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Three Principles for Market-Based Credit Regulation

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Over the last three decades, a new market-based credit system has grown up to become larger than the traditional bank-based credit system, only to mark that achievement in 2007 with a financial crisis of its very own. Some say the crisis was a "Minsky moment" when the inherent instability of credit—market-based credit as well as bank-based credit—was revealed for all to see. While not necessarily disagreeing with that formulation, I prefer to emphasize that it was a "Bagehot moment" when the Fed was forced to put aside its inflation fine tuning and go back to basics. In retrospect, it was the actions of the Fed, more than anything else, that put a floor on the crisis. The Fed did this by catching collapsing markets on its own balance sheet, first the wholesale money market and then the mortgage-backed security market (Mehrling 2011, ch. 6). The question now arises how to avoid ever having to do so again.

I. Back to Basics

The Bagehot Rule for handling financial crisis—"lend freely but at a high rate"—was Bagehot's attempt to distill the principles of central bank practice as that practice had developed organically over the previous 50 years (Bagehot 1906). Today the Bagehot Rule is where everyone starts when thinking about the role of the central bank, even if most subsequent discussion is about how to avoid crisis in the first place.

My concern about this near-universal framing of the problem is that the world Bagehot was thinking about is, in crucial respects, not the world we are dealing with today. Bagehot was all about the nineteenth century bill market; our new market-based credit system is about the twenty-first century integration of the money market with the capital market. As a consequence, when the Fed went back to basics, it found that it had to go beyond Bagehot.

Starting in August 2007, the Fed's first strategy for handling the crisis was simply to lower the Fed Funds rate, from 5 percent to 2 percent. It wasn't enough. Then, after the collapse of Bear Stearns in March 2008, the Fed embarked on a massive program of Bagehot-style last-resort lending, liquidating its holding of Treasury bills and lending out the proceeds, not only to banks but also to broker-dealers. But that wasn't enough either.

After the collapse of Lehman Brothers in September 2008, and while the attention of most of the world was focused on the Troubled Asset Relief Program, the Fed expanded its balance sheet on both sides, offering itself as counterparty to both sides of a wholesale (and global) money market that had frozen up. And then in March 2009, as the money market had begun to recover, the Fed went even further, replacing its money market lending with outright purchases of mortgage-backed securities, almost $1 trillion worth added to a balance sheet that had been less than $1 trillion only six months before.

One lesson to draw from this experience is that, in modern conditions, the central bank serves not merely as Bagehot-style lender of last resort but even more as "dealer of last resort." After Lehman, in effect the Fed quoted a price at which it was willing to buy money and a price at which it was willing to sell money, and then absorbed the resulting order flow onto its own balance sheet. That's what dealers do (Treynor 1987; Harris 2003). In modern finance theory, liquidity means the ability to buy or sell, in size, without moving the price. In normal times, dealers supply this liquidity (make markets) by offering trading options.[1] During the crisis, this

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[1] In normal times, the so-called "channel system" for monetary policy implementation (Bindseil 2005) establishes a public dealer "outside spread" around the prevailing

normal source of supply broke down, and the Fed stepped in to fill the gap.

In doing so, the Fed clearly went beyond the intentions of its century-old founders. The mental world of the founders was much more that of Bagehot, not the world of today; indeed they envisioned a Fed confined entirely to the discount of commercial bills! The exigencies of war finance, however, soon forced widening of their mental horizons, and the newborn Fed instead started life by providing backstop for the sale of Treasury debt. Subsequently, the Depression and World War II confirmed the centrality of Treasury debt markets in the US financial system, and the Fed adapted to changed circumstances by resolving to conduct its operations primarily in those debt markets (FOMC 1964). In wartime, the Fed had acted as primary dealer for government debt; in peacetime, it handed that role over to private security dealers.

The familiar distinction between market liquidity and funding liquidity (Brunnermeier and Pedersen 2009) is useful for understanding the difference between central banking in wartime and in peacetime.[2] In peacetime, security dealers supply market liquidity by quoting two-way markets, but their ability to absorb the resulting order flow depends on their access to funding liquidity. In peacetime, therefore, central banks quite properly focus their attention on funding liquidity, and on banks as suppliers of that funding liquidity, leaving it up to security dealers to transmit monetary intervention to the wider capital market. Under the stress of wartime, however, the dealer transmission mechanism breaks down, so central banks take over the job of supplying market liquidity (dealer of last resort) as well as funding liquidity (lender of last resort).

This historical perspective helps us to see that what happened in the crisis of 2007–2009 was analogous to what happens in wartime. "Dealer of last resort" was not new; what was new was the extension of dealer of last resort from government securities to private mortgage-backed securities.

The reason this extension became necessary is not hard to find; it was a consequence of the rising importance of market-based credit. In a bank-based credit system, funding liquidity and lender of last resort may well be enough to ensure sufficient flow of credit. A market-based credit system, however, relies on market liquidity and, hence, ultimately on dealer of last resort. Just as the Fed adapted, in its first 50 years, to the rise of a market-based system of government credit, the Fed's present task is to adapt to the rise of a market-based system of private credit. The Fed's shifting role during the crisis can be understood as the first steps toward that adaptation.

II. A Model of Market-Based Credit

What system of regulation would make sense if the market-based credit system were more or less completely to replace the bank-based credit system?

To help in thinking about this question, Table 1 shows a stylized picture of a market-based credit system. To avoid misunderstanding, the table is not intended to be a map of the shadow banking system circa 2007 (see Pozsar et al. 2010 for that). Rather, the table shows the outline of what a possible market-based credit system might look like in the future.[3]

Instead of the complicated tranching of the actual shadow banking system, which served to strip risk out of the underlying Residential Mortgage-Backed Securities, I'm imagining a future "Capital Funding Bank" in which all the risk stripping is done using simple derivatives, Interest Rate Swaps and Credit Default Swaps. And instead of the complicated system of capital buffers involving credit derivatives sold to hedge

"inside spread" established in private dealer markets. See Mehrling (2010).

[2] This distinction can be understood as a modern version of Moulton's (1918) distinction between "shiftable" (or salable) capital assets and traditional "self-liquidating" commercial bills.

[3] The table is also not intended to be a map of an entire possible future market-based credit system, only the portion that is critical for the discussion that follows. Thus, I abstract from the familiar capital market in which long-term borrowers issue securities that are acquired by long-term investors, i.e., the province of standard financial economics. And I abstract also from the familiar money market, where banks and nonbanks issue deposits and deposit substitutes to households and nonfinancial corporations that seek money balances on one of the standard motives, i.e., the province of standard monetary economics. My concern is with the place where the capital market and the money market intersect, i.e., the province of the intersection between financial economics and monetary economics.

TABLE 1—A MARKET-BASED CREDIT SYSTEM

Capital Funding Bank	
Assets	Liabilities
RMBS 100 CDS 0 IRS 0	100 MM funding
Asset Manager	
Assets	Liabilities
"deposits" 100	100 Capital 0 CDS 0 IRS
Global Money Dealer	
Assets	Liabilities
MM funding 100	100 "deposits"
Derivatives Dealer	
Assets	Liabilities
CDS 0 IRS 0	0 CDS 0 IRS

funds and insurance companies, I'm imagining that all of the risk is transferred to an "Asset Manager" who uses simple derivatives in order to achieve his desired risk exposure. (Note that I adopt the accounting convention of treating derivatives as contingent liabilities of the agent bearing the risk.) The consequence is that the "Capital Funding Bank" is the mirror image of the "Asset Manager" not only in terms of funding but also in terms of risk. CFB funding liabilities are the counterpart of AM assets, and AM derivative liabilities are the counterpart of CFB derivative assets.

In this model, two different financial intermediaries are crucial.[4] First is the "Global Money Dealer" that takes care of the funding transfer, in effect mobilizing the customer capital held by the Asset Manager to fund the RMBS held by the Capital Funding Bank. The second is the "Derivatives Dealer" that takes care of the risk transfer, in effect mobilizing the risk capacity of customer capital to bear the risk in the RMBS. By construction, both intermediaries are pure dealers holding completely "matched book" and taking no net risky positions of their own. (They are Volcker-Rule dealers, idealized market makers that do no proprietary trading.) The GMD quotes buy and sell prices for money, while the DD quotes buy and sell prices for term and credit spreads. Through arbitrage, the price of the underlying risky asset is implied by these dealer prices, and vice versa.

In this idealized market-based credit system, counterparty risk is handled by using collateral, so that all positions are fully secured. Specifically, by some system of hypothecation and rehypothecation, RMBS collateral flows to the GMD to support money market funding, and then flows further to the AM as security for his deposit.[5] Similarly, all derivatives exposures are secured by prefunding of a kind; the AM's deposit at the GMD is sufficient to cover any losses from its derivative liabilities, and the CFB's RMBS holding is sufficient to cover any losses from its derivative assets.

A key feature of this conceptual framework is the complete abstraction from solvency issues and, hence, also from the question of capital adequacy. By construction, any valuation change in the risky assets held by the CFB is matched by a valuation change in the customer capital that funds the AM. In this idealized world, AM capital is the risk capital for the entire system; there is no need for separate capitalization of the Capital Funding Bank, the Global Money Dealer, or the Derivatives Dealer, since by construction all asset risk is transferred to the Asset Manager.

The purpose of abstracting from solvency risk is to focus attention instead on liquidity risk, specifically on the role of the dealers in bearing that risk, and on the role of the central bank as backstop for those dealers.

Suppose, for example, that the value of the RMBS falls by $10. Now the CFB has a funding problem, since its posted RMBS collateral is no longer sufficient to support its borrowing from the GMD. At the same time, the AM's derivative liability increases by $10, requiring it to post additional deposit collateral to the DD. What is apparently required to make the market-based

[4] My emphasis on the dealer function follows Hicks (1989), but see also Stigum and Crescenzi (2007) who conceptualize banks as a specialized kind of security dealer.

[5] This way of thinking about secured lending was inspired by the account of Aitken and Singh (2010).

Table 2—Value Fluctuation and Credit Expansion

Capital Funding Bank	
Assets	Liabilities
RMBS 90 CDS 10 IRS 0	100 MM funding
Asset Manager	
Assets	Liabilities
"deposits" 100	90 Capital 10 CDS 0 IRS
Global Money Dealer	
Assets	Liabilities
MM funding 100	100 "deposits"
Derivatives Dealer	
Assets	Liabilities
CDS 10 IRS 0	10 CDS 0 IRS

credit system work is a mechanism for shifting the AM's deposit collateral to the credit of the CFB in such a way as to make that collateral available to support continued borrowing from the GMD.

The way this plays out in balance sheets is shown in Table 2; note the credit expansion on the balance sheet of the DD, a credit expansion that is secured by the aforementioned transfer of collateral through the DD. If the valuation change is temporary then, when value returns to its previous level, collateral will flow back in the opposite direction, and the credit expansion will be canceled.

But if the valuation change is permanent, then at some point losses are realized by actual payment. The Asset Manager pays $10 to the Derivative Dealer, who then pays the CFB, who then uses the payment to reduce borrowing from the GMD. In the case of a permanent valuation change, the net effect is a credit contraction of $10 on the balance sheet of the Global Money Dealer, as money market funding contracts to the size of the underlying capital value being funded.

In either case, temporary or permanent value change, the important point to emphasize is that the *mechanism* through which fluctuation in the value of risky assets is absorbed by customer capital involves fluctuation in the size of dealer balance sheets. And the mechanism that produces balance sheet fluctuation is the flow of collateral and money *payments*. In Table 2, the payments system is assumed to operate perfectly. But if it does not, there is plenty of room for self-reinforcing liquidity spirals (as Brunnermeier 2009).

For example, if for any reason the CFB were unable to top up the collateral for its money market borrowing, it might be forced to liquidate some portion of its assets, so driving their price down even more and worsening the CFB's funding problem. Further, if the GMD fails to receive additional collateral, it will be unable to top up the collateral needed to support its own secured deposit liabilities, and so might face a funding problem of its own. By construction, these are liquidity problems, not solvency problems, hence the province of a central bank.

Separately, if for any reason the AM were unable (or even merely unwilling) to post additional collateral for its derivative liability, the DD might be forced to close out the AM's position, driving derivative "insurance" prices up and, hence, the implied RMBS price down even more, so worsening the problem. Further, having failed to receive additional collateral from the AM, the DD will be unable to top up the collateral needed to support its derivative liability to the CFB, and so might face a margin call of its own. Again by construction, these are liquidity problems, not solvency problems, hence the province of a central bank.

Traditional lender of last resort is one response to these problems. The central bank could lend to the Global Money Dealer, so directly backstopping the liquidity of its deposit liabilities (to the AM) while also indirectly supporting continued lending (to the CFB). And if that is not enough, the central bank could also lend to the Derivative Dealer, so directly backstopping the liquidity of its derivative liabilities (to the CFB) while also indirectly supporting continued forbearance on collateral margin calls (to the AM).

But funding liquidity may not be enough to stop the rout. Nothing in lender of last resort prevents the GMD from demanding additional collateral from the CFB, not only to cover current mark-to-market losses but also, even more, to safeguard against possible future losses. And

nothing in lender of last resort prevents the DD from demanding additional collateral from the AM, again not only to cover current mark-to-market losses on derivative positions but also to safeguard against possible future losses. And nothing prevents the CFB or the AM from responding to these demands by attempting to liquidate their positions, so continuing the downward liquidity spiral.[6]

The key point is that, in a market-based credit system where funding is secured by collateral, the market value of collateral plays a much more crucial role than in a bank-based credit system. In such a system, therefore, a central bank liquidity backstop may need to embrace also dealer of last resort by bidding, in the open market, for some subset of the risky assets that are serving as collateral. The central bank could bid for RMBS, so directly supporting the value of CFB collateral and indirectly the value of AM derivative positions. Or it could offer RMBS derivative "insurance," so directly supporting the value of AM positions and indirectly the value of CFB collateral. Or it could do a bit of both, backstopping market liquidity in both derivative markets and the underlying cash markets.

The point of such intervention, it is important to emphasize, is not so much to take risky assets off the market but rather to prevent a liquidity spiral from destabilizing the price of those assets and so, as a consequence, undermining their use as collateral in the market-based credit system. As with the Bagehot Rule, much of the impact of such intervention comes not from the actual positions taken by the central bank but rather from the price support provided by trading options that may well remain unexercised and so never show up on the central bank's balance sheet.

III. Conclusion

By way of summary, here are three principles that seem to follow from this way of thinking:

(i) Asset markets, not banking institutions. Market liquidity, not funding liquidity; dealer of last resort, not lender of last resort. This most important first principle reminds that market liquidity is the more relevant concept for a market-based credit system, that market liquidity is normally supplied by dealers, and that the best way to support the dealer system in a crisis may be to support the markets in which they deal by supporting key collateral values.

(ii) Outside spread, not inside spread. Bagehot's Rule for funding liquidity emphasizes lending freely but at a high price, the high price being Bagehot's safeguard against moral hazard; only those in true need will borrow, and they will pay back as soon as they are able. Analogously, a modern rule for market liquidity should emphasize buying and selling freely but at a wide spread around what price would be in more normal times.

(iii) Core assets, not periphery. Bagehot emphasized lending against "all good banking securities" which he specified as "what in ordinary times is reckoned a good security—on what is then commonly pledged and easily convertible" (p. 198). It is not the job of the central bank to make bad securities good, but only to stop a liquidity spiral; it can do this most efficaciously by focusing its liquidity support operations on a subset of good securities (rather than a subset of too-big-to-fail banks).

[6] And of course nothing prevents that downward spiral from spilling over to the larger financial system, from which we have been abstracting, as well as to the larger economy. See footnote 3.

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