banks with minimal amounts of equity. Consider two bank managers whose banks have similar assets. Manager A's bank is more prudently funded with 10% equity, while Manager B's bank has only 3% equity. In addition to having a safer bank, assume that Manager A has managed his bank's assets very well, earning a return on assets (ROA) of 3%, while Manager B has managed his assets quite poorly, earning a return on assets of only 2.5%. As the table below shows, Manager B posts a much higher ROE despite the fact that Manager A is the better manager.

	Realized Return on Assets (ROA) (Before Interest Payments)	Interest Rate on Debt	% Equity Funding	Realized Return on Equity (ROE)
Manager A	3.00%	2.00%	10.00%	12.00%
Manager B	2.50%	2.00%	3.00%	18.67%

Manager B's ROE exceeds Manager A's ROE only because Manager B's bank is more highly leveraged and more fragile. If Manager A is compensated on the basis of ROE, he has incentives to reduce his equity funding and the safety of his bank.

Requiring Banks to Fund with More Equity is Not Socially Costly

Many policy decisions are quite challenging since they involve difficult tradeoffs between social costs and benefits. For an example, consider levees that are built for flood protection. Should a levee be built for the once-in-a-100-year flood or the once-in-500-year-flood? Building a safer levee produces clear social benefits, but it also entails social costs, since the construction of a safer levee requires the use of more resources (e.g., more labor) that could have been used elsewhere for other purposes. Fortunately we do not face this sort of difficult tradeoff when thinking about bank capital requirements. This is because requiring banks to fund with more equity does not use up any social resources that could have been used for other purposes. It only entails that banks change the nature of the contractual promises that they make to those providing their funding. Some securities that would have been sold by a bank with the label "debt" must now be sold with the label "common share." In fact, banks can over relatively short periods of time increase their equity capital significantly by not making dividend or other payments to shareholders, but instead using the cash that they would have paid out to shareholders to pay off their debt and reduce their overall leverage. Of course we know that banks will not do this voluntarily since it will reduce the subsidies that they get from the government. In addition, managers may be concerned because this will mechanically reduce the

return on equity (ROE) even as it makes their banks safer and less of a danger to the economy. The reduction in bank subsidies and the reduced return on equity due to lower risk and lost subsidies are *private* costs to the managers and shareholders of the bank (when considering only their holdings in the banks, not necessarily their entire portfolio or economic welfare), but they are *not social costs*.

Requiring banks to fund more with significantly more equity will make our financial system safer and substantially reduce the risk of another financial crisis that imperils the rest of the economy. Of course, a significant increase in required equity funding is not a panacea that solves all problems and removes the need for any other types of regulation or supervision. However, contrary to the flawed arguments against it, requiring significantly more bank equity produces significant social benefits at little or no social cost.

Note that it does not follow from this that banks should be funded with 100% equity. A nontrivial portion of bank liabilities, e.g. deposits, is socially valuable. But much of the debt that banks have used in funding is used simply because incentives (tax and guarantee subsidies, compensation based on ROE measures) make it privately, but not socially, desirable.

Level Playing Fields and Playing in the Shadows

It is often argued that our overriding concern must be that playing fields are level. The claim is that if other jurisdictions permit their banks to be thinly capitalized, we also must permit our banks to be thinly capitalized. Otherwise our banks will be unable to compete. It is important to understand what is really being said by those making this argument. They are really contending that if other countries provide too-big-to-fail and other types of subsidies (at taxpayer

expense) to their banks and these subsidies encourage their banks to be highly leveraged and fragile, posing a threat to their economies, we must provide similar subsidies to our banks (at taxpayer expense), so that our banks are fragile and highly leveraged and pose a danger to our economy. This makes no sense. In broad terms banks can generate profits in three ways:

- They can make and monitor loans to households and commercial enterprises.
- They can facilitate payments, transactions and the issuance and trading of various securities.
- They can exploit their ability to borrow at government subsidized rates, becoming highly leveraged, thinly capitalized and systemically risky in the process.

True social value is potentially created by the first two activities, but not by the third, even though the third can be a great source of bank profits. Taking away the third activity is not socially costly and actually produces significant social benefits. As mentioned above, if either of the first two activities requires a government subsidy, that subsidy should *not* be provided through the third activity. Arguing that other jurisdictions permit their banks to earn great profits through the third activity is not an argument for saying this should be permitted in our country.

It is also often claimed that if higher capital and other regulatory requirements are imposed, banks and other entities will just find a way to do "risky stuff" in the shadows (e.g., the unregulated shadow banking sector). This claim sounds a bit like the unruly teenager who argues that if his parents don't permit him to take illegal drugs in their house, he will simply do it at his friend's house. It is clearly a challenge for regulators to monitor risk and make sure that it is not being hidden in ways that ultimately burden the taxpayer and put the economy at risk. But this is not an insurmountable challenge. It should, for example, be noted that before the crisis much of

the shadow banking system relied on support from regulated entities. This meant that regulators had the potential to control it.

We Need the Government to be Less Involved

Because of too-big-to-fail guarantees and other subsidies our government is enmeshed in the financial system. As a consequence prices and decisions are distorted and private markets are not working as they should. Figure 5 shows the difference between the system that we have now (the left side of the figure) in which losses are socialized and the system we should have (the right side) in which losses are privatized. Some may contend that the imposition of higher capital requirements is a case of the government interfering with private markets. This is completely wrong. Higher capital requirements that lead to prudent bank funding actually take the government out of the system and put the responsibility for bearing risk on the private markets, *not the taxpayer*. In addition they produce a huge social benefit by making the risk of another devastating financial crisis much lower.