The Case for Regulating the Shadow Banking System

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1. Introduction

The title of this paper raises at least two threshold questions. First, what is meant by "shadow banking"? Second, what is meant by "regulate"? Neither question has an obvious answer.

This paper uses the term "shadow banking" to refer to a specific activity: *maturity transformation* that takes place outside the depository banking sector. "Maturity transformation" simply denotes the issuance of fixed-principal, very short-term IOUs, with the proceeds invested in longer-term financial assets (typically credit assets). This activity is of course the traditional domain of depository banking. The shadow banking system performs virtually the same function, but its short-term IOUs are not formally styled as "deposits."

The term "shadow banking" as used herein has no *necessary* connection to the securitization markets—although shadow banking firms do own large amounts of securitized credit. Nor does the definition above hinge on collateralization in any formal legal sense. Some of the short-term IOUs issued by shadow banks are collateralized instruments, but many are unsecured. The concept of shadow banking, as used herein, does not refer to purportedly "shadowy" or "opaque" areas of the financial markets, such as the derivatives markets. It is not an all-purpose reference to unregulated or lightly regulated parts of the financial system, nor is it intended to encompass the hedge fund industry (although *some* hedge funds are engaged in shadow banking). Finally, it is not a loose reference to the structured credit business—the tranching of securitized credit through collateralized debt obligations and the like. It is important to be clear about these issues, because the term "shadow banking" is often used to signify very different things. This paper adopts a precise, functional definition: shadow banking is simply maturity transformation that takes place outside the depository banking sector. In the words of economist Gary Gorton, "the 'shadow banking system' is, in fact, real banking."[1]

What about "regulate"? This term, too, must be used carefully. The term is sometimes used interchangeably with oversight or supervision: we will bring institutions under the "regulatory umbrella" so that they will no longer be "out of view" of the relevant authorities. But this formulation is incomplete. The longstanding regulatory regime for depository banking encompasses many things: explicit portfolio and activity restrictions; capital requirements; cash reserve requirements; restrictions on affiliations and affiliate transactions; access to public support facilities, i.e., the lender of last resort and deposit insurance; a special receivership regime in the event of failure; and so on. In view of this panoply of regulatory tools and functions, the proposition that we should "regulate" the shadow banking system, in and of itself, conveys little information. *How* should we regulate the functional activity of maturity

[1] Gary Gorton, *Slapped in the Face by the Invisible Hand: Banking and the Panic of 2007,* at 3 (May 9, 2009) (prepared for the Fed. Reserve Bank of Atlanta's 2009 Fin. Mkt. Conference).

transformation, if at all? What are the components of a coherent regulatory design for this activity—if indeed one is needed?

This paper argues that maturity transformation is associated with a cognizable market failure, establishing a *prima facie* case for government intervention. Indeed, this market failure arguably is *the* central problem for financial regulatory policy. (To borrow a phrase from University of Chicago economist Doug Diamond, a leading theorist in this area: "Financial crises are always and everywhere about short-term debt.") Panics by holders of short-term IOUs disrupt the credit markets, leading to supply shock in which businesses and consumers find that their access to credit for consumption and real investment is significantly diminished. The result is a substantial disruption to the real economy.

In the area of *depository* banking, our modern regulatory system seems to have had stability-enhancing benefits. This circumstance suggests that, in developing a regulatory approach to shadow banking, the tools of modern depository regulation might offer a useful starting point. But the key question to ask is *which* of those tools are essential. This paper will argue that the stabilization of maturity transformation—the core business in which shadow banking firms are engaged—seems to depend upon the availability of public support facilities, i.e., tools like the lender of last resort and deposit insurance. Recent regulatory reforms in the United States have not moved in this direction. Indeed, the movement has been decidedly *away* from this approach to stabilizing maturity transformation. It will be argued that recent reforms are therefore unlikely to be conducive to stable conditions in the shadow banking system.

In this regard, it is important to address the role of "resolution." It is commonly argued that the risks of shadow banking can be significantly mitigated through the use special administrative resolution techniques. At first blush, the logic appears to be straightforward. The federal resolution regime for depository banks seems to have been associated with relatively "smooth" bank failures, systemically speaking. So it seems only natural to apply similar resolution techniques to non-depository firms—including firms engaged in shadow banking. This was the basic logic behind the creation in the United States of the new Orderly Liquidation Authority (OLA), a centerpiece of the recently enacted Dodd-Frank Act. Indeed, OLA was modeled closely on the existing U.S. receivership regime for depository banks. The idea was to take this resolution tool, which appears to have served us well in the depository realm, and transport it to the non-depository sector.

However, this logic raises a basic question. It is true that depository failures—which historically were very damaging—have been rendered relatively benign. But was this shift made possible by depository *resolution*? Or was it deposit *insurance*? For these are two very different things. Deposit insurance and lender-of-last-resort authority are specifically directed toward preventing depository banks from defaulting on their short-term IOUs (deposits). By contrast, OLA is an insolvency regime, not an insurance program. It will be shown below that the institutional design of OLA contemplates that shadow banking firms will still default on their

short-term IOUs in practically all cases. Simply put, if default is the problem, then OLA probably is not the solution.

This article will sketch the outlines of an alternative regulatory regime for shadow banking, modeled on deposit insurance. A full analysis of this alternative is beyond the scope of the present paper. However, one central point will be emphasized. If maturity transformation is associated with a market failure, then we must consider limiting the types of firms that may finance themselves with short-term IOUs—that is, we must consider requiring firms to obtain a license in order to issue into this market. Logically, this would mean legally *disallowing* unlicensed parties from funding themselves with these instruments (subject to *de minimis* exceptions).

This prohibition is, of course, the foundational law of depository banking: firms are legally prohibited from issuing deposit obligations without a special license. In any discussion about "regulating" shadow banking, the threshold regulatory question is whether this cornerstone *prohibition* should be extended to encompass the broader universe of short-term IOUs. In a sense, shadow banking can be understood as modern-day "Free Banking"—a regime under which no special license is required to issue money-like instruments. Like the Free Banking regime of the mid-nineteenth-century United States, the shadow banking system has shown itself to be unstable, with adverse consequences for the real economy.

This article draws on two recent works by the author. The first, *Regulating Money Creation After the Crisis,*[2] provided some of the conceptual underpinnings for the argument presented here. The second, *A Regulatory Design for Monetary Stability,*[3] provided a more detailed defense of the insurance-based regime described herein. This article focuses more directly on the shadow banking problem, and it offers a more pointed critique of recent regulatory policy—particularly OLA.

2. The Contemporary Monetary Landscape

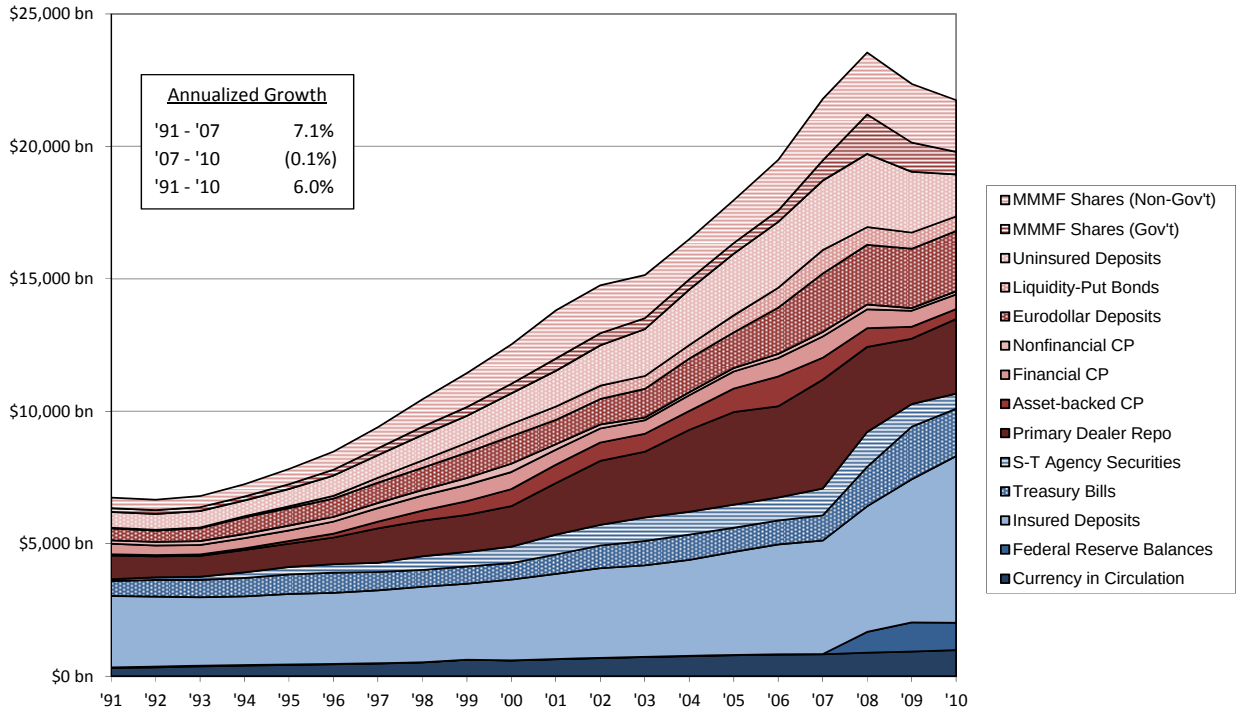
Shadow banking involves the issuance of fixed-principal, very short-term IOUs. This article refers to these instruments as "money-claims"—a generic term that recognizes the *monetary* character of these instruments.

It is useful to begin with a brief overview of the market for U.S. dollar-denominated money-claims. The following figure depicts the evolution of this market over the past two decades:

[2] Morgan Ricks, *Regulating Money Creation After the Crisis,* 1 HARV. BUS. L. REV. 75 (2011).

[3] Morgan Ricks, *A Regulatory Design for Monetary Stability,* Harvard John M. Olin Discussion Paper Series No. 706 (Sept. 2011).

Figure 1: Gross Money-Claims Outstanding[4]



In this figure, the red-tinted series (the top nine series in the graph) represent "private" money-claims, in the sense that the issuer (promisor) is a private firm, not a public institution. The blue-tinted series (the bottom five) represent "sovereign" money-claims, meaning that the government is either issuer or guarantor of the instrument.[5]

Each of the instruments shown in the figure above is a fixed-principal, very short-term IOU. Their precise technical features vary in certain respects. Some, like repurchase agreements ("Primary Dealer Repo") and portions of the asset-backed commercial paper market, are collateralized instruments; the others generally are not. Insured and uninsured deposits are issued only by licensed depository banks; the rest are issued by non-depository institutions. Money market mutual fund "shares" function like fixed-principal IOUs and typically are redeemable more or less on demand; unlike the other instruments, their issuers are regulated under the federal investment company laws. Eurodollar deposits are simply *U.S. dollar-denominated* short-term IOUs issued by financial institutions that are domiciled outside the United States. (The "Euro" prefix is misleading, as the issuer need not be European.) These formal distinctions are matters of detail and are not important for present purposes. All of these

[4] Sources detailed in Appendix A. In certain instances—particularly Eurodollar deposits—extrapolation was required due to the absence of reliable data. (Extrapolation methodologies are described in the appendix.) This figure uses a one-year maturity cutoff, following market convention for the "money market." However, these instruments are heavily concentrated at the short end of the range. A large majority mature inside of one month, and probably a majority mature within one *week*.

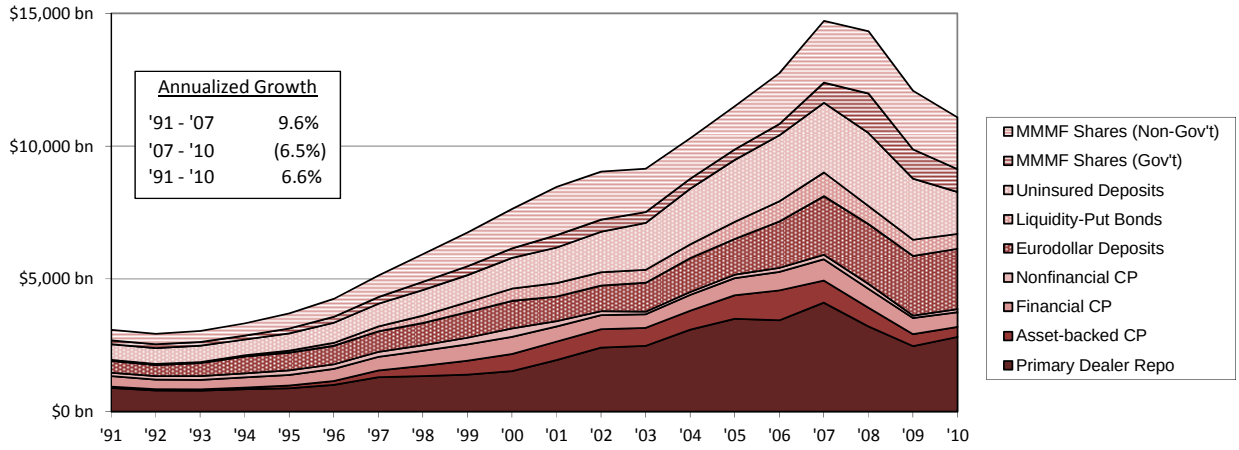
[5] In the case of short-term agency securities, the guarantee has been implicit.

instruments are fixed-principal, very short-term IOUs, and it will be argued below that they share basic *functional* attributes.

The figure above gives rise to a few immediate observations. First, the market for U.S. dollar-denominated money-claims is huge, exceeding $20 trillion on a gross basis.[6] (By way of comparison, total outstanding U.S. mortgage debt is around $14 trillion.) Second, this market has grown rapidly over the past two decades. The 7.1% annualized growth rate of this market from 1991 to 2007 was significantly in excess of the 5.4% annualized growth rate of nominal GDP over the same period. Third, while insured deposits were the single largest individual component of this market throughout the entire period, their share of the total was steadily diminishing during the years preceding the crisis. Finally, while the market for short-term IOUs is commonly supposed to consist largely of commercial paper issued by nonfinancial firms to finance their working capital, it is immediately apparent that this view is mistaken. The figure shows that nonfinancial commercial paper is only a trivial component of the overall market for money-claims. This market is dominated by sovereign and financial issuers, not commercial or industrial ones. The issuers of private money-claims represent the modern shadow banking system.

It is useful to look separately at the private and sovereign components of the money-claim universe. Private money-claims are shown in the following figure:

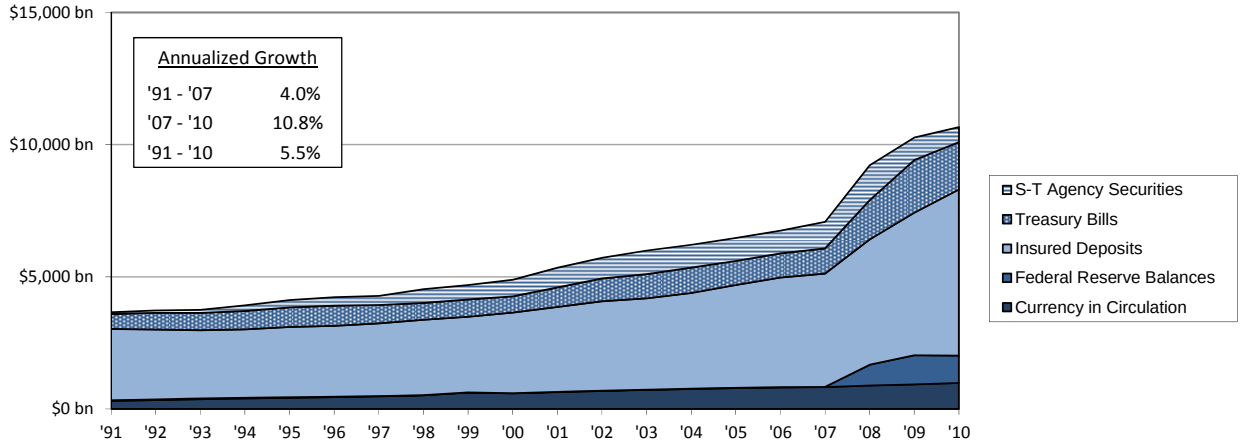
Figure 2: Gross Money-Claims Outstanding – Private



Sovereign money-claims—i.e., money-claims that are either issued or guaranteed by the federal government—are shown here:

[6] It should be emphasized that these are *gross* numbers. That is to say, these figures do not net out those money-claims that are held by issuers of money-claims. For example, the figure includes the "shares" of money market mutual funds; these institutions' assets consist entirely of other categories of money-claim that are shown in the figure. Similarly, the figure includes Federal Reserve balances, which are generally owned by the issuers of deposit obligations.

Figure 3: Gross Money-Claims Outstanding – Sovereign

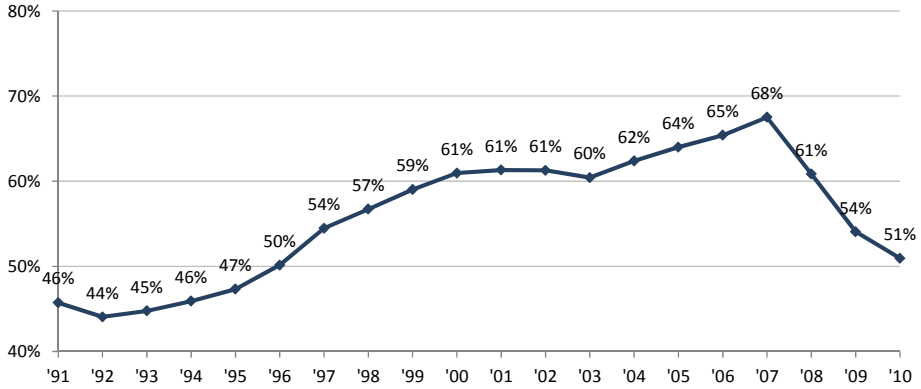


As shown above, over the period from 1991 to 2007, private money-claims grew at an annualized rate of 9.6%, far outstripping the 4.0% growth rate of sovereign money-claims over the same period. Unsurprisingly, this trend reversed itself in 2008 with the government's intervention during the financial crisis. The quantity of sovereign money-claims increased dramatically from 2007 to 2010. Interestingly, most of this crisis-related growth came not from the Federal Reserve's balance sheet expansion ("Federal Reserve Balances")—indeed, the pictures above reveal the relatively modest size of the Federal Reserve's balance sheet in relation to the overall market for money-claims—but rather from emergency increases in deposit insurance coverage.[7] Still, as shown in Figure 1.1, the post-crisis growth in sovereign money-claims was insufficient to offset the massive contraction in private money-claims over the same period.

During the years preceding the crisis, private money-claims came to represent a steadily increasing share of the total. The following figure illustrates this trend and its sudden reversal over the past three years:

[7] This increased coverage was attributable to two policy measures: first, the increase in the deposit insurance cap from $100,000 to $250,000 under the Emergency Economic Stabilization Act of 2008, Pub.L. No. 110-343, § 136; and second, the FDIC's emergency Transaction Account Guarantee program, which temporarily removed the deposit insurance cap for noninterest-bearing demand deposit obligations.

Figure 4: Gross Money-Claims Outstanding – Private / Total



As shown above, by 2007 private money-claims had come to represent 68% of the total, up from 46% at the start of the period. A cursory examination of this figure reveals that the periods during which the share of private money-claims increased most rapidly roughly coincide with recent financial "booms" (1996 through 2000, and 2004 through 2007). This shift can be understood as an increasing privatization of the money supply.

The proposition that the instruments shown in the tables above have "money-like" attributes was addressed in detail in *Regulating Money Creation.* That argument will not be repeated here. For present purposes, it will be sufficient to postulate that economic agents find it useful to allocate a portion of their wealth to liquid instruments whose value *relative* to currency is extremely stable.[8] In order to possess this stable-price property, a financial instrument must exhibit very low credit risk *and* very low interest rate risk. Money-claims are unique in possessing both of these attributes.

In this regard, it is important to emphasize that the term "money-claim" is not synonymous with the term "safe asset" as used in the current literature.[9] That term has come to denote credit instruments that have, or are perceived to have, negligible *credit* risk. Thus a long-term Treasury security, or a long-term AAA-rated obligation issued by a securitization trust, would constitute a safe asset under current usage. Importantly, however, such long-term instruments can and do fluctuate significantly in price due to changes in market rates of interest.[10] This characteristic is incompatible with the requisite stable-price feature described

[8] For a discussion that reaches similar conclusions on this score, see Robert E. Lucas & Nancy L. Stokey, *Liquidity Crises,* Federal Reserve Bank of Minneapolis, Econ. Policy Paper 11-3 (May 2011).

[9] For a recent discussion of the importance of this distinction, see Zoltan Poszar, *Institutional Cash Pools and the Triffin Dilemma of the U.S. Banking System,* IMF Working Paper 11/190 (August 2011).

[10] By way of illustration: if ten-year interest rates increase from 5.0% to 6.0%, a risk-free bond with a duration of 10 years will lose about 9% of its market value. Interest rate movements of this magnitude are not an unusual occurrence. From year-end 1990 to year-end 2010, there were fourteen distinct, non-overlapping periods over which ten-year Treasury yields increased by one full percentage point.

above. Accordingly, all long-term instruments are excluded from the term "money-claim" as used herein.

Currently, there exists no cognizable legal or regulatory category corresponding to the term "money-claim" as used herein. Instead, our existing regime singles out the issuers of *deposit* obligations for special treatment. This article takes the position that this distinction is both formalistic and anachronistic. Other money-claims serve a function substantially similar to that of deposit obligations. In essence, they are cash-parking contracts.

This is not to suggest that there are no important distinctions between deposit obligations and other money-claims. On the contrary, two such differences merit special mention. First, demand deposit obligations serve as the predominant medium of exchange in modern economies. Generally speaking, other money-claim categories do not serve this function. Second, deposit obligations are a ubiquitous retail product; a significant proportion of their ownership base consists of relatively unsophisticated consumers. By contrast, most other money-claims are institutional products. In these two important respects, deposit obligations are indeed special.

Yet it does not follow that different regulatory regimes are warranted for deposit-issuers, on the one hand, and other money-claim issuers, on the other. It will be argued below that money-claim issuance (or, equivalently, maturity transformation) is associated with a market failure that justifies government intervention. This rationale will be shown to apply equally to deposit-issuers and to issuers of non-deposit money-claims.

In practice, the functional similarities between deposit obligations and other money-claims are widely acknowledged. *Regulating Money Creation* described a variety of legal, accounting, and economic contexts in which non-deposit money-claims are treated as functional substitutes for deposit obligations. (To provide just one example: they are designated as "cash equivalents" under generally accepted accounting principles so long as they mature within three months, and their purchases and sales are not required to be recorded in the statement of cash flows—such transactions are treated as exchanges of "cash" for "cash.") It is for this reason that the issuers of non-deposit money-claims have come to be known in recent years, collectively, as the shadow banking system. Like depository banks, shadow banking firms are engaged in the business of maturity transformation, but the money-claims they issue are not formally styled as "deposits."

Finally, it is noteworthy that, as a matter of *emergency* policy, the regulatory distinction between deposit obligations and other types of money-claim has been disregarded. As shown in the following table, almost every category of private money-claim was targeted with emergency stabilization programs in 2008 (compare with Figure 1 above):

Table 1: The Policy Response to the Financial Crisis

Private Money-Claim Category		*Emergency Policy Measures*
Money market mutual fund "shares"	►	MMMF Guarantee (Treasury) Money Market Investor Funding Facility (Fed)
Uninsured Deposits	►	Transaction Account Guarantee (FDIC) Term Auction Facility (Fed) Deposit insurance limit increase (EESA[11])
Liquidity-Put Bonds	►	N/A
Eurodollar Deposits	►	Central Bank Liquidity Swaps (Fed)
Financial Commercial Paper Nonfinancial Commercial Paper	►	Temporary Liquidity Guarantee Program (FDIC) Commercial Paper Funding Facility (Fed)
Asset-Backed Commercial Paper	►	ABCP MMMF Liquidity Facility (Fed)
Primary Dealer Repo	►	Primary Dealer Credit Facility (Fed) Term Securities Lending Facility (Fed)

In addition, the major emergency policy measures that are not reflected in this table—such as capital infusions under the Troubled Asset Relief Program (TARP), as well as the FDIC's massive debt guarantee program for longer-term debt—were primarily directed toward stabilizing diversified financial firms that rely heavily on money-claim financing. It is no exaggeration to say that practically the *entire* emergency policy response to the recent crisis was aimed at stabilizing the market for private money-claims.

The stated purpose of these interventions was not to protect these markets for their own sake, but rather to protect the real economy. These emergency measures were therefore predicated on the assumption that an unhindered panic in the money-claim market would do serious economic damage. The basis for this assumption is discussed next.

3. What's the Matter with Panics?

Defaults by money-claim issuers tend to follow a predictable and well-known pattern. First, one or more money-claim issuers experiences significant portfolio impairments. Some

[11] Emergency Economic Stabilization Act of 2008, Pub.L. No. 110-343, § 136.

money-claimants begin to withdraw funds from suspect issuers, causing an initial liquidity drain. Other money-claimants sense danger, and withdrawals escalate into a self-perpetuating run. (In the context of shadow banking, "withdrawal" simply means declining to roll over money-claims.) Absent government liquidity support, the result is default and insolvency proceedings for money-claim issuers. Furthermore, a run on one institution may serve as a "focal point" for money-claimants of other issuers, causing liquidity pressures at relatively healthier firms. Runs thus tend to happen in correlated fashion, giving rise to panic conditions. This is a standard and fairly uncontroversial account.

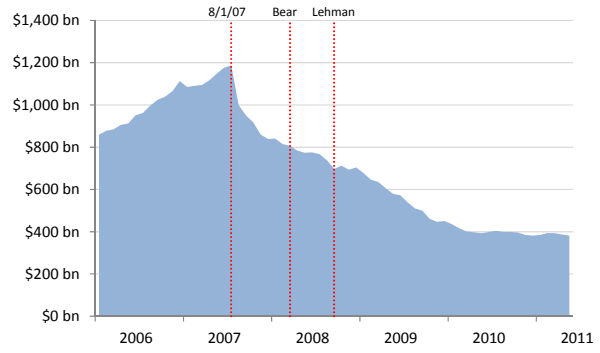
These developments should be expected to impact the supply of newly issued credit to borrowers in the real economy. Under panic conditions, cash parkers remove funds from suspect issuers and seek safety in sovereign money-claims (such as Treasury bills) or in money-claims issued by firms with substantial cash balances. As a precautionary response, money-claim issuers (shadow banks) naturally reduce their exposures to the capital markets and seek to increase their cash reserves. When this happens on a large scale and in correlated fashion, the result is a shock to the supply of newly issued credit. Such a supply shock should be expected to increase credit costs and reduce the quantity of real credit issued.[12]

A dynamic like the one described here was evident in the recent financial crisis. The following figure depicts the liquidity events:

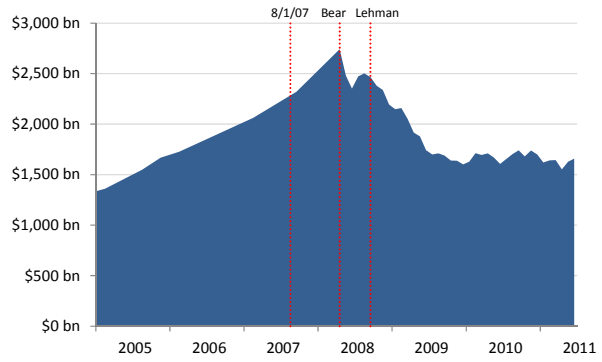
[12] For a related but somewhat different account, see Jeremy Stein, *Monetary Policy as Financial-Stability Regulation* (working paper, May 2011). Stein emphasizes the role of "fire sale" externalities that result from bank runs. In his model, funds removed from the banking system during a run are not immediately re-intermediated. As a result, there is less capital "left over for investment in new projects," and the "hurdle rate for new investment" increases. The model is one of a supply shock in the credit markets brought about by run-behavior. *See also* Douglas Diamond & Raghuram Rajan, *Fear of fire sales and the credit freeze* (working paper, April 2009).

Figure 5: The Liquidity Events[13]

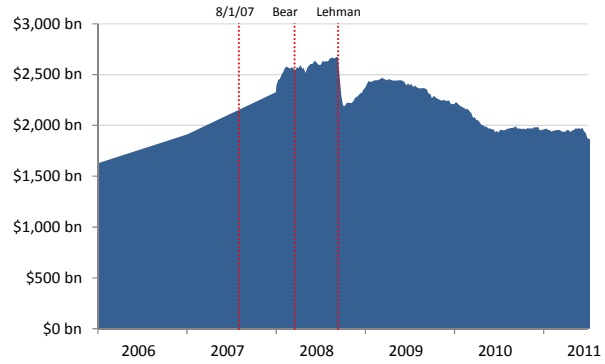
A) U.S. Asset-Backed Commercial Paper Outstanding



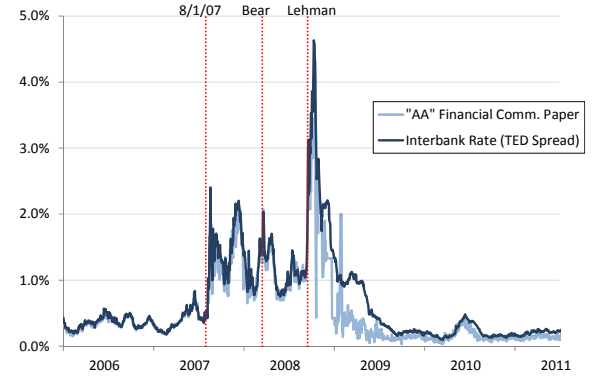
B) Short-Term Repo Outstanding
(Broker-dealer "tri-party" repo)



C) U.S. Prime Money Market Fund Shares Outstanding



D) Short-Term Funding Spreads
(three-month obligations; spread to risk-free rate)



The figure above depicts an unfolding liquidity crisis in the shadow banking system. This liquidity crisis started in August 2007 with a market-wide run on asset-backed commercial paper (ABCP), a class of short-term IOUs issued by conduits that invest in longer-term securities. During the second half of 2007, the volume of outstanding ABCP went into free-fall (panel A), as many investors declined to roll over their positions.

Panel B above shows a similar phenomenon occurring a few months later, in a different segment of the money-claim market. It is widely known that the proximate cause of the failure of Bear Stearns was a run on the firm's overnight financing through the giant dealer repo market. Despite the Fed-assisted rescue of Bear Stearns in March 2008, and despite the Federal Reserve's simultaneous establishment of special lending facilities to support the repo market, the period after Bear's failure saw a rapid reduction in repo volumes.

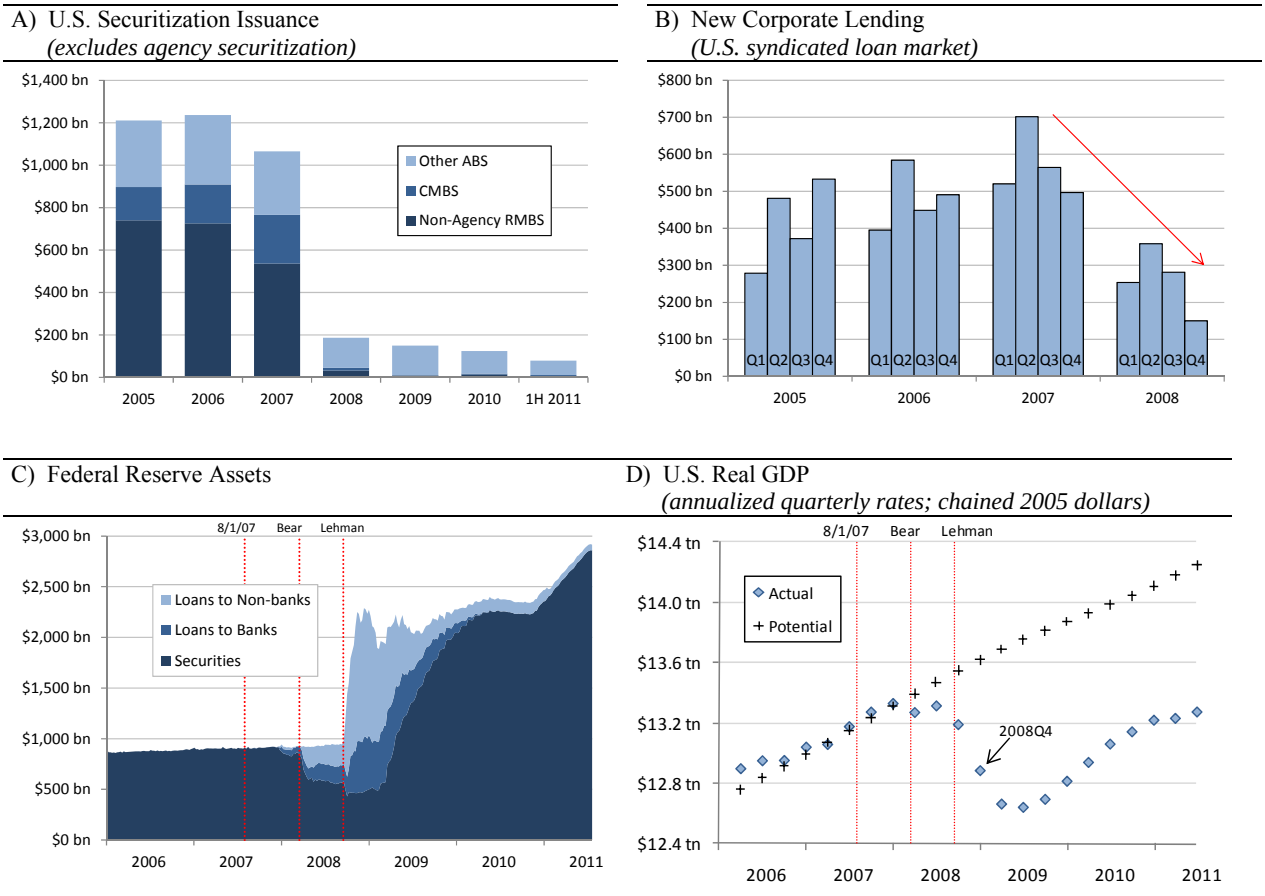
As shown in panel C above, the Lehman Brothers default in September 2008 triggered a run on the money market mutual fund sector—one of the core distribution channels for money-

[13] Sources: (A) SIFMA; (B) FSOC Annual Report; (C) Investment Company Institute; (D) Bloomberg.

claim funding. Practically overnight, investors withdrew nearly half a trillion dollars from prime money market funds. The free fall was halted only after a massive policy response was brought to bear, including a Treasury guarantee of the entire money market mutual fund sector.

As shown in Panel D above, the costs of money-claim financing skyrocketed during this period. Short-term funding spreads widened dramatically, as cash-parkers sought the safe-haven of *sovereign* money-claims in lieu of ABCP, repo, MMMF "shares," and other private money-claims. Naturally, the shadow banking sector responded by going into cash-preservation mode. The result was a drastic reduction in the supply of new credit to real borrowers, as shown in the following figure:

Figure 6: The Credit Crunch[14]



These figures show dramatic reductions in securitization volumes (panel A) and newly originated loans to big corporations (panel B). Notably, these reductions began well before the crisis reached its apex after the fall of Lehman in September 2008. Furthermore, these volume

[14] Sources: (A) SIFMA; (B) Ivashina and Scharfstein, *infra.*; (C) Federal Reserve; (D) FRED.

reductions coincided with significant increases in the cost of credit in virtually every area of the consumer and business credit markets.[15]

As noted above, the panic of 2007–2008 was met with a massive federal policy response. This emergency response included an explosion of Federal Reserve liquidity facilities, as shown in panel C above. It also included an array of other emergency measures, including the Treasury money market fund guarantee; a new FDIC program to guarantee senior debt issued by depositories and their affiliates; and, in early October, giant equity infusions into the nation's largest financial institutions through the TARP program.

These measures ultimately proved sufficient to arrest the money-claim panic. By the following May, short-term funding spreads had returned to pre-crisis levels. These emergency measures were accompanied by extraordinary monetary policy initiatives by the Fed, which cut the target federal funds rate to zero and conducted additional expansionary monetary policy through so-called "quantitative easing" initiatives (evident in the buildup of securities in panel C) above. However, while risk-free rates remained remarkably low by historical standards, these measures were insufficient to avert an abrupt and severe macroeconomic contraction (panel D).

The suggestion of this section is that the liquidity events shown in Figure 5 were responsible, in significant measure, for the credit crunch and the ensuing macroeconomic contraction shown in Figure 6. In other words, this sequence should be interpreted as a causal chain. However, there is at least one other plausible interpretation that must be considered. Perhaps all of these phenomena simply reflected a broad re-pricing of risk in the capital markets. In its strong form, this view would treat the liquidity event as epiphenomenal, a superficial symptom of the fundamental re-pricing of credit. The implication is that the credit crunch would have happened anyway, even without the run.

A recent study by Victoria Ivashina and David Scharfstein of Harvard Business School casts doubt on this alternative explanation.[16] Their paper, which is essential reading on the credit crunch, examines U.S. financial firms' syndicated lending to the corporate sector during 2007 and 2008.[17] The authors show that lenders with higher amounts of (uninsured) non-deposit financing reduced their syndicated lending activities in the second half of 2008 to a far greater extent than did those with more stable deposit funding (much of which is FDIC-insured). Specifically, a lender with a deposits-to-assets ratio one standard deviation below the mean reduced its loan originations by 49% during late 2008 versus the prior year, whereas a lender

[15] This broad increase in credit spreads seems to rule out the hypothesis that the decline in issuance volumes was driven mostly by a decline in *demand* for financing. A reduction in demand would tend to drive spreads down, not up. The evidence is consistent with a supply shock.

[16] Victoria Ivashina & David Scharfstein, *Bank lending during the financial crisis of 2008,* 97 J. FIN. ECON. 319 (2010).

[17] A syndicated loan is a large corporate loan provided by multiple financing sources. The authors focus on this market due to the availability of a robust data set of new originations.

whose ratio was one standard deviation above the mean reduced originations by only 21%. Put simply, financial firms that were more susceptible to run-behavior cut back on new corporate loan issuance much more severely. The authors conclude that their findings are "consistent with a decline in the supply of funding as a result of the bank run."[18] They further note that "the drop in supply puts upward pressure on interest rate spreads, and leads to a greater fall in lending than one might see in a typical recession."[19]

This discussion has offered suggestive evidence that the instability of the shadow banking system had damaging effects on the capital markets and the real economy during the recent crisis. If accurate, this circumstance amounts to a market failure, creating a *prima facie* case for government intervention. The remainder of the paper will consider alternative modes of intervention. The next section will analyze the likely efficacy of "resolution" techniques, such as those embodied in the new Orderly Liquidation Authority. It will be argued that those techniques should not be expected to meaningfully mitigate the damaging effects of shadow banking instability. The subsequent section will briefly sketch an alternative approach, one modeled on the modern deposit insurance regime.

4. "Orderly" Failure and Shadow Banking

It is commonly argued that the shadow banking problem is best addressed through the use of risk constraints (such as portfolio restrictions and capital requirements), perhaps combined with access to central bank liquidity support (the lender of last resort). The difficulties associated with these approaches were discussed in detail in *A Regulatory Design for Monetary Stability.* Due to considerations of space, those arguments will not be repeated here. It will simply be noted that both risk constraints and public liquidity support give rise to very significant social costs, and the corresponding benefits are not measurable in any satisfactory way. This circumstance presents legislators and regulators with extremely difficult calibration challenges, leaving them to rely on "gut feel," impressionistic judgments, speculative assumptions, and superficial analyses. The practical significance of this problem would be difficult to overemphasize. A regulatory design that did not rely on such heroic regulatory capacities would obviously be preferable.

In part due to the limitations of these approaches, a major international policy priority has been to develop new insolvency regimes for shadow banks and other non-depository financial institutions. In the United States, one of the centerpieces of the Dodd-Frank Act was the creation of a new Orderly Liquidation Authority (OLA) for certain financial firms. The goal of this new mechanism is ambitious: as set forth in the statute, it aims "to provide the necessary authority to

[18] Ivashina & Scharfstein, *supra.*

[19] *Id.*

liquidate failing financial companies that pose a significant risk to the financial stability of the United States in a manner that mitigates such risk and minimizes moral hazard."[20]

Can such a regime be expected to meaningfully address the market failure that is inherent in shadow banking? As noted in the introduction, the statutory scheme of OLA is modeled directly on the existing FDIC receivership authority for depository institutions. This seems sensible; that regime appears to have provided a way to deal with depository insolvencies without imperiling the broader financial system. At first glance, then, this approach might seem to hold the promise of facilitating "orderly" failures of shadow banking entities.

But this proposition needs to be examined more closely. Is it depository *receivership* that makes "orderly" depository failures possible? Or is it deposit *insurance*? For the two are logically distinct. A little history may shed some light here. Prior to the creation of the FDIC, bank failures were handled under insolvency regimes that treated depositors as ordinary creditors. As the FDIC's *Resolutions Handbook* recounts:

> In general practice, between 1865 and 1933, depositors of national and state banks were treated in the same way as other creditors—they received funds from the liquidation of the bank's assets after those assets were liquidated. On average, it took about six years at the federal level to liquidate a failed bank's assets, to pay the depositors, and to close the bank's books—although in at least one instance this process took 21 years. Even when depositors did ultimately receive their funds, the amounts were significantly less than they had originally deposited into the banks.[21]

With the advent of deposit insurance, it became evident that bank failures could no longer be handled effectively under existing insolvency regimes. A central objective of deposit insurance was to give insured depositors seamless access to their funds when banks failed—to maintain the "moneyness" of deposits. The point of course was to prevent *default* on these monetary instruments. Making this happen required a substantial administrative apparatus: the government had to create an agency with the resources, the expertise, and the institutional mandate to achieve this objective. Plainly, the existing management teams of failed banks could not be relied upon to administer the deposit insurance regime. The FDIC needed to control the operations of failed banks; it could not be on the outside looking in.

These two distinct functions—deposit insurance and receivership authority—still go hand in hand. From the *Handbook*:

> In every failing institution transaction, the FDIC assumes two roles. First, the FDIC in its corporate capacity as insurer protects all of the failing institution's depositors …. Second, the FDIC acts as the receiver of the failed institution and administers the receivership estate for all creditors. The FDIC as receiver is functionally separate from

[20] Dodd-Frank Act § 204(a).

[21] FEDERAL DEPOSIT INSURANCE CORPORATION, RESOLUTIONS HANDBOOK 68 (2003).

> the FDIC acting in its corporate role as deposit insurer, and the FDIC as receiver has separate rights, duties, and obligations from those of the FDIC as insurer. U.S. courts have long recognized these dual and separate capacities.[22]

Understanding the FDIC's dual roles is important—because the new OLA regime encompasses only one of these roles. OLA is a receivership regime, not an insurance program. And the function of FDIC-as-*receiver* is quite specific. "A receivership," says the *Handbook,* "is designed to market the institution's assets, liquidate them, and distribute the proceeds to the institution's creditors."[23] The objective of this liquidation process is "to maximize the return on the sale or disposition of the receivership estate's assets."[24] It should be evident that the function of depository receivership per se sounds rather similar to the function of the corporate bankruptcy regime. Indeed, the *Handbook* itself notes that "[i]n many ways the powers of the FDIC *as receiver* of a failed institution are similar to those of a bankruptcy trustee."[25] In short, the aim of FDIC-as-receiver is to preserve the value of the firm's assets or enterprise in order to maximize recoveries.

But here we run up against a basic question of objectives. Preserving enterprise value in order to maximize recoveries is no doubt a worthwhile policy goal. It is, after all, one of the basic goals of the corporate bankruptcy system. However, the analysis of Part 3 of this paper suggested that the distinctive problem associated with shadow-banking failures arises not from enterprise value losses, but rather from the disruption to the credit system and the real economy that occurs when money-claimants anticipate a potential *default*.

In their monumental *Monetary History of the United States,* Milton Friedman and Anna Schwartz emphasized this very point. They observed that the bank failures that ushered in the Great Depression "had two different aspects."[26] The first, they said, consisted of "losses to both [the failed banks'] owners and their depositors, just as the failure of any other group of business enterprises involved losses to their owners and creditors"[27]—in other words, losses of enterprise value. And the second aspect was their *monetary* impact, i.e., the monetary (and associated credit) contraction that arose when funds were removed from the depository system. Friedman and Schwartz posed a basic question: "Which aspect was the more important for the course of business?"[28] Their conclusion was that "the second was vastly more important than the first."[29]

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[22] *Id.* at 6.

[23] *Id.* at 85.

[24] *Id.* at 2.

[25] *Id.* at 67 (emphasis added).

[26] FRIEDMAN & SCHWARTZ, A MONETARY HISTORY OF THE UNITED STATES 1867–1960, at 351.

[27] *Id.*

[28] *Id.*

[29] *Id.*

To underscore this point, Friedman and Schwartz noted that the losses of bank enterprise value in the early 1930s were "minor" as a fraction of total wealth and "would deserve no more attention than losses of a comparable amount in, say, real estate."[30] In their view, "[t]he bank failures were important not primarily in their own right, but because of their indirect effect."[31] More pointedly:

> If [the bank failures] had occurred to precisely the same extent without producing a drastic decline in the stock of money, they would have been notable but not crucial. If they had not occurred, but a correspondingly sharp decline had been produced in the stock of money by some other means, the contraction would have been at least equally severe and probably even more so.[32]

If this monetary view has merit, then losses of enterprise value are at most a secondary issue when it comes to depository failures. And the discussion above made clear that the function of FDIC-as-*receiver*—on which OLA is modeled—is really about maximizing the enterprise value of failed banks. It is the FDIC-as-*insurer* that keeps the adverse monetary consequences from taking place.

But does the new OLA regime not give the FDIC access to resources that would enable it to deal with these *monetary* effects as well? For instance, could it not make funds available to honor the money-claims of failed issuers, thereby avoiding any adverse monetary repercussions? The answer is: not necessarily. It is true that the FDIC *might* have substantial resources at its disposal under the OLA regime (more on this in a moment), and that these resources *might* be used under some circumstances to honor money-claims. Specifically, the OLA legislation gives the FDIC the power to make "additional payments" to third parties if certain conditions are met.[33] Presumably this power could be invoked to honor money-claims, at least some of the time. The FDIC has even hinted at this possibility. In its Interim Final Rule ("IFR") regarding OLA implementation, the FDIC made clear that *long-term* creditors (those with terms exceeding 360 days) will *never* receive such "additional payments."[34] By inference, this leaves open the possibility that money-claims might sometimes be honored in accordance with their contractual terms, thus neutralizing the monetary impact of failure.

Importantly, however, the FDIC can make additional payments to creditors only under specified circumstances. In particular, the statute requires the FDIC to conclude "that such action

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[30] *Id.*

[31] *Id.*

[32] *Id.* at 352.

[33] *See* Dodd-Frank Act §§ 210(b)(4), 210(d)(4), 210(h)(5)(E).

[34] Federal Deposit Insurance Corporation, *Orderly Liquidation Authority Provisions of the Dodd-Frank Wall Street Reform and Consumer Protection Act*, Interim Final Rule, 76 Fed. Reg. 4211 (Jan. 25, 2011) [hereinafter FDIC IFR]. The rule has since been finalized. Federal Deposit Insurance Corporation, *Certain Orderly Liquidation Authority Provisions under Title II of the Dodd-Frank Wall Street Reform and Consumer Protection Act*, Final Rule, 76 Fed. Reg. 41626 (July 15, 2011).

is necessary (I) to maximize the value of the assets of the [firm]; (II) to maximize the present value return from the sale or other disposition of the assets of the [firm]; or (III) to minimize the amount of any loss realized upon the sale or other disposition of the assets of the [firm]."[35] As a textual matter, these conditions have nothing to do with preventing money-claim defaults. On the contrary: these are enterprise value considerations. Certainly these conditions would permit payments under contracts that are needed to keep the business running, such as contracts for ongoing services (paying utility bills, meeting payroll, and the like). But it is far from obvious that pure *funding* contracts—such as money-claims—could *ever* satisfy any of these criteria. It is worth asking what the status of, say, Lehman Brothers's commercial paper—the default on which ignited a run on the money market mutual fund industry—would have been under these standards. It comes down to the FDIC's interpretation.

There is no need to speculate about the FDIC's position. It goes out of its way in the IFR to note that, despite the fact that it reserves the *right* to make additional payments to short-term creditors, no one should count on it. Indeed, according to the IFR, additional payments will be granted with "exceeding rarity."[36] For the avoidance of doubt:

> While the Rule distinguishes between long-term unsecured senior debt and shorter term unsecured debt, this distinction does not mean that shorter term debt would be provided with additional payments under [the applicable statutory provisions]. …
>
> Short-term debt holders … are *highly unlikely* to meet the criteria set forth in the statute for permitting payment of additional amounts. In *virtually all cases*, creditors with shorter-term claims on the covered financial company will receive the same pro rata share of their claim that is being provided to the long-term debt holders. Accordingly, a potential credit provider to a company subject to the Dodd-Frank resolution process should have no expectation of treatment that differs depending upon whether it lends for a period of over 360 days or for a shorter term.[37]

It is possible that this is all an elaborate head-fake. Maybe the FDIC fully intends, as a matter of policy, to promptly honor (in full and on time) the money-claims of issuers that are put into receivership under OLA, and believes that it has the statutory authority to do so. (If so, its bluff is unlikely to work forever; you can't fool all of the people all of the time.) As a starting point, however, it seems more sensible to take the FDIC's policy statements at face value.

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[35] Dodd-Frank Act § 210(h)(5)(E). To be precise, this is the standard for transferring claims to a so-called "bridge entity," where they are to be honored. Other avenues are available to make additional payments, but they are subject to more or less the same standards. Incidentally, the FDIC has self-imposed an additional procedural condition: additional payments can be made to a creditor only upon an affirmative vote by the FDIC Board of Directors, which must make a specific determination that the relevant statutory requirements are met. FDIC IFR at 4215.

[36] FDIC IFR at 4212.

[37] *Id.* at 4211–12 (emphasis added). To drive home the point, in its request for comment on the IFR, the FDIC asked: "Are there additional ways to counteract any impression that shorter term debt is not at risk?"

So what happens to unsecured money-claimants that do *not* receive additional payments—as will be the outcome "in virtually all cases"? The answer is that they will receive payments in accordance with their creditor priority based on the value realized, or expected to be realized, from the liquidation of the enterprise.[38] More specifically, as a technical matter, the "maximum liability" of the receivership to any claimant "shall equal the amount that such claimant *would have received* if" the failed firm "had been liquidated under chapter 7 of the Bankruptcy Code" or other applicable insolvency laws.[39] In short, unsecured money-claimants should expect to see their claims impaired or extinguished—and they may not receive payouts, if any, for some time.[40]

For *secured* money-claims (that is, repo instruments) the treatment is somewhat different—but just as problematic from a monetary standpoint. The FDIC has until 5:00 pm on the business day following its appointment as receiver to decide whether the repo contract will be honored and, if so, to notify the repo creditor of its decision.[41] If the repo claim is not honored, the repo creditor may terminate the contract and take the collateral. However, it should be clear that any failure to honor repo obligations has adverse monetary consequences. Repo is a money-claim; the collateral underlying it typically is not. If the repo creditor had wanted an asset resembling the underlying collateral, presumably it would have bought that instead. (The fact that repo is collateralized does not imply that the repo creditor is indifferent as between owning the repo and owning the collateral!) Repo creditors do get their collateral quickly, but they must then monetize the collateral if they want to restore their money balances. This means persuading third parties to part with money. If the collateral is very liquid and can easily be sold at little or no fire-sale discount (a big "if" during a panic), then the direct harm to money-claimants under this scenario might be rather small. Nevertheless, the money supply has shrunk.[42] Just as importantly, as witnessed in the recent crisis, the moment at which repo creditors seize and liquidate collateral from failed money-claim issuers is likely to be precisely the moment at which normally liquid collateral becomes very hard to sell. (If the collateral were so liquid, why did the repo issuer not monetize it to prevent its own demise?) If the collateral cannot easily be

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[38] Dodd-Frank Act § 210(b)(1).

[39] *Id.* § 210(d)(2) (emphasis added).

[40] The FDIC "may, in its discretion and to the extent that funds are available, pay creditor claims" after it has determined that they are allowed. Dodd-Frank Act § 210(a)(7). There is no date certain.

[41] *See id.* § 210(c)(10)(A). Obligations on those contracts are suspended until that time, *see id.* § 210(c)(8)(F)(ii), and creditors' walkaway clauses are unenforceable, *see id.* § 210(c)(8)(F)(i). This discussion assumes that the repo instrument qualifies as a "qualified financial contract," as should practically always be the case.

[42] The FDIC has indicated that it will "exercise care" in valuing collateral and that it"will review [each secured] transaction to ensure it is not under-collateralized." FDIC IFR at 4212. Any money-claim that *is* undercollateralized presumptively will not be honored: "[I]f the creditor is undersecured due to a drop in the value of such collateral, the unsecured portion of the claim will be paid as a general creditor claim." *Id*. Explicitly, the FDIC wants to discourage "overreliance" on "short-term, secured transactions in the repurchase market," which it views as "[a] major driver of the financial crisis and the panic experienced by the market in 2008." *Id.*

monetized, then from a consequential loss perspective repo creditors might be little better off than unsecured money-claimants.

There is yet another problem. Even if the FDIC *wants* to make additional payments to money-claimants under OLA, it may do so only if the requisite resources are available. The funding provisions of OLA are therefore paramount. In implementing a receivership, the FDIC must borrow from the Treasury Department—and those borrowings are not unconditional. They are subject to "such terms and conditions as the [Treasury] Secretary may require."[43] That is to say, they are at the discretion of the then-presiding Administration—which might very well be sensitive to the political ramifications of authorizing the disbursement of potentially hundreds of billions of dollars in taxpayer funds to honor the money-claims of a failed financial firm.

Furthermore, there are explicit statutory limitations on the size and timing of those borrowings. For the first thirty days of any receivership, unless the FDIC has "calculated . . . the fair value of the total consolidated assets" of the failed firm, the FDIC is not permitted to borrow funds in an amount exceeding 10% of the firm's most recently reported "total consolidated assets."[44] Only after the thirtieth day (or sooner if the fair value calculation is completed) can the FDIC borrow more—but even then its borrowing capacity is limited to 90% of the "fair value of the total consolidated assets" of the firm "that are *available for repayment.*"[45] (Presumably this latter qualifier is intended to exclude from the calculation assets that are subject to a security interest; if so, then the amount of resources available to the FDIC in any liquidation is a *decreasing* function of the amount of repo issued by the firm.) Thus even if the FDIC wanted to make quick payouts to money-claimants and were satisfied that it had the statutory authority to do so under the additional payments provisions, it still would need the concurrence of the executive branch, and it might still run up against statutory borrowing capacity limits.

Finally, there is one other critical, if more subtle, potential impediment: Treasury's ability to provide the necessary resources is subject to its own funds availability. If the Treasury Department needs to issue Treasury securities in order to raise the proceeds for a big loan to the FDIC, and if those borrowings would cause the federal government to exceed the then-operative statutory public debt ceiling, then *congressional* approval would be needed.[46] As witnessed in the recent crisis (not to mention the summer of 2011), this risk is hardly trivial.[47]

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[43] Dodd-Frank Act § 210(n)(5).

[44] *Id.* § 210(n)(6).

[45] *Id.*

[46] *Id.* § 210(n)(5).

[47] The debt ceiling needed to be increased in *both* of the major pieces of crisis-response legislation that were enacted in late 2008. *See* Housing and Economic Recovery Act of 2008, Pub. L. No. 110-289, § 3083, 122 Stat. 2654; Emergency Economic Stabilization Act of 2008, Pub. L. No. 110-343, § 122, 122 Stat. 3765. Former Treasury Secretary Henry Paulson has emphasized that the debt ceiling was a key issue in congressional negotiations during the crisis. *See* HENRY M. PAULSON, JR., ON THE BRINK 150, 154 (2009).

To sum up, the position of money-claimants in a Dodd-Frank orderly liquidation is far from secure. Their statutory *entitlements* are generally similar to what they would be in bankruptcy: they have no legal basis to complain if they receive only the value they would have received in a bankruptcy liquidation, and they generally have no right to receive any payments at all until the conclusion of the receivership, which might be years away. (Contrast this with the position of insured depositors.) Although it will decline to do so "in virtually all cases," the FDIC might in its discretion authorize additional payments to money-claimants if it satisfies itself that such payments would maximize returns or minimize losses to the receivership. Even then, however, adequate funding must materialize—and it is not obvious that it will do so in a timely fashion or at all. The quantity of funds available for any liquidation is subject to strict numerical limitations, particularly in the first thirty days. The Administration needs to agree to supply the necessary funding. And there is a significant chance that the debt limit would need to be increased, requiring an act of Congress.

Needless to say, this approach is very different from the model that the FDIC uses for insured depositories—the one that arguably has prevented insured depositor panics for nearly eighty years. If the "orderliness" of depository failures arises from the fact that insured depositors' claims are seamlessly honored in full and on time—if, as Friedman and Schwartz argued, the basic problem is essentially *monetary* in character—then OLA cannot be said to offer a reasonable prospect of "orderly liquidation."

5. Sketching an Alternative Regulatory Design

So long as money-claims remain subject to default, it seems unlikely that the problem of runs and panics, and the associated adverse economic consequences, can be avoided. As shown above, OLA is not designed to address this issue.

In *A Regulatory Design for Monetary Stability,* the author proposed a regulatory apparatus to address this problem directly. The elements of the proposal can be described succinctly. Under the proposed design—a "public-private partnership" (PPP) regime for money creation— the government would:

1. Establish licensing requirements for the issuance of money-claims. (Logically, this would mean *disallowing* unlicensed parties from issuing these instruments, subject to *de minimis* exceptions.)

2. Require licensed firms to abide by portfolio restrictions and capital requirements. (In effect, adherence to these risk constraints would be the "eligibility criteria" for the regime.)

3. Establish an explicit government commitment to stand behind the money-claims issued by licensed firms—making them default-free.

4. Require licensed firms to pay ongoing, risk-based fees to the government in exchange for this public commitment.

Those who are familiar with the modern regulation of depository institutions will observe that these are *precisely* the core regulatory techniques that have been used for the depository sector since the establishment of the FDIC in 1933. Specifically: (1) the federal government and state governments issue special charters to depository banks, and unlicensed firms are legally prohibited from issuing deposit liabilities; (2) depository banks are constrained to a narrow range of permissible activities and investments and are subject to capital requirements; (3) the federal government explicitly stands behind (most) deposit obligations through the deposit insurance system; and (4) depository banks pay ongoing, risk-based fees to the government in return for this explicit commitment. In short, U.S. depository banks operate under a public-private partnership regime.

Conceptually, then, the PPP proposal is modest, even conservative. It envisions the modernization of an approach that has been used in the United States for many decades, arguably with reasonable success (albeit with some notable lapses). Importantly, the proposal is not that deposit insurance be "extended" to cover institutions that are currently ineligible for depository licenses. Instead, the argument begins at an analytically prior position. It starts by revisiting banking law's foundational *prohibition:* existing law forbids the issuance of *deposit* obligations without a special license, but this prohibition does not apply to other categories of money-claim. As argued above, this distinction is both formalistic and anachronistic. In our modern financial system, deposit obligations—once the predominant cash-parking contract—have come to represent only a small fraction of outstanding money-claims. Other money-claims raise the same basic policy problem.

The end result of this functional regime would be to make all money-claims sovereign and default-free. In the event of insolvency, licensed issuers would be subject to a special resolution regime under which money-claims would be honored in full and on time, while other providers of financing would see their claims impaired or extinguished. (This resolution regime would be modeled on the FDIC's existing resolution regime for depository banks, under which insured deposit obligations are seamlessly honored.) In effect, the PPP regime would recognize money creation as a public good. The proposal does not contemplate coverage caps, such as the current $250,000 limit on deposit insurance coverage. All money-claims, whether or not styled as "deposits," would be sovereign obligations.

A natural question is what types of firm should be eligible for licenses—equivalently, what types of asset portfolio should be permitted to be financed with money-claims. The author's prior paper, *A Regulatory Design for Monetary Stability,* provides reasons to think that licensed issuers should be limited to relatively low-volatility portfolios of credit assets. Many business models that currently rely heavily on money-claim financing, such as broker-dealers and certain types of hedge fund, would be ineligible for licenses under this criterion. Such firms

would therefore be precluded from issuing money-claims—again, just as firms not licensed as depository banks are now prohibited from issuing deposit instruments. In practical terms, they would be required to "term out" their funding, i.e., finance themselves in the (debt and equity) capital markets. Funded in this way, these firms would be amenable to ordinary bankruptcy procedures. Furthermore, having dealt with the problem of money-claim panics through the PPP system, the government could credibly deny unlicensed firms access to public support facilities.

Under the proposed design, large portions of the financial industry that currently rely heavily (directly or indirectly) on money-claim funding would be required to term out their financing structures. The effects on the profitability and size of these firms would be very substantial. Relatedly, the PPP regime should be expected to result in higher bid-ask spreads in the capital markets, reducing overall capital mobility to some degree. Moreover, the money market mutual fund business model would be rendered uneconomic.[48] These effects are undesirable when considered in isolation. However, the removal of a subsidy is necessarily costly to its beneficiaries.

Without question, the PPP regime raises implementation challenges and risks of its own. In particular, it requires a substantial contingent resource commitment from the government. However, this is true of any government intervention to provide a public good. (And the government's response in the recent crisis should give the lie to the notion that such a commitment does not already exist.) The costs of publicly underwriting the money supply through the PPP system must be weighed against the benefits of monetary stability, which appear to be substantial. Unlike recent regulatory reforms, the PPP proposal contemplates the end of shadow banking—an activity whose existence appears to be incompatible with financial and monetary stability.

[48] MMMF portfolios consist entirely of money-claims, which would all be federally insured under the PPP regime, reducing their yield. In addition, MMMFs would be required to pay ongoing fees and abide by capital requirements, since their "shares" are themselves money-claims. It is very unlikely that this business model would generate sufficient returns to be viable.

Appendix A: Sources for Money-Claim Figures

Measure	Source	Notes
Currency in Circulation	Federal Reserve Bank of St. Louis – Economic Research Division (FRED)	Year-end data.
Federal Reserve Balances	FRED	Year-end data.
Treasury Bills	2011 Economic Report of the President – Table B-87	Year-end data.
Insured Deposits	Federal Deposit Insurance Corporation (FDIC) –2011Q1 Quarterly Banking Profile	Estimated Insured Deposits reported by the FDIC; Q4 data.
Short-Term Agency Securities	Bloomberg (GSE short-term borrowing); 2010 Annual Reports for Fannie Mae and Freddie Mac; FHLB Office of Finance Annual Reports (discount notes)	FHLB discount notes extrapolated prior to 1998 (as a constant proportion of GSE short term borrowings). Year-end data except for Freddie Mac 2010, whose short-term debt measure is an average balance.
Primary Dealer Repo	Treasury Department Financial Stability Oversight Council (FSOC) 2011 Annual Report Chart 5.2.43; Federal Reserve	Extrapolated prior to 1995 (as a constant proportion of financial CP). Q4 data.
Asset-Backed CP	Federal Reserve Data Download Program; FRED	Pre-2001 data reflects Federal Reserve's old method; 1991 figure not available, so set equal to 1992; December data. 2001-2010 data reflects Fed's new method; year-end data.
Financial CP	Federal Reserve Data Download Program; FRED	Pre-2001 data reflects the Fed's old method; December data. 2001-2010 data reflects the Fed's new method; year-end data.
Nonfinancial CP	Federal Reserve Data Download Program; FRED	Pre-2001 data reflects the Fed's old method; December data. 2001-2010 data reflects the Fed's new method; year-end data.
Eurodollar Deposits	FDIC 2011Q1 Quarterly Banking Report; McGuire & von Peter, *The US Dollar Shortage in Global Banking*, *BIS Quarterly Review* 54 (March 2009)	Sum of (i) FDIC's reported foreign office deposits and (ii) McGuire and von Peter's $2.2 trillion eurodollar deposit estimate for 2007 extrapolated before and after 2007 (as a constant proportion of the FDIC's reported foreign office deposits). Q4 data.
Government Money Market Mutual Funds	Investment Company Institute 2011 Investment Company Factbook	Year-end data.
Non-government Money Market Mutual Funds	Investment Company Institute 2011 Investment Company Factbook	Includes both the non-government and tax-exempt categories reported in the ICI Factbook; year-end data.
Liquidity-Put Bonds	FSOC 2011 Annual Report Chart	2005-2010 estimates are the sum of

Measure	Source	Notes
	5.2.42; Federal Reserve	the average amounts outstanding of Tender Option Bonds, Auction Rate Securities, and Variable Rate Demand Bonds; extrapolated prior to 2005 (as a constant proportion of ABCP). Year-end data.
Uninsured Deposits	FDIC 2011 Quarterly Banking Report	Calculated by subtracting Estimated Insured Deposits from Domestic Office Deposits. Q4 data.