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1

Bagehot was a Shadow Banker: Shadow Banking, Central Banking, and the Future of Global Finance

2

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11 The modern shadow banking system, at its core, bears a surprising resem-
12 blance to the 19th century world that Walter Bagehot helped us to under-
13 stand in his magisterial book, *Lombard Street: A Description of the [London]*
14 *Money Market* (1873). At the heart of both worlds is the wholesale money
15 market, and operating as the crucial liquidity backstop in both worlds is
16 the central bank. At the time Bagehot was writing, this backstop function
17 was not yet fully understood, much less accepted; much the same could
be said of the central bank's backstop of the shadow banking system today

*The authors are members of the Shadow Banking Colloquium, a project of the Financial Stability Research Program of the Institute for New Economic Thinking. Thanks to Falk Mazelis for research assistance, and to Phil Prince for searching comments on an earlier draft.

1 (Capie, 2012). We are living today in a Bagehot moment, when the outlines
2 of the new are just emerging from the ashes of the old.

3 During crisis, the central banks of Bagehot's time and our own both
4 dutifully employed their balance sheets to stem the downturn. In both
5 his time and ours, they did so without much prior theory about why it
6 would work and with hardly any thought about possible implications for
7 more normal times. The time for all of that would come later, after the
8 crisis. Bagehot's book started the process of necessary rethinking for his
9 own time by bringing out into the open how the Bank of England had
10 acted during previous crises. We start the process of necessary rethinking
11 for our own time by using Bagehot as an entry point for understanding
12 the modern shadow banking system and the Fed's response to the global
13 financial crisis.

14 In doing so, we are conscious of taking a different approach to the
15 subject than does most of the existing literature. For most authors, the
16 important thing about shadow banking is the "shadow", the distinct whiff
17 of illegitimacy that comes from regulatory evasion in good times combined
18 with unauthorized access to the public purse in bad times. This is the origin
19 of the widespread impulse to frame the question of appropriate oversight
20 and regulation of shadow banking as a matter of how best to extend the
21 existing system of oversight and regulation as it is applied to traditional
22 banking. See, for example, the much-cited paper of Gorton and Metrick
23 (2010), as well as the recent overviews by Adrian and Ashcraft (2012) and
24 the Financial Stability Board (2012).

25 For us, by contrast, shadow banking is simply "money market funding of
26 capital market lending", sometimes on the balance sheets of entities called
27 banks and sometimes on other balance sheets. As such, shadow banking is
28 not some troubling excrescence on the healthy body of traditional banking.
29 Rather, it is the centrally important channel of credit for our times, which
30 needs to be understood on its own terms. From this vantage point, the
31 question of appropriate oversight and regulation requires us to abstract
32 from what we know about traditional banking, and to start instead by
33 imagining a world in which shadow banking is the only banking system.

34 The defining role of markets, both money and capital markets, for our
35 understanding of shadow banking directs attention to the central impor-
36 tance of prices, and also to the central importance of market-making
37 institutions, both for price discovery and for continuing secondary market

Capital Funding Bank		Global Money Dealer		Asset Manager	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
RMBS	MM funding	MM funding	“deposits”	“deposits”	Capital
CDS					CDS
IRS					IRS
FXS					FXS

Derivative Dealer	
Assets	Liabilities
CDS	CDS
IRS	IRS
FXS	FXS

Fig. 1. A market-based credit system.

1 liquidity. These institutions, relatively unimportant from the perspective of
 2 traditional bank loan-based credit, are both central and essential for mod-
 3 ern capital market-based credit. When they are working well, the whole
 4 system works well; and when they stumble, the whole system stumbles. In
 5 what follows, we place them at the very center of analytical attention.

6 Figure 1 shows an idealized picture of the shadow banking system,
 7 which we might more neutrally call the “market-based credit system”. The
 8 “capital funding bank” is engaged in money market funding of capital mar-
 9 ket lending, hence shadow banking, specifically the funding of residential
 10 mortgage-backed securities (RMBS). We imagine the risk in these securities
 11 being hedged in various swap markets — generically, credit default swaps,
 12 interest rate swaps, and foreign exchange swaps — so that the combined
 13 CFB asset position is essentially risk-free.¹ We further imagine this asset
 14 position being used as security for money market funding.

15 The “asset manager” is the mirror image of the capital funding bank,
 16 holding its capital in (secured) money form and enhancing the return on
 that capital by selective risk exposure in various swap markets — again

¹To avoid possible confusion, let it be noted that we adopt an “insurance” convention of booking swaps that strip out risk as contingent assets on their ultimate owner’s balance sheet, and hence also as contingent liabilities on the balance sheet of the counterparty to whom the risk is transferred. An alternative “investment” convention is also possible, which would instead book the risk exposure as an asset on the reasoning that it has positive expected return even if zero net present value at inception.

1 generically credit default swaps, interest rate swaps, and foreign exchange
2 swaps. Standing in between the asset manager and the capital funding
3 bank are two types of market-makers: one the “global money dealer” whose
4 dealing activities establish the price of funding, and the other the “derivative
5 dealer” whose dealing activities establish the price of risk. These dealers will
6 be the central focus of our analysis.

7 In this stylized model, we abstract from counterparty risk because all
8 funding is secured, and because all derivative positions are matched either
9 by offsetting natural positions (such as RMBS for the CFB) or by reserves
10 sufficient to make good even in the worst-case scenario (“deposits” for the
11 AM). Further, our dealers are matched-book dealers, with no net exposure
12 to price risk, and thus with no need for capital reserves. Because their cash
13 and collateral inflows and outflows are exactly matched, they have no need
14 for liquidity reserves either. The only capital in the system, and the only
15 deposit holding as well, are both on the balance sheet of the asset manager,
16 which is as it should be since the asset manager is the only agent facing
17 any risk. (We will be relaxing these strong assumptions when we consider
18 boom-bust dynamics in Section II.)

19 The stylized character of this model means that it cannot be expected
20 to line up exactly with the institutional arrangements of current financial
21 markets. Indeed, most large investment banks probably contain within their
22 walls elements of all four functions. The value of the model is in helping us
23 to make conceptual distinctions between these functions, both within given
24 institutions and across institutions. Just so, for example, capital funding
25 bank structures can be found on the balance sheets of most European
26 universal banks, but also in off-balance sheet conduits of various kinds.
27 Money market mutual funds might be considered global money dealers,
28 but they are not the only ones. Pension funds might be considered asset
29 managers, but also non-financial corporate treasurers and even synthetic
30 Exchange-Traded Funds. Central counterparty clearinghouses might be
31 considered derivative dealers, but so also is anyone running a bespoke
32 swap book.

33 The main purpose of the model is to provide an overarching framework
34 to make conceptual sense of the many moving parts of the market-based
35 credit system. Most important, the model highlights the central impor-
36 tance of the dealers who make prices in money and capital markets. In
37 doing so, we also uncover a link to the older Bagehot-era literature since,

1 in effect, Bagehot's bill brokers were last century's version of the model's
2 Global Money Dealers (Wood, 2000). At the core of the modern-world
3 credit system lies a bill-funding apparatus quite analogous to the one
4 Bagehot and his contemporaries were trying to understand and to man-
5 age. For understanding and for managing our own system, we start from
6 Bagehot.

7 **Bagehot and Beyond**

8 Reading Bagehot, we enter a world where securities issued by sovereign
9 states are not yet the focal point of trading and prices, as they would come
10 to be in the 20th century. Instead, the focus of attention is the private bill
11 market, which domestic manufacturers tap as a source of working capital,
12 and which traders worldwide tap to finance the movement of tradable
13 goods. It is a market in short-term private debt, typically collateralized by
14 tradable goods.

15 Supplying funds to the bill market were, among others, banks that pur-
16 chased bills at discount from face value using their own deposit liabilities,
17 typically planning to hold to maturity and redeem at par. The institution
18 of "acceptance", by which a bank or some other party guaranteed payment
19 of a bill at maturity, was the way non-prime bills became prime. Backstop-
20 ping the whole thing was the Bank of England, whose posted "Bank Rate" in
21 effect put a floor on the price of prime bills; bank rate was usually somewhat
22 higher than the market rate of discount. Banks whose immediate cash out-
23 flow (from deposit withdrawals) outran their immediate cash inflow (from
24 maturing bills) could take their prime bill assets to the Bank of England
25 for rediscount, and get cash for them. Normally, though, they could get a
26 somewhat higher price by tapping the lively secondary bill market to find a
27 private buyer. In normal times, the central bank backstop operated to sup-
28 port the market; only in crisis times did the central bank backstop become
29 the market.

30 What has come down to us as the Bagehot Rule for stemming financial
31 crisis — lend freely but at a high rate of interest — was originally about the
32 Bank of England buying bills freely but at a low price. It should be empha-
33 sized, however, that the Bank could and did also make loans ("advances")
34 against bill collateral, and the Bank's generous collateral valuations pro-
35 vided further support for market prices. Bagehot famously urged the Bank

Deficit Firm		Bank		Bank of England		Surplus Firm	
Assets	Liabilities	Assets	Liabilities	Assets	Liabilities	Assets	Liabilities
	Bill		Acceptance	Bill	Deposit	Deposit	
				Acceptance			

Fig. 2. Bagehot’s lender of last resort.

1 to accept as collateral “what in ordinary times is reckoned a good security”
 2 rather than attending to current market valuation. The point of all these
 3 measures was to prevent troubled banks from being forced to liquidate
 4 fundamentally sound assets at fire sale prices.

5 Figure 2 shows a stylized picture of how the discount system worked
 6 in Bagehot’s day. We show the Bank of England as the ultimate backstop
 7 for the system, rediscounting prime bills by using its own liabilities as a
 8 source of funds. Note well that the Bank of England takes in as assets both
 9 the underlying bill and the acceptance which guarantees par payment at
 10 maturity. In principle, the Bank of England’s risk exposure was supposed
 11 to be about when it would be paid, not about whether it would be paid,
 12 thus liquidity risk not solvency risk. The banks writing acceptances were
 13 supposed to be taking the solvency risk, so making up with their own capital
 14 any losses on the underlying bill.

15 What would Bagehot make of modern shadow banking?

16 On the surface, the modern system looks quite different. The closest
 17 thing we have to the institution of “acceptance” is the credit default swap
 18 (Mehrling, 2010), but that does not so much guarantee eventual par pay-
 19 ment as current par valuation. Just so, according to standard financial
 20 theory, the price of a “risk-free” security = price of risky security + price
 21 of risk insurance. Further, the modern system is fundamentally a world of
 22 long-term debt, which connects to the world of short-term bills through the
 23 institution of the interest rate swap; in standard financial theory, the price
 24 of a short-term security = price of long-term security + price of interest
 25 rate swap. Finally, the modern system has dispensed with the gold standard
 26 of Bagehot’s day, with the consequence that securities contain currency
 27 risk which can be stripped out using the institution of the FX swap; the

1 price of a dollar security = price of foreign currency security + price of
 2 FX swap.

3 These differences from the world of Bagehot are significant but should
 4 not distract us from seeing that at the heart of his world, as ours, is the
 5 money market, and operating as crucial backstop in both worlds is the
 6 central bank. Indeed, it could be said that the whole point of the various
 7 swaps is to manufacture prime bills from diverse raw materials. Putting
 8 together all the equations in the previous paragraph, we can distinguish
 9 the various stages of manufacture:

$$\begin{aligned}
 \text{Price of "risk-free" prime bills} &= \text{price of risky security} \\
 &+ \text{price of risk insurance} \\
 &+ \text{price of interest rate swap} \\
 &+ \text{price of FX swap.}
 \end{aligned}$$

10 At its core, modern shadow banking is nothing but a bill-funding market,
 11 not so different from Bagehot's. The crucial difference between his world
 12 and ours is the fact that Bagehot's world was organized as a network of
 13 promises to pay in the event that someone else does not pay, whereas our
 14 own world is organized as a network of promises to buy in the event that
 15 someone else does not buy. (That is what the swaps do, in effect.) Put
 16 another way, Bagehot's world was centrally about funding liquidity, whereas
 17 our world is centrally about market liquidity (Brunnermeier and Pedersen,
 18 2009), also known as "shiftability" (Moulton, 1918).

19 What accounts for the shift from Bagehot's time to our own? The key
 20 reason seems to be that in today's world, so many promised payments
 21 lie in the distant future, or in another currency. As a consequence, mere
 22 guarantee of eventual par payment at maturity does not do much good.
 23 On any given day, only a very small fraction of outstanding primary debt
 24 is coming due, and in a crisis, the need for current cash can easily exceed it.
 25 In such a circumstance, the only way to get cash is to sell an asset, or to use
 26 the asset as collateral for borrowing. In the private market, the amount of
 27 cash you can get for an asset depends on that asset's current market value.
 28 By buying a guarantee of the market value of your assets, in effect you are
 29 guaranteeing your access to cash as needed; if no one else will give you cash
 30 for them, the guarantor will.

1 That, in effect, is what all the swaps are doing, or at any rate what
2 they are trying to do, because the plain fact of the matter is that all the
3 swaps in the world cannot turn a risky asset into a genuine Treasury bill.
4 What works in standard finance theory works only approximately in actual
5 practice, and the devil is in the details of that approximation. The weird
6 and wonderful world of derivatives at best creates what we might call quasi-
7 Treasury bills, which may well trade nearly at par with genuine Treasury
8 bills during ordinary times, only to gap wide during times of crisis. Here
9 we identify the fundamental problem of liquidity from which standard
10 theory abstracts, as well as the reason that central bank backstop is needed.
11 Promises to buy are no good unless you have the wherewithal to make good
12 on them; the weak link in the modern system is the primitive character of
13 our network of promises to buy.

14 Just so, consider the situation of a shadow bank that holds both a risky
15 asset and various swaps that reference that risky asset, and then finances the
16 lot in the wholesale money market, as in Fig. 1. In principle the combination
17 of assets and swaps is risk-free (i.e., a quasi-Treasury bill), but the practical
18 question is whether the shadow bank can finance the combination in the
19 same way that it could if it were actually risk-free (i.e., a genuine Treasury
20 bill). Suppose that the market value of the asset falls a bit. Even supposing
21 that the value of the swaps rises pari passu — which it may not, given
22 liquidity issues — there still remains the issue how to use that change in
23 market value to meet the funding gap on the asset itself.

24 If the terms of the swap contracts are mark-to-market with speedy cash
25 collateral transfer, then the swap value gain produces immediate cash inflow
26 that might possibly be used to fill the funding gap. However, if the terms
27 are otherwise so that the funding gap persists, then the underlying risky
28 asset position may have to be liquidated, so exacerbating downward price
29 pressure as a liquidity spiral gets underway. And even if the swap terms
30 are favorable, there could still be a problem, since what is favorable to one
31 party is unfavorable to its counterparty. Mark-to-market with speedy cash
32 collateral transfer just means that the liquidity troubles of the shadow bank
33 are shifted onto the shoulders of its swap counterparty, which now faces its
34 own funding gap. Even if the shadow bank is fine, its counterparty may be
35 forced to liquidate and so spark its own downward liquidity spiral.

36 To stem these liquidity spirals, what is clearly needed is some entity
37 that is willing and able to use its own balance sheet to provide the necessary

1 funding. If the funding gap is at the shadow bank, we need an entity that can
2 turn the increased value of swap positions into an actual cash flow. If the
3 gap is at the swap counterparty, we need an entity that can turn whatever
4 assets the counterparty might have into actual cash flow. Ultimately we
5 need a central bank, but that is just the ultimate backstop. Well before this,
6 what we need is a dealer system that offers market liquidity by offering to
7 buy whatever the market is selling. Only in crisis time does the central bank
8 backstop become the market; in normal times, the central bank backstop
9 merely operates to support the market.

10 Thus, just as in Bagehot's days, the critical infrastructure is an intercon-
11 nected system of dealers, backstopped by a central bank. Just as in Bagehot's
12 days, the required backstop may involve commitment to outright purchase
13 of some well-defined set of prime securities (such as Treasury securities).
14 But it must also involve commitment to accept as collateral a significantly
15 larger set of securities, in order to indirectly put a floor on their price in
16 times of crisis. In previous work, we have called this commitment "dealer
17 of last resort" rather than "lender of last resort" in order to draw attention
18 to the modern importance of market liquidity, and hence the importance
19 of placing bounds on price fluctuation (Grad, Mehrling, and Neilson, 2011;
20 Mehrling, 2011).²

21 The key issue for financial stability, today as in Bagehot's days, is to find
22 a way to ensure a lower bound on the price of prime bills. The difference
23 is that today, unlike in Bagehot's days, prime bills are manufactured by
24 stripping price risks of various sorts out of risky long-term securities. The
25 consequence is that today, unlike in Bagehot's days, a lower bound on
26 the price of prime bills also requires some kind of liquidity backstop of

²The contrast with "lender of last resort" is not meant to be a contrast with Bagehot himself, but rather a contrast with the distorted version of Bagehot that has come to dominate our thinking during the intervening century. Under the bank loan-based credit system, emphasis came to be placed entirely on the lending, i.e., funding liquidity, to the neglect of indirect price support of the underlying accepted collateral, i.e., market liquidity. That happened, so it seems, for two historically contingent reasons. First, most often the underlying accepted collateral was a genuine Treasury security so price support seemed irrelevant. Second, when the underlying collateral was something other than a Treasury, it was typically a collection of illiquid loans that had no real market price that could be supported. Given the rise of the shadow banking system, neither of these historically contingent reasons any longer applies.

1 the instruments that are used to create the prime bills from riskier raw
2 material.

3 **The Dealer Function, Boom and Bust**

4 Dealers supply market liquidity by quoting a two-sided market and absorb-
5 ing the resulting order flow on their balance sheets (Harris, 2003). One
6 important kind of idealized dealer is a “matched-book” dealer whose long
7 positions exactly match his short positions, so that the dealer is in principle
8 completely hedged against price risk. This is the kind of idealized dealer we
9 imagined in our basic model of the shadow banking system (Fig. 1). But
10 a dealer who insisted on matched book at every point in time would not,
11 strictly speaking, be supplying market liquidity at all. If customers are able
12 to buy or sell quickly, in volume, and without moving the price, it is because
13 a dealer is willing to take the other side of that trade without taking the time
14 to look for an offsetting customer trade. The consequence is inventories,
15 sometimes long and sometimes short depending on the direction of the
16 imbalance; and the consequence of inventories is exposure to price risk.

17 For Global Money Dealers, matched book means term funding of quasi-
18 T-bills. Deviations from matched book involve overnight funding of quasi-
19 T-bills (long inventory), or overnight investment of term funding (short
20 inventory). For Derivative Dealers, matched book means offsetting swap
21 positions, and deviations from matched book involve net risk exposures
22 (long or short). In both cases, deviations from matched book involve expo-
23 sure to risk, so profit-seeking dealers will insist on positive expected profit as
24 the price of bearing that risk. The way that dealers ensure positive expected
25 profit is by shifting the prices they quote in line with the exposures they are
26 bearing.

27 Figure 3 shows a stylized model, adapted from Treynor (1987), of how
28 inventories affect price quotes in money and capital markets. In money
29 markets, the longer the “inventory” (exposure to liquidity risk) the higher
30 the yield; in risk markets, the longer the “inventory” (exposure to price
31 risk) the higher the risk premium. In both cases, the slope of the quote
32 curve depends on the amount of risk per unit of inventory, and also on the
33 availability of the backstops (which Treynor calls value-based investors),
34 which determine the outside spread. The different slopes in the money
35 and capital markets reflect an assumption that the outside spread is much

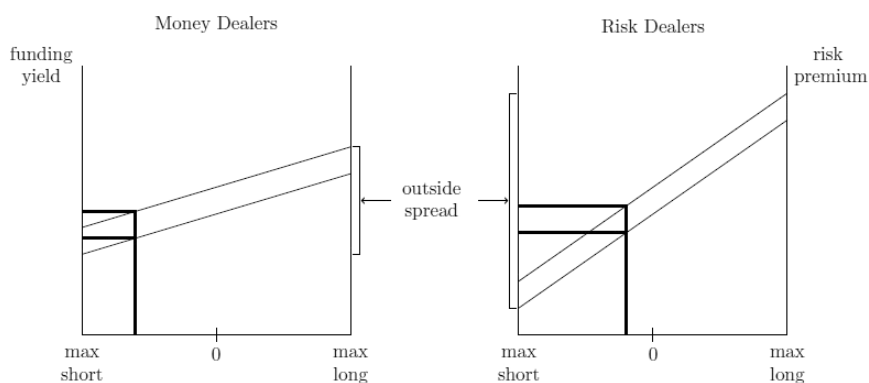


Fig. 3. The dealer system (boom).

1 tighter in the former than in the latter. In both cases, observe that dealers
 2 move their price quotes to bring, buy, and sell order flows (quantities) closer
 3 in line with each other, and in doing so, they move prices farther away from
 4 their “fundamental” matched-book reference point.

5 Because dealer inventory pressure determines prices, the economics
 6 of the dealer function interact intimately with the economics of shadow
 7 banking. The figure depicts both money dealers and risk dealers as holding
 8 net short positions, in effect using their balance sheets to absorb an excess
 9 order flow for money and for risk exposure respectively. From a dealer
 10 perspective, asset managers are the ultimate buyers of money and risk
 11 exposure (see Fig. 1), so the figure can be interpreted as the result of net
 12 order flow from asset managers. By absorbing the imbalance, dealers are
 13 pushed into short inventory positions, which cause them to quote lower
 14 money yields and lower risk premia.

15 The key point is that this price distortion makes shadow banking more
 16 profitable. Responding to the price incentive, shadow banks can be expected
 17 to spring up, so creating order flow on the other side of the market, which
 18 allows dealers to run off their positions until the next flow imbalance pushes
 19 up inventories again with consequent price distortions that stimulate fur-
 20 ther expansion. From this point of view, it is natural to trace the origins of
 21 the market-based credit system to two kinds of net order flow: increased
 22 demand for money balances, and increased demand for derivative risk
 23 exposure. Pozsar’s work on institutional cash pools has emphasized the
 24 former (Pozsar, 2011); here we emphasize equally the latter idea, which we

1 treat as arising from techniques of modern portfolio management in which
2 invested capital is all held in money form, and risk exposure is achieved
3 using derivatives (Mehrling, 2012). It is this order flow that created condi-
4 tions favorable for the expansion of shadow banking.

5 In expansion mode, the inventory pressure on dealers is readily taken off
6 by expansion of the private profit-seeking market-based credit system. But
7 in contraction mode, the inventory pressure is all on the other side, and it
8 is also harder to get rid of, as we shall see. From a dealer perspective, capital
9 funding banks are the ultimate sellers of money and risk exposure, so when
10 order flow from that direction is high, dealers are pushed into long inven-
11 tory positions, which causes them to quote higher money yields and higher
12 risk premia. For money market dealers, a shift to a long inventory position
13 means funding term assets in overnight markets. Crucially, inventories of
14 quasi-T-bills serve as collateral for secured funding, but inevitably the price
15 of those quasi-T-bills comes under pressure once there is no longer excess
16 demand for money assets pushing price above fundamental value. And
17 softening price inevitably raises doubts about fundamental value, even if
18 there is no change in actual fundamentals. In such a circumstance, the
19 central bank's willingness to lend against collateral, as also its willing-
20 ness to buy the underlying, is key to preventing disorderly liquidation.
21 To a generation raised on Jimmy Stewart banking, it looks like an illegiti-
22 mate extension of lender of last resort from banks to dealers, but Bagehot
23 would have recognized it as a fully legitimate support of the prime bill
24 market.³

25 Less familiar to Bagehot would have been the capital market side of
26 things. For risk dealers, contraction is a situation where everyone wants
27 to sell risk exposure and no one wants to buy, even as the price of risky
28 assets continues to fall. Dealers who dare to accommodate the resulting
29 mismatched order flow find themselves saddled with risk exposure and
30 mark-to-market losses that threaten insolvency. Meanwhile, the prospect of
31 insolvency prevents other dealers from stepping in to buy. Without market-
32 makers there can be no prices, and no prices means no secured borrowing,
33 because there is no way to evaluate the security offered. Even quasi-Treasury

³The fact that some of the quasi-T-bills turned out to be less than prime inevitably cast doubt on all of them. Sloppy, or even fraudulent, underwriting during the boom thus exacerbated the downturn when it inevitably came.

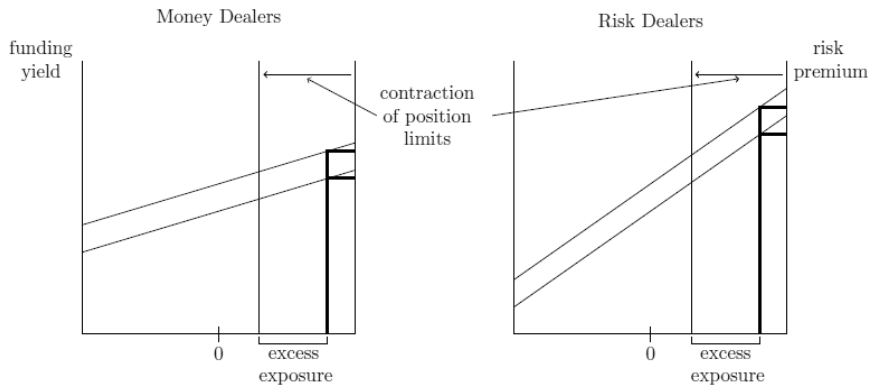


Fig. 4. The dealer system (in crisis).

Assets	Liabilities
Money	Reserves
	Swaps

Fig. 5. Dealer of last resort.

1 bills cease to be quasi-Treasury bills since the operative pricing equation —
 2 price of “risk-free” security = price of risky security + price of risk insur-
 3 ance — now has unknown values on the right-hand side. In this way, the
 4 central bank’s classic role in supporting the price of prime bills logically
 5 expands during crisis to include supporting the price of the raw material
 6 from which prime bills are manufactured.

7 Figure 4 shows the plight of the dealers during contraction as a matter of
 8 position limits that contract beyond realized inventories. If not for central
 9 bank support, dealers would be forced to liquidate for whatever price they
 10 can get, causing yields to spike and asset prices to plummet. If instead the
 11 central bank steps in as dealer of last resort, taking onto its own balance
 12 sheet the excess inventories of the strained dealers, the consequence is to
 13 place bounds on the disequilibrium price movement. Contraction is not
 14 so much halted or reversed as it is contained and allowed to proceed in a
 15 more orderly fashion.

16 Figure 5 shows the balance sheet exposures for a central bank that
 17 acts in this way as dealer of last resort. The first line represents the excess

1 inventory of the money dealers (term assets funded with overnight money).
2 The second line represents the excess inventory of the derivative dealers.
3 Comparison with Fig. 1 reveals that the dealer of last resort is in effect
4 filling the gap left by the slowing order flow from asset managers. The key
5 difference, however, is that the asset manager demand was funded by private
6 capital, whereas central bank demand is funded by reserve expansion.

7 The fact that the central bank can help in this way, by creating money
8 rather than putting up any capital, reflects the maintained assumption of
9 the present paper that the financial crisis is entirely a matter of liquidity and
10 not at all a matter of solvency. Under this strong (and admittedly unrealis-
11 tic) assumption, no additional capital resources are needed to address the
12 crisis because there are no fundamental losses to be absorbed, only tem-
13 porary price distortions to be capped. In any real-world crisis, of course,
14 there are both liquidity and solvency elements at play, so liquidity backstop
15 is insufficient. Just so, in the US crisis, there was the Treasury standing in
16 the wings to provide capital as needed (e.g., TARP). In this paper, we have
17 abstracted from such matters in order to draw attention to the liquidity
18 dimension, which remains largely unappreciated.

19 **The Inherent Instability of Credit**

20 The boom-bust expansion and contraction of shadow banking inevitably
21 involves expansion and contraction of the supply of money. Here we find
22 the link between shadow banking and macroeconomic instability. This link
23 exists even though, by maintained assumption, the fluctuation in question
24 does not involve any expansion or contraction of traditional bank deposits,
25 but rather only various kinds of money substitutes. Money market mutual
26 fund shares (invested in ABCP) or outright holding of RP are close substi-
27 tutes for bank deposits because they can be spent on short notice; Treasury
28 bills and quasi-Treasury bills are close substitutes because they can be used
29 at short notice as collateral to obtain purchasing power. Either way, the
30 growth of shadow banking can be understood as the elastic supply response
31 to increased demand for money balances.

32 The “boom” character of the resulting expansion is simply the shadow
33 banking version of Hawtrey’s famous “inherent instability of credit”
34 (Hawtrey, 1913), and it arises as a direct consequence of the market-making
35 activities of dealers. Simply put, it is easy to make money by making markets

1 when you are standing in between powerful sources of ultimate flow supply
2 and flow demand. As a consequence, during boom times, the supply of
3 market liquidity (i.e., dealer balance sheet capacity) is plentiful, and so the
4 effective supply of money increases even more rapidly than the nominal
5 supply of quasi-Treasury bills (Sweeney *et al.* 2009). Not only the quasi-
6 Treasury bills but also the risky assets they finance become unusually liq-
7 uid. The consequence is credit inflation, and a boom in the real economy
8 as well.

9 Of course, even at the peak of the boom, government-issued Treasury
10 bills and Fed-issued cash/reserve balances remain the ultimate form of
11 collateral and the ultimate form of money respectively. But both become
12 decreasingly important quantitatively given the growth of private capi-
13 tal markets and private money markets. Ultimate collateral and ultimate
14 money remain crucial reference points, but the actual instruments are
15 important only in times of crisis when promises to pay are cashed rather
16 than offset with other promises to pay. Just so, during the recent global
17 financial crisis, expansion of Fed reserves, Treasury debt, and contingent
18 Treasury debt (deposit insurance) provided crucial levers to prevent the
19 crisis from spiraling out of control.

20 Just as the “boom” character of expansion can be understood as a con-
21 sequence of the dealer balance sheet expansion producing plentiful market
22 liquidity, so too can the “bust” character of contraction be understood as
23 a consequence of dealer balance sheet contraction producing scarce mar-
24 ket liquidity. Simply put, it is hard to survive, much less actually to make
25 money, by continuing to make markets when faced with powerful reversal,
26 so the wisest course of action is simply to hold back. As a consequence,
27 the supply of money substitutes that was sufficient to meet demand dur-
28 ing the boom no longer proved sufficient once contraction began, simply
29 because quasi-Treasury bills shed their money-like aspect. Even without
30 much actual contraction of the money supply broadly measured, and even
31 with quite aggressive expansion of base money, the effective money supply
32 plummeted, taking with it real economic activity.

33 **Conclusion**

34 The rise of the market-based credit system can be seen as the rise of a
35 (largely) private credit system alongside the existing (largely) public credit

1 system, as well as the rise of a (largely) international credit system along-
2 side the existing (largely) national credit system (Ricks, 2011). Increas-
3 ingly, the dollar has become a private and international currency, and the
4 international dollar money market has become the funding market for
5 all credit needs, private and public, international and national. From this
6 point of view, the rise of the market-based credit system is just part of the
7 broader financial globalization that is such a prominent feature of the last
8 30 years.

9 But that new system has yet to show its ability to stand on its own, since
10 it has grown up largely as a parasitical growth on the old system. Money
11 market dealers were and still are typically divisions of traditional banks
12 that enjoy traditional governmental backstops. And risk dealers were and
13 still are typically funded by bank lending of one kind or another, in this
14 way enjoying indirect access to traditional governmental backstops. The
15 regulatory question now facing us is the apparent impossibility of extend-
16 ing these traditional public backstops to a system that is now increasingly
17 private and international.

18 The way out, we suggest, is to shift our intellectual framework in a
19 fundamental way, back to Bagehot in order to step forward to the 21st cen-
20 tury. It is not the shadow bank that requires backstop, but rather the dealer
21 system that makes the markets in which the shadow bank trades. Central
22 banks have the power, and the responsibility, to support these markets both
23 in times of crisis and in normal times. That support, however, must be
24 confined strictly to matters of liquidity. Matters of solvency are for other
25 balance sheets with the capital resources to handle them.

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