Thank you for inviting me to deliver the AEA/AFA luncheon speech. I am especially happy to be here because the President of the American Finance Association, David Scharfstein, was one of my thesis advisors, while Olivier Blanchard, the President of the American Economic Association, taught me macroeconomics at MIT. It is indeed a singular honor to be asked to speak in front of your teachers, but I am also glad to have co-authors, friends, and colleagues like Doug Diamond and Luigi Zingales here.

I started my research career in banking nearly thirty years ago. This was a time when interest in banking was vanishingly small. At the AFA meetings, the hall emptied whenever a banking session was announced, with people grabbing their belongings and rushing for the exits before they were subjected to a long discourse on panics and bank runs. I came to realize that they panicked, not because the subject matter was boring, but because much of this work was thought of as the proper realm of economic history. After all, there had been no system wide panics in the industrial world for over half a century. Of course, there is nothing wrong in studying history, but since 2007, banking has moved from the pages of history to the nightly news. Today, it is hard to have a discussion in macroeconomics, macro-finance, or development, without referring to banks.

Given this interest, I feel confident I will not empty this hall immediately as I turn to two issues that have become salient in today’s economic discourse; liquidity and leverage. I have been thinking about these issues for much of my professional life, largely in work with Douglas Diamond, but also with others in the room. I certainly also owe an enormous debt to researchers in the room, which I will not be able to acknowledge in the short time available – hopefully the papers that are listed in the presentation on my website do that.

Everyone here knows that a bank’s issuance of short-term demandable or overnight claims in order to finance illiquid loans leads to panics. Since the dawn of banking in Assyria and Sumeria, long before we had central banks, deposit insurance, or a tax advantage to debt, banks have had this structure, and critics have been troubled by it, as they are today. Yet the structure has endured. The main point I want to make today, based on work with Doug Diamond, is that this structure of banks – financing illiquid loans with short term or demandable debt -- is not just a bug in the system, it is also a feature.¹

Let me explain why, after which I will argue that this does not rule out equity financing – indeed there is a trade-off whereby banks will optimally have some equity in their capital structure. What we are saying, though, is that mandating very high equity capital levels comes at a cost to bank activity.

Bank Illiquidity and Demandable Debt

[Slide 2] Let us start by describing the functions a bank performs as simply as possible. We consider a one-period risk-neutral world of symmetric information, where an entrepreneur has a project in need of funding. Each entrepreneur has specific abilities vis a vis his project so that the cash flows he can generate exceed what anyone else can generate from it. The entrepreneur needs financing. We build on the notion from Hart and Moore (1994) that human capital is inalienable, that is, no one can

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contractually bind themselves beyond a certain point. So, for example, having borrowed and invested, the entrepreneur can threaten to quit and not produce project cash flows C unless the financier negotiates his debt claim down. An outside financier can extract repayment only by threatening to take the assets away and sell it to the second best producer from the project, whom we assume can produce only βC where β < 1. As a result, the financier can extract a repayment of only βC, and assuming the prevailing interest rate is 0, this is how much he will lend up front. Thus projects are illiquid in that they cannot be financed to the full extent of the cash flows they generate – they get βC in financing, which is less than C.

Financing also requires skills, and financiers can differ in their abilities. A financier who lends at an early stage of a project knows how the project is set up, and thus learns how best to re-deploy the project’s assets – that is, he has a better sense of who the second best producer might be. Such a relationship lender has a greater ability to lend to the project than others, because he has a stronger liquidation threat. Let us assume others can extract only \( \frac{2\beta C}{3} \) if they were to negotiate directly with the entrepreneur – they can identify only third-best producers, for example. So here we have the fundamental problem of intermediation. If the financier does not have enough money of his own, and wants to borrow from others to fund the loan to the entrepreneur, the amount he can raise from outsiders, or that he can get if he sells the loan, will be \( \frac{2\beta C}{3} \), which is less than the present value of the payments he can extract from the entrepreneur of βC. The loan is also an illiquid asset precisely because the financier cannot commit to using his specific abilities on behalf of the less capable outsiders.

[Slide 3] Thus the source of illiquidity of the real asset (the project) and the financial asset (the loan to it) are the same: an agent’s specific abilities, which lead to non-pledgeable rents. In the case of the project, it is the entrepreneur’s greater ability to run it relative to a second best operator, which earns him a rent of \( (1 - \beta)C \). In the case of the loan, it is the relationship lender’s better ability to recover payments relative to anyone else, which earns him a rent of \( \frac{\beta C}{3} \).

[Slide 4] There is, however, a way the financier can pledge out his rents and borrow the entire \( \beta C \) against the loan, something we will argue the entrepreneur cannot do. A demand deposit is a fixed claim with a sequential service constraint, whereby depositors who run on the bank get their money back in the order in which they approach the banker until he runs out of money or assets. We argue that if the financier sets up as a banker financed by \( n \) demand depositors totaling a face value of \( \beta C \), the banker cannot hold up depositors and, instead, has to pay them the promised amount.

Intuitively, the sequential service constraint creates a collective action problem among depositors, which makes them run on the banker whenever he tries to negotiate down their deposit claim. Because they run immediately, rather than enter into negotiation, this commits them not to make concessions to the banker and drives his rent to zero. I will explain why in a moment, but recognize that once the banker fears a run whenever he tries to renegotiate demand deposits, he can commit to pay the full

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value of the amount he collects from the entrepreneur, $\beta C$, to the depositors. This means he can raise $\beta C$ from them against the loan. The project loan the bank holds is no longer illiquid because the banker manages to tie his special ability to recover repayment to the loan, and drives his own prospective rents to zero.

[Slide 5] The interesting part of this theory is the aftermath of the run – and this is where we get mildly theoretical, so bear with me. After a run, the depositors or their receivers have seized the cash as well as the financial assets of the bank – that is, the loan to the entrepreneur. They are in direct contact now with the entrepreneur. However, the depositors together can only collect $\frac{2}{3} \beta C$ from the entrepreneur because they have inferior collection abilities. Can the banker sidle up to them and offer his collection services for a fee, thereby reinstating his rent? The answer is no. For the entrepreneur, seeing the banker hovering in the background, will do a deal with the depositors whereby the banker is shut out. The precise nature of the deal is unimportant, what is important is that the disintermediated banker has no ability to stop the deal or insert himself in it, and hence his rents are driven to zero.

Could the entrepreneur raise money directly from the public by issuing demand deposits, relying on the same disciplinary structure? If the entrepreneur precipitates a run, depositors will essentially have claims on the project. However, the entrepreneur is still the best person to run the project, and depositors cannot avoid negotiating with him and giving him his rents. Demand deposits thus do not discipline the entrepreneur. The reason for the difference in effects on the banker and the entrepreneur is subtle but important. Having made the initial loan, the banker is a pure transfer agent and contributes nothing to the fundamental process of value addition. His ownership of the loan when he is not run allows him to insert himself into collection, but if he is disintermediated, he is not needed. By contrast, the entrepreneur is critical to the project and value creation even after a deposit run, and cannot be ignored.

[Slide 6] Put differently, and perhaps more practically, banks that experience runs go into receivership and liquidation [the unhappy banker is Dick Fuld of Lehman], while entrepreneurs that go into bankruptcy renegotiate their debts and live happily ever after. Demand deposits discipline banks not firms.

Consider 6 implications of this theory:

1) The ability of bankers to borrow against the full value of their assets implies they have no problem paying depositors on demand, even when the entrepreneur’s cash flows are delayed. All they need to do is to borrow from another depositor, and the bank’s ability to commit allows them to do so easily. This means the disciplinary role of demand deposits is not at variance with its role in payments or in providing firms or depositors liquidity on demand, something critics have misunderstood. Indeed, as I said, it is the essential feature that makes both roles possible, even

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while financing illiquid assets. In contrast, ordinary firms cannot borrow against the full value of their assets.

2) What if the financier provided essential services, not just up front, but ex post? For example, a venture capitalist provides management guidance as she steers two kids in a garage to unimaginable wealth. Our model suggests that when the financier provides substantial ex post value, demand deposits do not discipline her. This is why venture capitalists are financed differently from banks, and typically have long-term finance. They also earn substantial rents for their services.

3) Conversely, many money market funds are liquid because of the intrinsic liquidity of their assets. Claims can be priced at market value every minute, and withdrawn on demand, but the fund manager contributes little to collection and there is no need to discipline him. Therefore, there is no need to maintain the nominal value of money market claims at a dollar, since demandability without marking to market creates fragility without adding liquidity.

4) We have assumed a world of certainty. Of course, a bank fully financed with demandable deposits or overnight debt would fail every time economic uncertainty hit the value of loans. As we argue in a follow-on paper, there is obviously a role for equity capital or long term debt to buffer demand deposits against such uncertainty, so that we do not have a run every time there are small adverse shocks. The point, however, is that the more the equity, the more the banker takes away in rents, and the less the bank can pass through. This is the trade-off that regulators have to make in setting capital requirements. Importantly, additional capital does not come for free – greater safety comes at a higher overall cost of capital. Capital structure irrelevance theorems do not apply to banks.

5) We have assumed a world of perfect information, where depositors do not accept any offer to renegotiate down – they constitute a hard budget constraint for the banker. To implement this, all that a small depositor needs to know is that the bank is open for withdrawals at face value. Of course, the depositors collectively want to know that the bank is solvent. In practice, large players like banks and financial firms like hedge funds, as well as their employees who trade, drink, and sometimes collude together, know a lot about the solvency of other large players in the system. This is why inter-bank runs and large depositor runs are invariably what precipitate broader concerns about a bank, and alert small depositors to run. Therefore, the information requirements of our model are not implausibly high, nor does deposit insurance for small deposits make our model irrelevant for the modern world.

This is also a good place to acknowledge our debt to an excellent paper by Charles Calomiris and Charles Kahn, where they argue that depositors collect information to stop banker fraud, and the first-come-first-served nature of bank deposits gives those who can monitor the bank powerful incentives to do so. Calomiris and Kahn’s depositors also monitor banker actions or strategies, which is not essential for our result. Our contribution to their seminal insights is to focus illiquidity

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on human capability, and most importantly, to explain why demandable deposits can discipline bankers but not firms. Indeed, those who argue that banks issue demandable debt because of some perverse agency problem associated with debt have to also explain why we don’t see ordinary corporations doing so.

6) Finally, monetary economists have argued that central banks should not shrink their balance sheets too much, now that they have got into the business of issuing safe short-term liabilities. They point out that if the central bank withdrew from such activities, banks would issue more short-term liabilities, incurring maturity mismatches, which would be risky. We agree, but we also believe such mismatches play a beneficial role in financial intermediation, and thus have an offsetting benefit. To crowd out the banks from this function may not be appropriate. Similarly, central bank issuance of electronic currency – essentially demandable deposits held by the public at the central bank – has the same crowding out effect, and this should be considered carefully before proceeding.

Any theory has critics, and ours seem to be particularly incensed because we suggest that bankers have a point when they argue that more equity is costly. What, for want of a better term I will call the “100 percent equity” camp wants is for banks to be financed with just equity – to set capital requirements sky-high. Essentially, this boils down to the claim that equity finance has as good governance properties as debt finance. There are probably three ways equity can be thought to work;

First, it is often argued that because equity is the residual claim, shareholders monitor the bank more closely than debtholders. This is the easiest to dismiss. Most banks have widely dispersed shareholders or indexers who rarely read the annual reports, let alone monitor. Indeed, Professor Martin Hellwig quotes a German banker saying, “Shareholders are stupid and impertinent – stupid because they give their money to somebody else without any effective control over what this person is doing with it, and impertinent because they ask for a dividend as a reward for their stupidity.”

Of course, large institutional investors may monitor banks, but it is hard to argue that they are in a better position to know a bank’s deficiencies than other bankers or hedge funds who do business with the bank every day. Furthermore, once they find the bank going off track, equity holders have to intervene by getting a sizeable majority on the board to support them. Short-term debt holders simply have to stop renewing loans, while depositors only have to withdraw their money. Debt governance clearly has a greater chance of being effective than equity governance.

A second argument for why equity works is that capital requirements are a budget constraint. Every time the bank needs to expand business, it has to raise more capital. If the market undertakes appropriate due diligence at these times, it can serve to discipline banks. Unfortunately, though, even if banks go to the market for equity, it is a one-off event. So long as they can convince the market to trust them – paying a hefty price for the trust, as we have argued – the market exerts no more discipline on them until they hit their capital constraint again. In the meantime, however, bankers have a long leash. This can hardly result in better governance than short-term debt.

A third argument for equity is that capital serves as a buffer. Clearly, any losses engendered by the banker are first born by equity. But if there is no discipline on the banker, these losses can be enormous. By forcing banks to raise more equity even while loosening discipline on them, the 100 percent equity

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camp may increase the social cost of these institutions significantly. That the costs are paid for up front does not mitigate the social ineffectiveness of the structure they propose.

That brings me to a key concern of critics. If short-term debt is such a good disciplinary device, how come it did not stop Lehman? In reality, it did stop Lehman! Lehman experienced a run in the week of September 8th 2008. At that time, according to estimates by Professor Larry Ball, it had marked-to-market assets of about $600 billion, and shareholder’s equity of between -$2 billion and +$13 billion. In other words, the run started just about when Lehman was marked-to-market insolvent, which is precisely when debtholders are supposed to run in our model. The point is that debtholders are not supposed to protect equity, they are supposed to protect themselves. They did! Lehman’s failure reflects a failure of the shareholder board to govern in the best interests of the shareholders, not a failure of debt governance.

This leads to another criticism. If bankers felt disciplined by short-term debt, why would they economize on equity and fight so furiously against higher capital requirements? The answer is simple. Bankers are in a competitive market. They will gravitate towards a capital structure that is most efficient, if they want maximum leeway to undertake value-enhancing activities. Typically, this will imply more short-term leverage than the 100 percent equity camp will allow them. Again, this is not to say that pre-crisis levels of bank leverage were sound. They were not. However, we cannot go on tacking more and more capital on to banks without impairing activity, shifting risks into the shadow banking system, or having banks take risks we do not measure. I do not know what the socially optimal bank capital ratio is, but I strongly believe it is well below 100 percent.

[Slide 7] Neither Doug nor I are starry-eyed aficionados of bank leverage or bankers. All governance is imperfect, though for banks, debt governance is less imperfect than the alternatives. Our subsequent papers dwell on the consequences of aggregate liquidity shortages and system-wide collapse when banks have issued short-term debt, as well as the effects of distorted bank incentives that propel them to load up on excessively illiquid assets or assets prone to fire sales. Despite their propensity to create trouble, often in ingenious new ways every time, banks cannot be wished away. At best we can manage them to minimize the harm they do while maximizing the benefit.

Let me end with some evidence. First, contrary to the beliefs of the equity camp about the superiority of equity governance, Jorda et al (2017) show after a comprehensive study of 17 economies over the period 1870 to 2013 that higher bank capital ratios have little predictive power on the occurrence of a banking crisis. Similarly, Haldane (2011) reports that pre-crisis regulatory capital ratios performed no better than a coin toss in predicting which institutions in a sample of large international banks would be distressed during the turmoil of 2007 and 2008. Jorda et al. find higher equity did have positive effects.

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10 Haldane, Andrew G. 2011. Capital Discipline. Remarks Based on a Speech Given at the American
in enhancing growth rates in the recovery, but their main finding suggests caution on relying solely on the therapeutic effects of higher bank capital on keeping banks from getting into trouble.

Second, it should trouble all of us that banks levered excessively before the crisis, and bank governance collapsed. But this was not a bank specific phenomenon. Consider three charts.

[Slide 8] The first indicates that corporate borrowing was going up in the United States pre-crisis. It then collapsed as the crisis hit, picked up as the recovery strengthened, and has continued to grow.

[Slide 9] The next chart indicates that a measure of the weakness of corporate internal accounting controls increased before the crisis, fell soon after, and has been climbing again since the recovery began. In other words, equity governance weakened before the crisis, strengthened during and soon after, and has started weakening again.

[Slide 10] Finally, both the quantity and fraction of covenant lite loans, a clear measure of laxity in governance by debt holders, follows a similar pattern, rising, falling, and rising again.

We should be worried today, but that is not my point. The point to take away is that it was not just banks that were borrowing excessively, and reducing governance before the crisis. Corporate equity governance and debt governance also fell, even as bank governance weakened. Perhaps most interesting though, corporate borrowing is significantly up once again, and corporate equity governance and debt governance is down. This is even as we have imposed higher and higher capital requirements on banks. What is going on? In a recent paper, Doug Diamond, Yunzhi Hu, and I try to make sense of this, arguing that anticipation of an excessively accommodative funding environment – that is, an environment of easy liquidity -- leads to higher leverage, which in turn crowds out governance. If we worry about this, we should work on factors that contribute to the easy liquidity, leverage is just a symptom. The paper is an NBER working paper for those interested in learning more.

Let me conclude with a plea, from experience of positions in policy making as well as being an academic. No matter how hard we try, our economic policy advice will be tainted by our biases. Nevertheless, through argument with each other based on analysis, we hopefully get closer to an unbiased understanding. Unfortunately, in these difficult times when political dialogue seems to have broken down, there is a risk that our own dialogue will follow. Increasingly, some of us espouse shrill ad-hominem attacks against fellow economists, suffused with sarcasm and ridicule rather than respectful disagreement. This may be popular with the public, but undermines its already-low perception of the profession. At a time when the elite, which includes pretty much everyone in this room, stands discredited in the public’s eyes, we should avoid a further descent into irrelevance. So even while we practice political economy, perhaps we should also remember we are part of civil society? Thank you for listening to me.

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