

# **Does Debt Discipline Bankers?**

## **An Academic Myth about Bank Indebtedness**

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### Abstract

Supplementing the discussion in our book *The Bankers' New Clothes: What's Wrong with Banking and What to Do about It*, this paper examines the plausibility and relevance of claims in banking theory that fragility in bank funding is useful because it imposes discipline on bank managers. The assumptions about information and about costs of bank breakdowns underlying these claims are unrealistic and they cannot be generalized without undermining the theory and policy prescriptions. The discipline narrative is also incompatible with the view that deposits and other forms of short-term bank debt contribute to liquidity provision; in this liquidity narrative, the fragility of banks is a by-product of useful liquidity provision and can only be avoided by government support. We contrast both narratives with an explanation for banks' avoidance of equity and reliance on short-term debt that appeals to debt overhang and government guarantees and subsidies for debt. In this explanation, the fragility of banks arises from conflicts of interest and is neither useful for society nor unavoidable.

## 1. Introduction

In our book, *The Bankers New Clothes: What's Wrong with Banking and What to Do about It*, we came out strongly in favor of raising bank equity requirements substantially. After examining the history of banking and the costs and benefits of bank borrowing to society, we concluded that requiring banks and other financial institutions to fund their investments with substantially less borrowing and substantially more equity than current and proposed regulations allow would be highly beneficial.<sup>1</sup>

Our assessment of the tradeoffs involved in equity requirements is at odds with those of some other researchers. For example, in the wake of the financial crisis, a group of distinguished academics specializing in banking and finance presented a blueprint for comprehensive financial reform. The so-called *Squam Lake Report* that they wrote, named after the lake in New Hampshire where the group met, contains the following statement: “Capital requirements are not free. The disciplining effect of short-term debt, for example, makes management more productive. Capital requirements that lean against short-term debt push banks toward other forms of financing that may allow managers to be more lax.”<sup>2</sup>

As indicated by this quote, the Squam Lake Report stresses what they claim to be the role of debt, particularly short-term debt, as a means of “disciplining managers.” Whereas the statement is made as if it were factual, about the real world of banking, it is primarily based on theoretical models. In these models, depositors and other short-term creditors are taken to monitor banks and their managers and threaten to withdraw their funds if they do not like what

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<sup>1</sup> The book is Admati and Hellwig (2013). Our discussion in this book was partly based on earlier work, in particular, Admati et al. (2011, 2012), and Hellwig (2009, 2010). In terms of the book, the material of this paper would follow immediately after our Chapter 10 (“Must Banks Borrow So Much?”) that discusses the relation between liquidity provision and indebtedness. However, we have written it here as a self-contained piece.

<sup>2</sup> See French et al. (2009, 69).

they see. By this threat, the short-term creditors supposedly “keep managers on the straight and narrow.” The disciplining effect is taken to arise because large withdrawals of funding can cause default and possibly even a forced liquidation. When regulators are asked why banks should not be required to use much more equity, they sometimes point to this research.

Regulators also may point to another academic literature, which gives a different explanation for why banks should fund with a lot of short-term debt. This literature suggests that short-term bank debt is important for satisfying the economy’s “needs for liquidity.” Short-term borrowing by banks creates “liquid assets.” Creating these assets is viewed as useful because, being safe and easily converted into cash, these assets can facilitate transactions and provide means of payment.<sup>3</sup>

The two literatures are agreed that the fragility associated with an extensive use of short-term borrowing by banks cannot and should not be avoided. In the liquidity narrative, fragility is an unfortunate but unavoidable by-product of the benefits that liquidity creation by banks brings to the economy. In the discipline narrative, the fragility itself is an essential part of the disciplining mechanism and is thus viewed as beneficial.

Paradoxically, these two literatures give contradictory and inconsistent accounts of the banks’ short-term creditors. The discipline narrative envisions depositors and other short-term creditors as being constantly on the watch so that they can withdraw their funds and stop their lending to the bank if they see managers misbehaving. In contrast, the liquidity narrative envisions depositors and other short-term creditors as being *unconcerned* about the risk of default by the bank. In the liquidity narrative, banknotes, checks and other short-term claims that the bank issues serve as means of payment, which is possible only if prospective trading partners

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<sup>3</sup> For example, Gorton (2012, 5) suggests that banks benefit the economy by “producing” opaque short-term debt that is highly liquid so that its holders can easily convert it into cash.

need not worry about the bank's safety. Short-term bank debt is said to be "informationally insensitive." The two visions, one of creditors constantly on the watch for problems and the other of creditors trusting that banks are safe, are not compatible with each other.

In Chapter 10 of our book, we discussed the liquidity narrative in some detail, arguing that the liquidity of bank debt is likely to be *improved* if banks are less indebted and have more equity. By contrast, we only mentioned the discipline narrative briefly, referring the reader to our own earlier research without going through the arguments in any detail.<sup>4</sup> Some readers of an earlier draft of the book had advised us to give little attention to the discipline narrative. They argued that this narrative is not much heard in public debate; bankers do not refer to it in their lobbying, and it actually sounds odd to people outside the academe.<sup>5</sup> Since the models are complicated and discussing them requires space and attention of the reader, we were advised that this "academic debate" should be left off the pages of the book.

However, since the policy recommendations from the interpretation of deposits and other short-term debt of banks as a disciplining device run counter to our own, it is appropriate to address this interpretation as well. In the following, we provide a more detailed account of the the discipline narrative and its application to the policy debate. Contrary to the Squam Lake Report, we conclude, as we have in previous writings, that this narrative, like liquidity narrative, is inadequate for informing the debate on bank capital regulation.<sup>6</sup>

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<sup>4</sup> See Admati and Hellwig (2013, 164-165, 301n56).

<sup>5</sup> An experienced industry veteran asked us why we spent so much space in Admati et al (2011, Section 5) discussing the discipline narrative. "Is this some academic thing?", he asked, to which we could only answer "yes!"

<sup>6</sup> Our discussion draws heavily on Admati et al (2011, Sections 5 and 7) and Admati et al. (2012). In a paper whose content and conclusions are similar to Admati et al (2011), Harrison (2004, 15-16), written by a central banker from New Zealand, refers to the models with short-term debt providing discipline as "little more than a theoretical curiosity" and concludes that "there is no credible argument here that capital is socially costly."

We will argue that the theory of debt as a device for effectively disciplining bank managers is implausible, little more than a myth. First, there are reasons to doubt the effectiveness of this kind of discipline. Second, the costs to society associated with providing this discipline are so high that it is inefficient to rely on this mechanism even if it were effective. In fact, the costs to society of the runs and liquidations that the disciplining mechanism relies on are so high that governments often prefer to prevent banks from collapsing and therefore bail out the banks' creditors. If depositors and other short-term creditors expect to be bailed out, however, any disciplining effects that the debt might have are voided.

The extensive use of debt in banking actually creates significant conflicts of interest between bank managers and bank shareholders on the one hand, and creditors or taxpayers on the other. Rather than *solving* a governance problem, heavy reliance on debt is a *source* of governance problems that distort banks' decision making and harm the public. It is also worth noting that the notion of short-term borrowing and fragility as a device for solving governance problems has not yet come up in the context of other corporations.<sup>7</sup>

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<sup>7</sup> Jensen (1986) has suggested that funding by debt forces managers to make payouts to investors and keeps them from wasting "free cash flow." In his view, the leveraged buyouts of the eighties were a way of replacing inefficient low-debt/high-free-cash-flow arrangements by more efficient ones. However, most large corporations do not maintain high indebtedness for extended periods of time, even after leveraged buyouts. A competing theory would explain high leverage in the 1980s buyouts as a distributive device designed to dilute incumbent debt holders; see, e.g., Shleifer and Summers (1988), Müller and Panunzi (2004). The free-cash-flow problem referred to by Jensen is actually more serious for nonfinancial companies than for banks. Whereas for nonfinancial companies activities in which management is expert may offer only limited scope for investments, for banks such limitations are unlikely to arise. Instead, in banking there is a serious problem of excessive risk taking due to conflicts of interest between borrowers and creditors. More generally, the literature on financial contracting has many models in which debt arises naturally as an optimal form of outside finance because debt is a hard claim, which is easy to handle because, as long as the debt is paid, the investor or lender does not care about the exact outcome or cash generated by investments. By the standards of this literature, however, we should not expect to see any funding through outside equity at all, yet, in real life, large corporations use such funding extensively. At best, therefore, the existing literature on financial contracting is relevant for small business finance, where debt finance is ubiquitous. It is unsuited for explaining the funding of large, publicly traded corporations.

## 2. An Analogy from Parenting

To explain the issues associated with the short-term-debt-as-discipline theories, we use an analogy from parenting, where discipline issues often arise. Kate's and Steve's son Jim is a college student far from home. Jim was caught drinking when he went to high school. Kate and Steve want to make sure he avoids such trouble in college. What can they do?

If Kate and Steve could follow Jim at all times, they would be able to intervene in time to prevent Jim from drinking too much. But this is not possible and would obviously interfere with Jim's independence in college.

What else could Kate and Steve do to "discipline" Jim's drinking? They might threaten that, if they hear anything about it, they will cancel the trip around the world that they were planning to take with Jim over the summer. Kate and Steve know that Jim really wants to go on the trip. The fear of having the trip cancelled might keep Jim from drinking.

The problem is that Kate and Steve are very unlikely to actually *know* whether Jim is drinking. Jim's friends, and even the college, are unlikely to tell them unless the college considers disciplinary action. When that happens, of course, the damage has already occurred.

Even if they find out about Jim's drinking, Kate and Steve may actually hate to cancel the trip. They have planned this trip for years, and they have already taken leaves from their jobs for the time of the trip. Leaving Jim behind is also out of the question, because then they could control him even less

Since Jim knows all of this, the threat of cancelling the trip will hardly affect his behavior. He anticipates that either his parents will not find out about his drinking, or, if they do, they will not want to carry out the threatened punishment.

### 3. Disciplining Bankers

The core of the governance and discipline problem with bankers is contained in the title of the book *Other People's Money: And How the Bankers Use it*, published in 1914 by Louis Brandeis, who subsequently was appointed to the US Supreme Court. Bankers invest other people's money. Their decisions affect the investors who have placed their money with them. How can investors ensure that bankers do not misbehave with the money?

Like Jim's parents, investors cannot continuously control what the banker is doing. Investors in other corporations also have this problem, but it is particularly acute in the financial sector where investments and activities are sometimes difficult to observe and positions can change very quickly. The cases of Bernard Madoff, involving two decades of large-scale fraud, and MF Global, involving the embezzlement of customers' securities, provide a clear warning. Less obvious examples involve investment bankers and traders taking inordinate risks at the expense of their banks.<sup>8</sup>

Unlike Jim's parents, investors have a choice as to whom they want to deal with. If they fear that a banker will embezzle their funds, they will not invest their money with him. If they fear that no bankers can be trusted, they will put no more than the minimum necessary for transactions into a bank and invest the rest of their money elsewhere (unless of course the claims against banks are guaranteed by the government so that they do not have to worry about losses).

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<sup>8</sup> The governance problem concerns relations inside the bank as well as relations between investors and bank. For an illustration, see UBS (2008), a report that Swiss bank UBS provided to account for what had gone wrong before the crisis. According to this report, UBS Senior Management had been unable to develop a full-scale account of UBS Investment Bank's activities in mortgage-backed securities in the years before to the crisis. There are also recurrent instances of rogue traders imposing billions of losses on their institutions, from Mr. Leeson bankrupting British bank Baring Brothers to Mssrs. Kerviel, Adoboli, and Iksil imposing large losses on Société Générale, UBS, and JP Morgan Chase respectively in recent years.



For a bank to be able to attract funds, it is therefore important to appear trustworthy and to convince investors that their funds will not be embezzled or put at risk unduly.

The discipline narrative of bank funding suggests that by using debt, particularly short-term debt, the bank reduces the investors' concerns and establishes its trustworthiness. This narrative is based on several theoretical papers showing how the use of debt for funding might discipline bankers. Each of these papers tells a story uses a mathematical model to explain the mechanisms at work in the story. In doing so, they show that, under certain assumptions, misbehavior of bankers can be prevented or the damage from such behavior can be reduced because creditors impose discipline on bankers.

One such paper tells the following story.<sup>9</sup> A banker wants to obtain funds for investments. Potential investors are concerned that he might embezzle the money. If they simply refuse his request, the bank will not get off the ground. If the banker's investment opportunities are highly profitable, this would be a lost opportunity.

In this story, the conflict of interest between the banker and investors is assumed to be less serious if the investments turn out well. In this case, the banker has more to gain from continuing to run the bank than from abusing the trust that investors put into him. Only if the investments turn sour, is the banker tempted to divert the remaining funds for his own purposes, or even to abscond with the money.<sup>10</sup>

In this setting, it is claimed that allowing investors to withdraw their money whenever they want can reduce the banker's incentives to misbehave. If investors observe how well the banker's investments are doing, they can use this information to withdraw their funds when the investments are doing poorly while leaving their funds with the bank if the investments are doing

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<sup>9</sup> Calomiris and Kahn (1991).

<sup>10</sup> As explained by Akerlof and Romer (1993), such looting played an important role in the US Savings and Loan crisis of the 1980s. The Madoff and MF Global scandals provide more recent examples.

well. If investors receive the information in time and take their money out quickly, they can prevent the banker from misbehaving. In this setting, the ability to withdraw their funds at the right time makes investors willing to entrust the banker with their money.

The mathematical model that formalizes this story is interpreted as a *theory of bank funding by demand deposits*. Demand deposits that can be withdrawn at any time are used to fund banks, so the argument goes, because this form of funding allows investors to pull their money out when they see the bank's investments turning sour. By pulling their money out, the depositors in this theory prevent the banker from increasing their damage by absconding with whatever money is left.<sup>11</sup>

Other accounts of deposits as a source of discipline do not assume that withdrawals themselves are useful; indeed, they might cause harm by forcing the bank into a costly liquidation. However, bank managers are said to be better behaved if they are afraid of withdrawals. In these accounts, depositors monitor the managers and withdraw their funds if the managers don't behave the way depositors wish.<sup>12</sup> This is similar to Jim's parents trying to discipline him through a threat, such as that they would cancel the summer trip.

In one of these accounts, for example, the fear of depositors withdrawing their funds makes the bank manager refrain from being too soft with the bank's own loan customers. Being soft with a borrower may seem like a good idea when the borrower has fallen on hard times and asks for a delay, promising to pay later. However, if the borrowers anticipate such forbearance by the bank manager and manage their own affairs less carefully, the bank may end up with lower profits because too many loans will be in distress. The fear that depositors might withdraw

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<sup>11</sup> Alternatively, withdrawals might be useful because, with adverse information about the bank's investment prospects, it might be better to have the money invested elsewhere; see Postlewaite and Vives (1987), Chari and Jagannathan (1988), and Jacklin and Bhattacharya (1988).

<sup>12</sup> Diamond and Rajan (2000, 2001, 2012).

their money, it is argued, prevents the bank manager from succumbing to the temptation of softness towards the bank's loan customers. By strengthening the bank's ability to collect loan payments, this fear is claimed to support the bank's viability.

Whereas the theoretical analyses described here refer to demand deposits, short-term debt might serve the same function.<sup>13</sup> If the debt has to be repaid before the bank's investments mature, the bank depends on investors' willingness to roll the debt over, i.e. to renew their lending to the bank. The refusal of short-term creditors to roll the debt over would have the same effects as a withdrawal of demand deposits.<sup>14</sup>

#### **4. A Brief Reality Check**

The claim that short-term debt "disciplines" bank managers runs contrary to recent experience. In the years before the financial crisis of 2007-2009, as banks were building up enormous risks, they dramatically expanded the extent of their borrowing, relying in particular on short-term debt.<sup>15</sup> Creditors did not impose much discipline. As reported earnings and stock price increases contained the message that all was going well and there was nothing to worry about, creditors did not have strong incentives to discipline the managers.

One account of the financial crisis refers to US investment banks placing "debt-fueled bets on the market." Such bets involved "putting up \$1 ... and using \$30 of debt" to make risky investments.<sup>16</sup> In this account, debt is an instrument for gambling, rather than a force for

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<sup>13</sup> In Dewatripont and Tirole (1994a,b, 2013), the fear of not being able to meet short-term debt obligations makes managers work harder to make sure that investments will do well so that the bank will not lose its funding.

<sup>14</sup> The effect is sometimes attributed also to long-term debt, a fraction of which must be renewed periodically, but this has not been properly supported by formal analysis. See, for example, Calomiris (1999), and Poole (2010).

<sup>15</sup> See, for example, Turner (2010).

<sup>16</sup> Sorkin (2009, 169). Whereas leverage of US commercial banks and bank holding companies was somewhat limited by regulation from the Federal Reserve Bank and the FDIC, investment banks, which were regulated the Securities and Exchange Commission, were subject to softer rules. Under these rules,

discipline. Borrowing itself appears as a way of taking risks, a result of recklessness, the very opposite of discipline.

Funding by short-term debt eventually did break down in the crisis, when the risks had materialized and it became clear that banks were in trouble. By that time, however, the damage had been done. In light of this experience, the claim that reliance on short-term debt keeps bank managers “disciplined” sounds hollow.

If bankers felt disciplined by short-term debt, why would they economize on equity and fight so furiously against higher capital requirements? Wouldn't additional equity allow them to be laxer and enjoy a quiet life as the quote from Squam Lake Report suggests? Does this “debt-as-disciplining” theory actually work, and if so, how?

### **5. Can Creditors Do Better than Jim's Parents?**

Our previous discussion of Kate, Steve, and Jim suggests that discipline may not be easy to impose. Kate and Steve cannot change their son Jim's behavior when they don't have the necessary information and when they don't have a credible threat.

Just as Kate and Steve do not have much information about Jim's behavior in college, depositors and other creditors usually do not have much information about the bank managers' actions. In banking, investments can be reshuffled very quickly and even supervisors spending a lot of time at the bank have trouble keeping track. The cases of Lehman Brothers, Madoff, MF Global and other banking scandals exemplify the difficulties.

One important difference between the bank's investors and Jim's parents is that the bank has many investors, while Kate and Steve are parents acting together. For Kate and Steve,

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they could use their own risk models to determine the required equity, and they were allowed to hide risks in off-balance-sheet “special purpose vehicles;” see, for example, Acharya et al. (2013). The same kind of lax regulation allowed European banks to have very high leverage; see UBS (2008), Hellwig (2009), Acharya et al. (2013), Thiemann (2013).

collecting information about Jim may be difficult but, if they could do it, they might consider it worth the effort. For one of numerous, possibly a million or more investors of a bank, this is less clear.

The bank's investors do not usually act together. To know when they should withdraw their money, they must individually spend time and effort monitoring the banks. Why would an individual investor do that? Wouldn't it be easier to just wait and see what others find out? If an investor monitors the bank and thereby contributes to disciplining the manager, all investors benefit, but the investor bears his own costs. This situation gives rise to a temptation to "free ride," letting others do the monitoring and benefiting from the resulting good behavior of the manager. If everyone tries to "free ride" on the monitoring efforts of others, of course, there will not be much monitoring.

The free-rider problem can be overcome if individual creditors want to make sure that they are first in line to get their money out if something goes wrong. With payments made on a first-come-first-served basis, demand deposits and other forms of short-debt can be thought of as devices for creating incentives to spend time and money on monitoring in order to avoid coming after the others.<sup>17</sup>

However, even under a first-come-first-served rule, depositors and other short-term creditors will not do much monitoring if the scenario in which the information from monitoring is useful seems unlikely. For a creditor, the only possible concern is one of actual default by the bank. In a realistic scenario, this is only relevant if the creditor is not insured by the FDIC or if he is insufficiently protected by collateral. Even creditors who are not insured by the FDIC and who are not protected by collateral may feel that the risk of default is remote and therefore there is no need to spend much effort on monitoring the bank.

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<sup>17</sup> See Hellwig (2005).

Creditors might in fact rely on freely available information from other sources. For example, they might glean information from the bank's stock price if the shares are traded on an exchange. The bank's shareholders have much stronger incentives than creditors to gather information.<sup>18</sup> Whereas creditors don't care what the manager does as long as the debts are paid, the bank's shareholders are impacted by everything managers do. The bank's stock price will generally reflect the information gathered by analysts and stock investors, as well as public information. If stock prices provide favorable information about the bank, creditors may infer that things are going well and that default is unlikely. Then they have little reason to do their own monitoring.

Events in the years before the financial crisis of 2007-2009 support this account of creditors' behavior. During these years, earnings reports and stock price increases contained the message that all was going well and there was nothing to worry about. The reassessment in 2008 was partly driven by general news and rumors and partly by stock price developments.

The theoretical accounts of demandable debt (or other short-term debt) as a disciplinary device do not allow for the stock market as a source of information. Most of them actually do not even allow for or consider outside equity at all.<sup>19</sup> Those that include outside equity assume that information is freely available to all investors.<sup>20</sup> The problem of how creditors come to have the information they need to engage in the purported discipline is neglected or trivialized. The possibility of creditors free riding on the information of shareholders that is reflected in stock prices does not arise. Yet, whether and precisely how creditors have the relevant information is central to whether creditors actually have a plausible way to provide discipline.

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<sup>18</sup> Calomiris and Kahn (1991) note in their final section that "equity trading could conceivably provide a superior disciplinary alternative to demandable deposit and contingent liquidation."

<sup>19</sup> See for example Calomiris and Kahn (1991), Diamond and Rajan (2000, 2001, 2012).

<sup>20</sup> See for example, Dewatripont and Tirole (1994a, 1994b, 2013), as well as Diamond and Rajan (2000, 2001, 2012).

Going back to the example of Jim and his parents, suppose that Jim becomes romantically involved with Michelle, another college student. Michelle communicates regularly with her parents, and Jim's and Michelle's parents actually know each other and interact regularly. Interacting with Michelle's parents gives Jim's parents a sense of security, because they always hear that all is well. Their confidence is unwarranted, however, if Michelle's parents do not know or care about Jim's situation, or if they are misinformed by Michelle. Michelle might actually encourage Jim's sprees, or worse. By the time Jim's parents might learn that the college takes disciplinary action, possibly against Michelle as well as Jim, it would be too late for them to do anything.

Analogously, the banks' creditors and shareholders may have conflicting interests with respect to what managers should do. Specifically, shareholders may benefit, and stock market analysts may report favorably, when managers take risks with investments and with additional borrowing. Yet these risks come at the expense of existing creditors (or taxpayers).<sup>21</sup> The situation is analogous to Michelle's encouraging Jim's sprees and Michelle's parents not warning Jim's parents. As we discuss later, the conflict of interest between borrowers and creditors can help explain the love of short-term debt in banking better than any notion of "debt discipline."

## **6. Discipline can be costly**

The theoretical literature underlying the discipline narrative of bank funding by debt is silent about the costs to the bank and to society of investors suddenly withdrawing their funds from the bank. In some analyses, there are no such costs; sudden withdrawals merely prevent

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<sup>21</sup> Dewatripont and Tirole (1994a,b, 2013) emphasize the natural alliance of management with shareholders and the natural conflict of these two with creditors.

embezzlement and are therefore costless, in some cases even socially beneficial.<sup>22</sup> In others, sudden withdrawals and bank runs are costly, but the costs are irrelevant because sudden withdrawals and runs occur only if the banker doesn't behave, and the fear of withdrawals itself is enough to ensure that the banker behaves properly; moreover, all investors in these models are well informed so there are no inefficient runs caused by false rumors or other forms of misinformation.<sup>23</sup>

In the real world, of course, sudden withdrawals and bank runs can be very costly and inefficient. If there was just a single investor in the bank, he might compare the costs and benefits of pulling his money out and choose to leave the money with the bank if that seems more advantageous. If this behavior is anticipated by the bank manager, he will not be intimidated by the investor's threatening to pull his money out of the bank. This is akin to Jim not being intimidated by Kate's and Steve's threat of canceling the trip around the world when the costs to themselves are too large.

For the debt-as-discipline theory to work, it must be the case that short-term creditors do not expect to be paid by the government when the bank is unable to pay them what it owes. In that case, when there are many investors, an individual investor might decide to withdraw his funds because he is afraid that other investors might be pulling out, which might force the bank to be liquidated. In this case, the investor would want to withdraw quickly, before the bank is closed, which would leave him only with a share of whatever remains for creditors in a resolution or bankruptcy process. Any consideration of the overall costs and benefits of

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<sup>22</sup> This is the case, e.g., in Calomiris and Kahn (1991). See also Postlewaite and Vives (1987), Chari and Jagannathan (1988), and Jacklin and Bhattacharya (1988).

<sup>23</sup> See, for example, Diamond and Rajan (2000, 2001, 2012).



liquidating the bank would be outweighed by the investor's fear of coming late in a run on the bank.<sup>24</sup>

Bank runs are rarely just the result of self-fulfilling prophecies. People get adverse information, which makes them think about how the bank is doing. This information is usually imperfect, particularly given the great difficulty anyone has of knowing everything about banks' investments and their value. Some of the information may be true and important, but it is difficult to disentangle what it means, and any creditor usually does not have the full story. In considering such imperfect information, the creditor will also think about what information others might have and how they might react. He might then decide to withdraw his funds right away because doing so seems to be the safest course of action. If sufficiently many investors do so, the bank may go into bankruptcy because it cannot come up with enough cash in time to replace the funding that is withdrawn.<sup>25</sup>

If many investors have adverse information, this may indicate that the bank is distressed or even insolvent and that it might actually be efficient to close the bank down. However, when information is imperfect, a run might force the bank to fail even in circumstances where investors collectively would be better off if the bank remained active.<sup>26</sup>

Such costs of relying on discipline by short-term debt are usually not considered by those who use the discipline narrative in the policy debate. Nor do they consider any additional costs that such breakdowns can impose on the rest of the financial system or the taxpayer.<sup>27</sup>

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<sup>24</sup> See R. K. Merton (1957), Bryant (1980), Diamond and Dybvig (1983).

<sup>25</sup> See Rochet and Vives (2004), Goldstein and Pauzner (2005). Their models of demand deposits and withdrawal strategies are based on the Morris and Shin (1998) analysis of currency attacks under incomplete information.

<sup>26</sup> See Rochet and Vives (2004). In the example with Jim and his parents, imagine the parents canceling the trip on the basis of false information about Jim's behavior in college.

<sup>27</sup> An exception is Dewatripont and Tirole (1994a, 2012). They emphasize the costs to society of banks being brought down by panics and runs and suggest that the problem of collective choice that banks'

The importance of such additional costs was evident in the crisis of 2007-2009: When the withdrawal of short-term funding forced Lehman Brothers into bankruptcy, the damage done to Reserve Primary, a leading money market fund, caused a run on major money market funds, which in turn forced the money market funds to withdraw their investments from other banks in the US and Europe; banks scrambling for cash tried to sell assets, which depressed asset markets worldwide. The stampede was only stopped when governments and central banks provided supports to the financial sector. If the short-term debt of Lehman Brothers was actually put in place in order to discipline its managers, exerting the purported discipline surely appears to have been quite expensive for society.

Since October 2008, much public policy has been based on the principle that a repetition of the Lehman Brothers experience is to be avoided by all means. With such a principle governing public policy, there is no scope for imposing discipline on bank managers by the threat of short-term creditors withdrawing their funds. Either the creditors don't withdraw because they count on the government to bail them out, or the bank can count on the government or central bank taking the place of short-term creditors should they withdraw in order to avoid a systemic crisis.<sup>28</sup>

Some criticize such interventions by governments and central banks because the supports distort the incentives of bankers and their creditors. However, once an important bank is in a crisis, it may be better for governments and central banks to intervene if doing otherwise might

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creditors have in imposing discipline be solved by prudential supervision rather than the first-come-first-served rule, which gives depositors individually the incentive to withdraw their funds when they receive bad information. This normative prescription presumes that the effects of the first-come-first-served rule are in fact blunted and runs eliminated by deposit insurance.

<sup>28</sup> As we explain in Chapters 4 and 9 of Admati and Hellwig (2013), since the advent of deposit insurance, deposits have become a very stable source of bank funding; runs by depositors have become extremely rare. Wholesale creditors such as money market funds are more sensitive to risks of the banks they lend to but, when in 2011, US money market funds withdrew their funding from European banks, the European Central Bank stepped in and provided liquidity support.

cause even greater damage to society.<sup>29</sup> This consideration is neglected in the literature on the desirability of using debt as a disciplining device, because, as explained above, this literature does not consider the social costs of the scenario in which the disciplining mechanism is actually invoked, which involves depositors and other short-term creditors suddenly withdrawing their funds from banks.<sup>30</sup>

## 7. The Liquidity Narrative of Short-Term Bank Debt

Whereas adherents of the discipline narrative of short-term bank debt often criticize the support that governments and central banks provide to the creditors of private banks' in a crisis, adherents of a competing "liquidity narrative" welcome this support.<sup>31</sup> In the liquidity narrative, banks rely funding with short-term debt because the banks' creditors find this form of funding particularly convenient and are willing to pay for the convenience by lending under more favorable conditions.<sup>32</sup>

According to the liquidity narrative, creditors of banks appreciate the ready availability of deposits and short-term bank debt. They value this availability, for instance the ability to make withdrawals from demand deposits at any time because they do not know in advance when they

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<sup>29</sup> As we discuss at the end of Chapter 5 of Admati and Hellwig (2013), there have been efforts, for example through Title II of the Dodd-Frank Act as well as in the UK, Germany and elsewhere, to create special resolution mechanisms for institutions whose default could harm the financial system and the economy. The idea is to improve over standard bankruptcy or insolvency legal procedures to prevent the collateral damage of the failure. For large global financial institutions, however, having a proper mechanism across national borders is very challenging and even the best mechanism is likely to be disruptive and costly.

<sup>30</sup> The Squam Lake Report proposes to square the circle by having banks rely on contingent capital, which is debt that would convert into equity "just in time" to deal with solvency problems and make bailouts superfluous. This contingent capital, however, involves *long-term* bonds, rather than short-term debt. Why such long-term debt should impose discipline on managers is not explained. Some discipline may perhaps be expected when the debt expires. However, if the maturities are long, the fraction of debt expiring each year will be small, and so will be the disciplining effect. If the maturities are short, the disciplining effect might be there, but the risk of a breakdown from a run would also be high.

<sup>31</sup> Diamond and Dybvig (1983), Gorton (2010, 2012), Gorton and Metrick (2010), Mehrling (2010).

<sup>32</sup> For an extensive discussion of the liquidity narrative, see Chapter 10 of Admati and Hellwig (2013).

will need cash. They also use their deposits for making payments without cash, by checks, bank transfers, credit cards, or debit cards. In a previous era, bank customers also used banknotes, which banks issued in return for deposits of gold. These notes obliged the issuing banks to pay the indicated amount of gold to whoever presented the notes for repayment. As means of payment, such notes were very convenient, much more so than the gold itself, like a kind of money.

For bank deposits and other short-term loans to the bank to serve as a kind of money, it is important that the bank is deemed to be safe so that its debt has a known and agreed upon value. In this case, the debt is said to be “informationally insensitive:” because nobody doubts the bank’s ability to pay, new information does not affect the value of the debt. Debt that is informationally insensitive can readily serve as basis for payments because everybody knows its value and trusts that a banknote or a check will be redeemed in due course. Consequently, bank debt can be used like money.

The notion that short-term bank debt is informationally insensitive stands in direct contrast to the discipline narrative. In the discipline narrative, depositors and other short-term creditors of banks are worried about the prospect of bank default and monitor the bank in order to withdraw their funds quickly when problems arise. This monitoring is necessary for disciplining the bank’s managers. In this narrative, the information that depositors and other short-term creditors obtain by monitoring matters for their assessment of the safety of the debt, i.e., the debt is informationally sensitive.

By contrast, in the liquidity narrative, default is so unlikely that additional information does not matter to debt holders. Because the debt is informationally insensitive, nobody invests in monitoring. Because nobody invests in monitoring, nobody fears that the banknote that is used

for payments might be tendered because the other party is taking advantage of extra information that it might have.<sup>33</sup>

In the liquidity narrative, the possibility that the bank might default is not altogether ignored. However, default is seen as an abnormal event, one that is highly damaging to liquidity even before it actually occurs. When a bank is in trouble, its debt ceases to be informationally insensitive, and its creditors have strong incentives to monitor what is going on. In this situation, the bank's debt is no longer treated like money. Banknotes for example are likely to trade at a discount, which may have to be quite large in order to overcome the participants' fear of being taken advantage of by people with better information. Or they may not trade at all because potential buyers are afraid to take them at any price.

Given the social costs of such breakdowns of liquidity, adherents of the liquidity narrative welcome government guarantees and central bank interventions in support of bank debt and asset prices.<sup>34</sup> The prospect of such support would extend the informational insensitivity of a bank's debt even to circumstances where the bank is in trouble. For investors, this extension would have the advantage that the debt he holds remains liquid and its value is readily realized even when there are doubts about the bank.

In the academic literature, the liquidity narrative and the discipline narrative provide two competing approaches to the prevalence of short-term debt in bank funding. They offer conflicting accounts of why banks rely on short-term debt, as well as conflicting policy prescriptions. In the discipline narrative, short-term creditors are constantly on the watch and thereby impose discipline on bank management; in the liquidity narrative they are happy that they do not have much to worry about. In the discipline narrative, deposit insurance and other

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<sup>33</sup> In addition to Gorton (2010, 2012), see Dang, Gorton, and Holmström (2010).

<sup>34</sup> Gorton (2010, 2012), Gorton and Metrick (2010), Mehrling (2010).

forms of guarantees represent major distortions; in the liquidity narrative, guarantees are highly desirable. These conflicts between the two narratives have not been much addressed.<sup>35</sup> We shall return to this issue in the concluding section.

## **8. Providing Liquidity Does Not Require High Leverage**

Like the discipline narrative, the liquidity narrative is sometimes seen as supporting the view that banks be highly indebted. Banks are said to be different from other firms because they fund with deposits and other forms of short-term debt that their creditors value for its liquidity. Some of the benefits that banks bring to the economy are thus tied to their debt.<sup>36</sup> It might therefore seem that the economy benefits most if banks issue as much liquid debt as possible. If this were true, limits to the leverage of banks might be harmful.

However, this view pays insufficient attention to the risks of banks from their investments. Banks do not keep the funds they obtain as a cash reserve. Most of the funds are used to make loans or other investments, another important benefit they provide to the economy.

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<sup>35</sup> Calomiris and Kahn (1991) set up the discipline narrative in competition to the liquidity narrative. However, their discussion is limited to the special version of the liquidity narrative treated by Diamond and Dybvig (1983), where bank runs occur only as a result of self-fulfilling expectations, without any substantive reason. Since the empirical record shows runs to be induced by adverse information, they conclude that the discipline narrative dominates this special version of the liquidity narrative. The empirical record does not, however, enable them to distinguish between the discipline narrative and a liquidity narrative involving incomplete information as in Rochet and Vives (2004) or Goldstein and Pauzner (2005). For an overview of the empirical record, see Calomiris and Gorton (1991).

<sup>36</sup> This view is extensively discussed in Chapters 4 and 10 of Admati and Hellwig (2013). Gorton (2012), which appeared too late to be covered in Admati and Hellwig (2013), actually refers to banks being in the business of producing debt as their output, with (equity) capital and investments serving as inputs. The terminology provides an intriguing metaphor but its meaning is unclear. Ordinarily, relations between inputs and outputs in production are specified in terms of input requirements for a desired level of output. Debt, however, can be produced simply by writing an obligation, a promise or IOU, without any change in equity capital or investments. We also think about production relations in terms of increases in inputs raising the output. With given investments, however, an increase in equity capital would lower the level of debt, albeit the debt would be of a higher quality because the risk of default would be lower with relatively more equity and thus less indebtedness. With a given amount of equity capital, an increase in investments would require an increase in debt, but the quality of debt would decrease, because default risk goes up with higher indebtedness. Nor is it clear how the bankers' choices of investments and investment risks would fit into Gorton's framework

In making loans and other investments, the money that banks owe their depositors and creditors is put at risk, and the bankers have control over the risks that are taken. What guides their decisions and what happens if the risks turn out badly? These questions bear directly on the ability of banks' debts to provide liquidity.

In fact, the use of more equity *enhances* the liquidity of bank debt. If the bank has enough equity to absorb its own losses, then its creditors can still trust that they will be paid, and the liquidity provision by the bank need not be disrupted. But if the bank has little equity, it may become distressed or insolvent, and may even default on its debts if the government allows it to fail. If the bank's depositors or other creditors become concerned about the bank's solvency and fear it might not pay them, the debt would no longer be as trustworthy, and its liquidity might be harmed because others might not be willing to accept it as "money" with known value.<sup>37</sup>

Having more equity need not interfere with the banks' ability to take deposits or issue short-term debt, because banks can increase their equity levels without reducing any of their debts. For example, banks can retain their earnings, or they can sell new shares to investors. With more equity, the bank is less vulnerable, and thus it can continue providing liquidity as well as making loans even after it incurs some losses. Less indebted banks are more trustworthy and better able to provide liquidity to their customers.<sup>38</sup>

It is therefore false to presume that the usefulness of bank debt in providing liquidity necessarily means that banks must be as highly indebted as they are or as they find attractive. Banks would actually enhance their ability to provide liquidity if they retained their earnings and raised more equity to become relatively less indebted. Remaining highly indebted may benefit

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<sup>37</sup> Gorton's (2012) view of capital as an input into the "production" of debt (see fn. 34) seems to be motivated by a similar logic, but he does actually discuss the impact of equity capital on the allocation of risks from investments.

<sup>38</sup> On this point, see also Admati, Conti-Brown and Pfleiderer (2012).

bankers and their shareholders but it harms banks' creditors and in fact interferes with banks' ability to provide liquidity without needing support. High indebtedness actually increases the likelihood of panics and runs.<sup>39</sup>

### **9. A Lack-of-Discipline Explanation of Bank Indebtedness**

Both the discipline and the liquidity explanations of why banks choose to rely on so little equity and so much short-term debt seem to be based on the presumption that if we see something that persists for a long time, it must be efficient. Because banks have for centuries been funding with a lot of short-term debt and avoiding the use of equity, it is presumed that there must be a "good" reason for it.

This presumption is problematic. In our book and in earlier writings we offered an alternative explanation of why banks use so much short-term debt and avoid equity. According to this alternative explanation, banks' extensive reliance on short-term debt and avoidance of equity may well be inefficient, socially and perhaps even privately, for the banks themselves. Specifically, the high indebtedness of banks and their extensive use of short-term debt can be explained as a result of flawed incentives of the banks.

Consistent with the liquidity narrative, we suppose that some of the banks' debt, such as deposits, is valuable to banks' customers and to society because of the convenience and liquidity it offers. Depositors and other short-term creditors are willing to pay fees or accept lower interest

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<sup>39</sup> According to Gorton (2010, 2012), panics and runs have to do with a breakdown of funding and a lack of cash, rather than a lack of capital. To support this view, Gorton (2012) cites the September 2008 run on Lehman Brothers and the breakdown of US dollar funding of European banks in the summer of 2011. He overlooks the possibility that such breakdowns may be motivated by concerns about bank solvency. Lehman Brothers had many risks that were hidden off its balance sheet, and the bank's equity capital was insufficient to absorb the losses. The European banks had very low levels of capital and were threatened by writedowns on Greek sovereign debt; even with liquidity support from the European Central Bank, the Belgian-French bank Dexia was de-facto insolvent and needed support from its governments.



because of the convenience of this liquidity, and the payment system that relies on bank deposits is beneficial in making transactions easier and cheaper.

However, the fact that some of banks' debt provides liquidity benefits does not explain the observed funding mix of banks, which usually have debt exceeding 90 or even 95 percent of their assets, a ratio that is much higher than with nonfinancial companies, and even most hedge funds. As we saw in the last section, liquidity provision by banks would actually be improved if they had more equity so that their debt would be safer.

The reason banks have so much debt and so little equity is not that this funding mix is necessary for the benefits banking provides to the economy but rather that banks *choose* to be so fragile for their own reasons. Their choice reflects a fundamental conflict of interest that arises between borrowers and creditors once debt is in place, the so-called *debt overhang effect*. Once debt is in place, a borrower can benefit by taking additional risk or adding to his borrowing, and some of these benefits come at the expense of the earlier creditors (or anyone guaranteeing the bank's debt).

Overhanging debt is known to color the choices of all borrowers, and particularly heavy borrowers.<sup>40</sup> Borrowing creates a bias towards additional borrowing and risk-taking relative to a situation in which debt has not yet been undertaken. As a result, borrowing can be "addictive" through a ratchet effect: if possible, a borrower may increase his indebtedness, but he will generally resist reducing it.<sup>41</sup>

Because banks borrow a lot, the borrower-creditor conflict is particularly intense for them, and it may not be resolved efficiently. This conflict can explain why banks have always

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<sup>40</sup> Debt overhang, which was first studied by Myers (1977), is extensively discussed in Chapters 3 and 8 of Admati and Hellwig (2013) and in Admati et al (2011, 2012).

<sup>41</sup> This effect is discussed in Admati et al (2012) and Chapter 3 in Admati and Hellwig (2013), which also for references to earlier literature.

been highly indebted. There is no reason therefore to believe that the level of bank indebtedness that we observe is efficient.

To limit the effects of debt overhang, creditors may try to impose additional conditions, such as a prohibition of borrowing that would have higher or equal priority as themselves. Such a prohibition, however, would still leave room for new debt that has lower priority. If new debt has a shorter maturity, however, it will be paid before the older debt, effectively gaining in priority. The only way for creditors to protect themselves against such behavior is to lend only at very short maturities.

Banks' reliance on short-term debt can therefore be seen as the result of a "maturity rat race" rather than any efficiency benefits from enhanced discipline or liquidity.<sup>42</sup> From this perspective, the expansion of short-term borrowing by banks in the years before 2007 reflects the very opposite of discipline, the lack of a mechanism constraining the effects of debt overhang and the rat race to continue borrowing at shorter and shorter maturities.

Much of the expansion of bank borrowing in the years before the crisis took the form of so-called repo (or "repurchase") contracts, under which the bank "sold" assets to a partner and immediately repurchased them for a date in the near future, often the next day. This was effectively a form of borrowing with collateral, but because the contract was treated legally as a combination of a sale and a repurchase, the lender was protected from a bankruptcy of the borrower; if the borrower went into bankruptcy, the lender would just "own" the collateral without having to go through the bankruptcy procedure. The assets given to the lender would of course not be available to satisfy any of the other lenders' claims in bankruptcy. Thus repo borrowing can also be seen as a way of taking advantage of other lenders, in particular those lenders who are not protected by any collateral.

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<sup>42</sup> See Chapter 10 in Admati and Hellwig (2013) and Brunnermeier and Oehmke (2013).

Debt overhang effects arise in nonfinancial companies as well as in banks. For banks, however, they are particularly pronounced because their indebtedness is so high, and the addiction to debt is therefore ever stronger. Moreover, nonfinancial companies often borrow from banks, usually just a few, which coordinate their lending to impose significant constraints on their debtors' borrowing, but banks' creditors tend to be dispersed and unable to impose much control to prevent the bank from diluting their positions. If they feel protected by short maturities and repo collateral, they may not even see the need to exert control. This does not mean, however, that the high indebtedness of banks is efficient; all participants might well be better off if banks were better able to commit themselves to not give in to future temptations to issue more debt at the expense of existing debt.

The detrimental effects of debt overhang in modern-day banking are exacerbated by the presence of explicit and implicit government guarantees and other subsidies of debt. Guarantees encourage and enable borrowing and risk taking, because creditors who are protected by the guarantees are not much concerned with additional borrowing and risk taking by banks.<sup>43</sup> Particularly in the presence of these guarantees and subsidies to bank borrowing, the most important governance problem in banking is that between bank managers and the banks' creditors or taxpayers.<sup>44</sup> These governance problems are further reinforced by compensation structures that are based on such measures as earnings or return on equity (ROE) over a period of time and that give bankers direct incentives to prefer borrowing and avoid using equity.<sup>45</sup>

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<sup>43</sup> See Chapter 9 in Admati and Hellwig (2013).

<sup>44</sup> The main beneficiaries from resisting industry-wide reductions in leverage are likely to be bank managers and those whose wealth is primarily tied to the bank. The impact of excessive borrowing on shareholders is not clear. Some shareholders, like managers, benefit more fully from the upside at the expense of others, but diversified shareholders likely lose. The excessive fragility of banks and the banking system affects their other holdings and affects them as taxpayers. See Admati et al. (2012) and Anat Admati, "The Great Bank Escape," *Project Syndicate*, December 31, 2012.

<sup>45</sup> See Chapter 8 in Admati and Hellwig (2013).

It is therefore not difficult to explain the choices made by bankers regarding the extent of borrowing and their resistance to reducing indebtedness through capital requirements. Whereas the discipline and liquidity narratives accept, or even justify, the fragility of banks as unavoidable or essential to the benefits banks bring to society, our explanation of why banks choose to be fragile reaches the opposite conclusion. Banks choose to be fragile for their own reasons and despite the fact that their fragility is highly *inefficient* for society and creates many distortions. Contrary to the theories of debt as discipline, our alternative theory is that high indebtedness in banking is due to a *lack* of discipline.

#### **10. “I’ve got a theory!”**

In engaging with regulators, we have heard both discipline and liquidity explanations of short-term indebtedness of banks being advanced as reasons why bank equity should not be raised beyond current proposals. The fact that the two narratives are inconsistent with each other and that they lead to conflicting policy recommendations did not seem to be noticed. Nor was much attention paid to the possibility that observed high levels of short-term indebtedness of banks might be due to effects such as debt overhang and subsidies, which create a wedge between what banks choose and what is good for the economy.

The existence of competing theoretical explanations for the same empirical phenomenon, begs the question which explanation is right. How can we distinguish between the different explanations and decide which one is valid? Empirical validation is especially important if different explanations lead to conflicting policy recommendations.

Theorists are not used to dealing with empirical validation. Much theoretical work is limited to articulating a hypothesis, such as “debt is needed to discipline bankers,” writing down a formal model, with a set of assumptions and a mathematical proof that, within the confines of

the model, the hypothesis is confirmed as it is logically implied by the assumptions. The conclusion then is that the hypothesis “explains” the phenomena to which it refers. The implication, often stated explicitly, is that the consistency of the theory with observed phenomena makes the theory true and valid in the real world.

However, the leap from “this theory generates results that are consistent with phenomenon X” to the statement “this theory *explains* phenomenon X in the real world” is a non sequitur. The consistency of a theory with observed phenomena is a necessary but not a sufficient condition for an empirical validation of the theory.<sup>46</sup>

If there are multiple competing theories, one must choose between them. Ideally, this is done on the basis of a thorough empirical investigation. Such an investigation may not always be possible, e.g. because the requisite data are not available. Moreover, since theoretical models are highly simplified abstract constructions, it may not always be clear how precisely the theoretical analysis relates to the data that are available.

In one sense, no theoretical model in economics can ever be fully validated empirically. All such models involve assumptions that are counterfactual. Theories and models are useful precisely because they make such assumptions and the simplifications that the assumptions provide allow us to better understand the point that the models are designed to explain. For empirical validation therefore the question is not whether the model is realistic but whether there is any reason to believe that the insight provides by the model is likely to remain relevant if the assumptions of the analysis are changed.

For example, a theory that “explains” the use of demand deposits as a device for disciplining bankers should not depend on the assumption, made in some of the literature, that

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<sup>46</sup> This point, which is taken for granted in other sciences, has been made very forcefully in Sutton (1990, 1991).

perfect information about the bank is available to depositors without any cost. As explained above, important parts of the discipline narrative for explaining the use of demand deposits do not pass this test. If depositors must spend time and effort to get information and if the information they get is imperfect, the use of demand deposits for bank finance may not contribute much discipline but may lead to costly runs.

Proceeding from a theoretical assessment of robustness to an empirical “smell test,” we have noted that the experience of the past decade suggests a lack-of-discipline explanation of short-term debt finance of banks rather than a discipline explanation. At a more elementary level, one might also observe that the debt-as-a-source-of-discipline models of bank finance assume a single person managing the bank, which has one line of activities, and in the model, there are no internal conflicts of interest such as those that might arise between the bank’s management and individual traders, or between different members of the bank’s board, who might be in competition to become CEO. The complexity and opacity of modern banking institutions is easily seen through by the current or potential future executives.<sup>47</sup> The authorities’ difficulties in the crisis, in just trying to figure out what banks’ balance sheets were, suggest that in reality, information is much more difficult to attain than the debt-as-discipline literature would have us believe.

Stripped-down versions of theoretical models are often used as building blocks in even more complex quantitative models, which are then used to produce “numbers” for policy, such as

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<sup>47</sup> For some specific questions in the context of the model in Diamond and Rajan (2001), see Paul Pfleiderer’s presentation “Reducing the Fragility of the Financial Sector: The Importance of Equity and Why it is Not Expensive,” at Norges Bank, November 29, 2012, available at <http://www.gsb.stanford.edu/sites/default/files/research/documents/Norges%20Bank%20Macroprudential%20Regulation%20Workshop%20Pfleiderer%20For%20Distribution%20%281%29.pdf>

the best level of equity banks should be required to use.<sup>48</sup> If the theoretical models are flawed or invalid, quite likely the numbers are useless.

Here again, the issue is not whether the models are realistic. A hiker's map provides orientation even though it does not provide a precise representation of the landscape. A really precise map would require a scale of one mile for one mile, which is useless. However, knowing that, to be useful, a map must have *some* distortion of reality should not lead us to believe that *any* distortion should be considered acceptable. The famous "map of the world as seen from New York's 9<sup>th</sup> Avenue," with vastly different scales for different areas, provides a wonderful wall decoration but is not suitable for orientation in traveling.<sup>49</sup> The use of flawed theoretical models as a basis for quantitative analysis resembles the use of the "map of the world as seen from New York's 9<sup>th</sup> Avenue" for orientation in traveling through the American Midwest.

Whereas theoretical myths and mathematical models can be fun, they do not advance science or provide useful orientation for policy. For policy, it is important that any models or theories that are used should capture the salient features of the real world and that the discussion focus properly on the social costs and the benefits of the policy alternatives. Flawed theories and flawed models are likely to do more harm than good. So are quantitative studies that start from such models. The fact that such studies end up with precise numbers for "optimal" capital regulation is irrelevant if the foundations of the studies are shaky.

We are not aware of any theory or model that would be provide appropriate estimates of the costs and benefits to society associated with different funding mixes for banks. But not

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<sup>48</sup> These are mathematical models with numerical parameter specifications taken from various empirical sources. Whereas the parameter values have some empirical basis, the models themselves are theoretical fictions. For example, van den Heuvel (2008) presents an analysis of the costs and benefits of bank capital requirements in a setting without money markets funds or investment banks, without interbank borrowing and lending, and with counterfactual specifications of the effects of bank size on costs and of overall risks in the economy.

<sup>49</sup> *The New Yorker*, March 29, 1976. See also *The United States of America as Seen by a New Yorker*.

having a precise estimate of the optimal equity requirement does not imply that we should refrain from asserting that equity levels on the order of two percent of total assets, as seen with some large European banks, or of three percent of total assets, as admitted by Basel III, are unsafe and that a significant increase will substantially improve the health and safety of the financial system.

Imagine a mountain hiker on a glacier walking up to the crest and coming to stand on a cornice, a snow overhang, without noticing the void underneath.<sup>50</sup> When warned of the danger, would he insist that we provide a precise, mathematically based estimate for where it is best to stand, balancing the tradeoff between seeing the view of the valley below and the risk of the cornice breaking off and taking him down to his death? Or would he step back right away to enjoy the view from a safe distance away from the edge especially when there is no way of telling where the overhang actually begins?

Similarly, even though we do not have a mathematically based estimate of the optimal capital requirement, we can confidently say that it is highly beneficial to move away from the dangerous and distorted financial system that we have and require banks to become much less highly indebted. There are virtually no healthy nonfinancial corporations in the economy that consistently maintain equity levels much below thirty percent of their total assets, and there is no reason banks and other financial institutions should be allowed to fund themselves so unsafely. Banks choose these levels for reasons that are entirely private to them, which include large subsidies to their borrowing without producing any benefits for society.

The current and proposed equity levels of major banks, which can be as low as on 3 percent of banks' total assets, expose the banks and the overall financial system to substantial and unnecessary risk. Not recognizing and dealing with insolvent "zombie" banks also bears great dangers. Taking active steps to eliminate these zombie banks and to strengthen viable

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<sup>50</sup> We are grateful to Paul Pfleiderer for suggesting this type of example to make the point.



banks would provide immediate benefits to the economy. Highly indebted, and especially distressed or insolvent banks, do not make appropriate loans and do not support the economy well. Allowing banks to rely as much on subsidized borrowing distorts the economy. The tendency of banks and other financial institutions to borrow excessively and thereby impose substantial risks on creditors, taxpayers and the overall economy must therefore be counteracted by well-designed and effectively-enforced regulation.

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