

Minsky and Modern Finance

The case of Long Term Capital Management.

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This article is motivated by a paradox. Writing in 1967, Hyman Minsky summarized the core idea around which all his mature theories were developed:

Capitalism is *essentially* a financial system, and the peculiar behavioral attributes of a capitalist economy center around the impact of finance upon system behavior [1967, p. 33, emphasis added].

At the time these words were written, probably few economists would have agreed with them, and fewer still members of the general public. Today, the same statement would arguably command general assent — and perhaps even more so among the general public than among economists — but that doesn't mean we are all Minskians now. The finance that has become the dominant world view is not the finance of Hyman Minsky but rather the finance of Nobel Prize winners Robert Merton, Myron Scholes, and their associates.

Although they both purport to be about the same financial system, the theory of Minsky and that of modern finance are about as orthogonal as any two theories can possibly be. So different are they that Minsky, never shy about criticizing views with which he disagreed, never even mentioned modern finance in his published writings, and the disregard appears to have been mutual.

My starting point is the premise that Minsky and modern finance each have part of the story, but only

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part, so that communication between the two approaches is critically important for future intellectual progress. What is each theory about? The discussion reveals not only contrasts but also complementarities.

MINSKY

When Minsky wrote that capitalism is essentially a financial system, it was before the advent of modern finance, before financial deregulation and the mutual fund revolution, before the breakdown of Bretton Woods and the subsequent rise of global currency markets, before the Eurodollar market, before junk bonds, and before securitization. He was writing, in fact, before practically all the developments that have rendered his statement merely a truism now at the end of the twentieth century, which is not to suggest that he saw ahead to what would happen, since he didn't. When he wrote that capitalism is essentially a financial system, he was referring to the capitalism of his own time, a capitalism that, by modern standards, was remarkably undeveloped financially. What then does he mean by "essentially financial"?¹

Minsky means that in a capitalist economy every economic unit — every firm, household, government, even every nation — is, in essential respects, like a bank facing the problem of daily balancing cash inflow against cash outflow. For him, the key problem an economic unit faces is *not* the familiar economist's problem of maximizing profit or utility subject to a budget constraint. More fundamental is the problem posed by the "survival constraint" that requires that cash outflow not exceed cash inflow.

To meet this constraint minute by minute, day by day, week in and week out, requires individual agents continually to have in mind the balance between their cash commitments and their cash flows, but it requires more than that. Because cash flows inevitably fall short from time to time, individuals require access to a reliable source of refinance that allows them to meet current cash flow needs by pledging expected future cash flows.

When Minsky says that capitalism is essentially a financial system, he is thinking not so much about stocks and bonds as about money, not so much about capital markets as about money markets, not so much about financiers as about bankers. Minsky focuses attention on the money market, and particularly on the repurchase and fed funds markets, as the place where

individuals attempting to satisfy their own survival constraints meet one another, and where their competing needs for refinance are adjudicated.

The asset price that is most significant for Minsky is the price of refinance, which is to say the short-term money market rate of interest. Other asset prices are about the current stock valuation of a stream of future cash flows, but the money market rate is about the clearing and ultimate settlement of cash flows and cash commitments coming due at the moment. In Minsky's view of the world, the money market is the very heart of the economic system, the place where the "coherence" of the system is daily tested.

In Minsky's logic of finance, the most basic element and the ultimate reality of the system is instantaneous cash flow. What appear to us as assets (as stocks, not flows) are in fact nothing more than expectations about future cash flows. If, over time, the cash flowing in to a particular economic unit is expected to exceed the cash flowing out, then whoever owns that unit is said to own a capital asset. Capital assets come in two types, financial and non-financial. Financial assets are two-sided, in the sense that they represent future cash outflows to the debtor and future cash inflows to the creditor. Non-financial assets are one-sided since the "debtor" who commits to pay cash flows is not any other economic unit, but rather nature, or the production process, or some such.

One way for economic units to meet the survival constraint would be to keep their cash outflow strictly within the limits imposed by the cash inflow emerging from their ownership of non-financial assets. Attempting to do better than this, units issue financial assets to trade future cash flows, but, and this is the crucial point for Minsky, such borrowing does *not* relax the survival constraint for society as a whole. Because of their two-sided character, financial assets can only transfer the constraint from one economic unit to another.

The only way for society as a whole to relax the survival constraint is to create new non-financial capital assets by means of investment. The whole point of investment is that it is expected to be profitable, which is to say that future cash inflows are expected to exceed by some margin the cash payment commitments required to finance the initial investment. In principle, this means that debt-financed investment can improve the balance between future cash flows and future cash commitments. This potential relaxation of the survival constraint presents a powerful incentive to the individ-

ual units who make investment decisions in a decentralized economy, and the availability of finance makes it possible for individual units to act on that incentive. At the aggregate level, economic growth and development — what Minsky calls the “upward instability” of capitalism — are the consequence.

The problem is that some investments work out and others do not, but the debt-financed owners of both face the same cash commitments. Inevitably, some units find that past investment has not relaxed their survival constraint as they anticipated. Instead, the balance between their cash commitments and cash flows has worsened, and perhaps even become impossible to bear.

At the aggregate level, the natural upward instability of the system leaves behind a residue of financial commitments that pose problems for the continuation of growth. At the individual level, these problems take the form of a sharply binding survival constraint that forces distressed units to reduce expenditure, sell assets, and/or borrow at high interest rates, all in order to raise cash to meet immediate commitments. At the level of the market, the problems of individuals are reflected in conditions in the money market, which means at the very least a higher price of refinance, and at worst a disruption and even breakdown of exchange. If the money market is the heart of the system, then financial crisis is a heart attack.

How to avoid a heart attack? In Minsky’s view, best of all that government should do the investing, thereby getting the benefit of capital accumulation without the residue of debt. If fear of socialism stands in the way of government investment, second-best is to encourage equity finance rather than debt finance, to encourage “to-the-asset” financing that matches debt maturity with the maturity of the capital assets financed by the debt, and to discourage subsidies that promote unprofitable (or “inept”) investment. If we can’t even do that, as it appears we haven’t been able to do, then heart attacks will happen, and we had better stand ready with emergency treatment, which means using the central bank to maintain liquidity in the money market during times of crisis.

Those voices of orthodoxy who would counsel holding back treatment in an attempt to use monetary policy to control business cycles are making a fundamental mistake, according to Minsky, and not only because such a policy of brinkmanship threatens to undermine coherence. Uncertainty about the availabil-

ity of refinance also increases both borrower’s and lender’s risk, driving a wedge between the supply price and the demand price for capital investment, and so putting a permanent damper on the pace of private investment, which is society’s only hope for overcoming the survival constraint.

In Minsky’s view, there is little that discretionary monetary policy can contribute to business cycle stabilization. Further, even the most timely crisis intervention ultimately treats only the symptoms of crisis, and does little to correct the underlying imbalance between the pattern of cash commitments and the pattern of cash flows, an imbalance that stems ultimately from reliance on private debt to finance capital accumulation.

MODERN FINANCE

If a proponent of modern finance were overheard to say that capitalism is essentially a financial system, we would have a pretty good idea what he means — something about the importance of capital asset pricing for guiding capital allocation decisions. In contrast to Minsky, modern finance is about stocks and bonds, not money; about capital markets, not money markets; and about financiers, not bankers. Most important, modern finance is about stocks, not flows, and it focuses attention on the movement of capital asset prices, not on the movement of liquid bank reserves. Modern finance largely abstracts from the liquidity issues that are so central to Minsky. Indeed, by construction, the theory assumes that buying and selling at equilibrium asset prices is unproblematical and beyond the scope of the theory.

In modern finance theory, a capital asset (whether financial or non-financial) represents a portfolio of exposures to different risk factors whose prices are determined by the preferences of wealth holders. The price of the capital asset is then, so goes the argument, equal to the weighted sum of the risk factor prices, with the weights proportional to the exposures to each factor. The argument depends on something called the *principle of no arbitrage*. If the capital asset were at any other price, then some component risk factor must have an implied price that is different from its price as implied by other capital assets, and riskless arbitrage profits must be attainable by buying the risk factor at the lower price and selling it at the higher price.

The operation of arbitrage in real markets is conceptualized by the theory as the process by which

asset prices are maintained at or near *no-arbitrage* levels. Thus, even though modern finance *assumes* liquidity in the overall market, it views arbitrage as the *source* of liquidity in individual security markets, since any deviation of a given asset price from its no-arbitrage level will attract arbitrageurs who stand ready to fill the gap between fundamental supply and demand.

In the real world, of course, one doesn't know the risk factors, their prices, or the exposures of the various marketed capital assets. Everyone who is thinking about buying an asset has her own idea about the value of that asset, an idea based on information available to her (and possibly to her alone) and based also on her own theory about how to map from information into investment value. From this point of view, the formation of market prices can be understood as a process by which the various individual information sets and individual mapping functions come into contact with one another and are adjudicated. If I place a high value on the asset and you place a low value on it, then I am a buyer and you are a seller, and the price is somewhere in between each of our private valuations.

In a market, price divides buyers and sellers into groups of equal size. In doing so, the market price is understood as pooling and publishing the various private information sets and private asset pricing theories. Does the market do a good job? What would it mean to do a good job?

In modern finance theory, markets are considered to be "efficient" if market prices are equal to investment values, where investment value is defined as the value of a security as estimated by a well-informed and capable analyst, which is to say someone with a particularly large information set and a particularly fine asset pricing theory to map from that information set into investment values. Why would anyone ever expect markets to be efficient in this sense? One would expect so if the well-informed and capable analyst were able to back up his assessment of investment value with actual trades.

According to modern finance theory, markets tend to be efficient to the extent that analysts act as arbitrageurs to establish market prices equal to their own conception of investment value. The operation of arbitrage in real markets is thus conceptualized by the theory as the process by which asset prices are maintained at or near *efficient* levels. Efficiency and liquidity are linked, and the cause of both is arbitrage.

It's easy to criticize this theory, most obviously

on the ground that reasonable people might well disagree about which asset pricing theory is the most fine. The obvious response that the market decides which theory is the most fine is also easy to dismiss as an example of circular reasoning, since the market is nothing more than the collection of investors operating under different asset pricing theories, none of which is necessarily The Truth.

It is easy to criticize, but it is more important for present purposes to appreciate the dynamic that is set in motion when a significant fraction of investors, with resources to back their views, come to believe in this model of the world. Whatever information they have, they are always looking for more. Whatever version of asset pricing theory they have, they are always looking for a better one. Each new piece of information, and each new improvement of the theory, raises the standard of what counts as well-informed and capable analysis.

Truth with a capital "T" may be unattainable, but progress toward Truth seems eminently possible, as well as personally enriching. Mistakes will be made, but that is how we progress. We interpret deviations of market price from state-of-the-art investment value as inefficiencies to be exploited for arbitrage profits. If we lose money on the implied trades, this tells us where our theory can yet be improved further. If the price discrepancy were not an inefficiency, it must have been another as yet unsuspected additional risk factor. We lose money, but we gain knowledge.

When a substantial fraction of investors come to view the world in this way, and come also to agree on what is the most fine asset pricing theory, we are well on our way to what Minsky in another context calls "the economics of euphoria." In Minsky's view of the world, there is no beautiful Truth toward which we are converging. It's an illusion, and we are in the most danger when the largest number of us come to believe in the illusion.

Ideas by themselves may do no harm, but when they get embedded in the structure of cash commitments stretching far out into the future, ideas become realities that constrain our freedom to maneuver in the face of evolutionary change. Robust finance gives way to fragile finance, as the pattern of cash commitments becomes increasingly unhinged from the pattern of cash flows.

Eventually, Minsky thought, the whole mess lands in the money market, where it takes the form of difficulties with refinance. Eventually there is a heart

attack, and what happens then depends on whether the Fed provides sufficient, and sufficiently timely, emergency treatment.

LONG TERM CAPITAL MANAGEMENT

The collapse and refinance of Long Term Capital Management in the fall of 1998 offers a particularly dramatic case in point. Following the approach of modern finance, the strategy of LTCM was to take advantage of certain inconsistencies in bond prices. It bought underpriced bonds and sold overpriced bonds short, and then waited for the prices to converge to "fair value," at which point it would reverse the trade and take its profits. Even very tiny price discrepancies could be exploited for large profits by doing such trades in volume, and with leverage. (Subsequent to LTCM's restructuring, the *New York Times* reported that with \$2.2 billion in capital, LTCM controlled a \$125 billion position in securities, and that derivatives raised its overall exposure to \$1.25 trillion.)

The "Long Term" in the firm's name referred to the idea that it might take some time for the targeted price discrepancies to disappear, and it also advertised the fund's willingness to wait. Notwithstanding the leverage, and the expected waiting time, the firm's founders (Nobel winners Robert Merton and Myron Scholes, among others) did not imagine that they were doing anything terribly risky, because the nature of their operation sheltered them from some of the most typical forms of market risk. They were diversified in the sense that they had about twenty different trades on at any moment, and the long/short balance meant that they were not exposed to the market risk of bond prices rising or falling, or so they thought. What happened?

The disruption in financial markets attendant on the Asian crisis and then the Russian crisis caused all the price discrepancies that LTCM was betting would narrow over time to widen instead. The result was that their long positions lost value relative to their short positions, eating into the firm's capital and threatening insolvency. But the threat of insolvency was not what led to collapse, at least not by itself.

It is important to remember (as those involved with the firm have been reminding anyone who will listen) that, had LTCM been able to borrow in order to maintain its positions through the crisis, it would have come out all right in the end. The evidence is the profits made by the banks that were forced to take equity

positions in LTCM as part of the restructuring.

Granted that the problem was not with the long-term profitability of the arbitrage strategy; then what was the problem? From the point of view of modern finance *theory*, long-term profitability is presumed to be a guarantee of short-term finance, but evidently this was not the case in modern finance *practice*. Why was LTCM unable to borrow to maintain its positions?

The question is unanswerable within the framework of the theory of modern finance, because the phenomenon is unthinkable, but not so within Minsky's framework. From a Minskian point of view, the problem that brought down LTCM was essentially a problem of refinance, which is to say it is exactly the kind of problem that Minsky's theory places at the center of discussion. Speaking broadly, the trades that LTCM had on were all liquidity trades, which is to say that LTCM took long positions in illiquid securities and short positions in similar but more liquid securities. This circumstance came about naturally because LTCM's theory of security valuation abstracted from liquidity, with the consequence that illiquid securities tended to look underpriced relative to liquid securities. All over the world, wherever there was a liquidity spread, LTCM was there taking a position intended to capture the spread over some time horizon.

The wide range of different trades made it look as though LTCM were diversified, but from a Minskian point of view it was not diversified at all. LTCM made one bet and one bet only, that liquidity spreads would narrow, and it lost that bet because it was unable to refinance its positions when spreads widened instead.

For understanding what happened next, it is most helpful to think of LTCM not as a hedge fund but as a security dealer making markets in certain illiquid securities. Ordinary security dealers make markets by buying and selling securities to absorb fluctuations in the balance between fundamental demand and supply. In the short term, they make money on the bid-ask spread. In the longer term, they make money by absorbing securities when prices are weak and disgorging them when prices are strong. Dealers finance their fluctuating security holdings primarily by borrowing in the money market using repurchase agreements. Thus, in their ordinary business they are long securities and short money, which is to say their long positions are less liquid than their short positions.

The important point is that such a balance sheet is vulnerable, as all dealers know, to a short squeeze in

money, which makes it expensive and difficult to roll over loans in order to refinance security holdings. In the event of a short squeeze, dealers may eventually be forced to sell their security holdings in order to raise cash, and the problem is to find a buyer. Since dealers create liquidity in security markets, liquidity tends to disappear if ever the dealers themselves need it. Knowing this, dealers arrange for dependable refinance from other dealers, and ultimately from banks.

Banks also operate as dealers and market makers of a sort. Deposit accounts are essentially short positions in the means of payment, while bank assets are long positions in some less liquid asset. Banks also face the problem of a potential short squeeze, and so arrange for dependable refinance from other banks, and ultimately from the central bank. From this point of view, central bank lender-of-last-resort intervention is nothing more than refinance of bank asset positions, refinance that then enables banks to refinance other dealer asset positions, which then enables dealers to refinance the asset positions of non-financial economic agents. The essential point is that, in the real world, there is a hierarchical structure of financial assets of varying degrees of liquidity, and that dealers and bankers play a critical role in knitting together the various layers of the structure into a unified system.²

This conception of what happens in financial markets is distinct from that of modern finance, which assumes at the start of analysis that *all* assets are equally and completely liquid, and thus in effect assumes that the dealers' job of knitting together the layers of the system is sufficiently unproblematical that a seamless unity is achieved under all conditions. Looking behind this key assumption of modern finance theory, we can see that LTCM was behaving as a market maker far out on the illiquid margin of existing markets where other dealers fear to tread. When the firm began to get into trouble, it looked for refinance to other market makers, who looked for refinance to the banks, who looked for refinance to the Federal Reserve.

The press has wondered why the Fed got involved in "bailing out" a hedge fund. Once one understands that LTCM was a security dealer whose operations were intricately intertwined with the operations of other security dealers, the reason becomes clear. The Fed was refinancing the market-making system, and doing so in the most expeditious way by going to the source of the strain.

An immediate focus of the Fed's attention seems

to have been the condition of the Treasury bill futures market, where LTCM seems to have had a very large short position that it was unable to sustain on account of inability to come up with additional margin. (Futures are marked to market daily, so cash demands may arise before contracts mature.) This was the place where the short squeeze pinched most seriously. Had LTCM defaulted, the futures clearinghouse would likely also have failed, and the ultimate counterparties would have taken a loss.

This would have been bad enough in an ordinary futures contract, but it raised even more serious prospects, given the key role of the Treasury futures market in the system as a whole. The counterparties on the long side of LTCM's futures contracts all thought of themselves as owning Treasury bills, even though the actual counterparty was LTCM, not the government. Defaults on Treasury bill futures would therefore have thrown the deepest and most liquid market in the world into disarray, precipitating the mother of all short squeezes as the scramble for liquidity spread worldwide. Given the hierarchical structure of the market-making system, a threat to the Treasury futures market is a threat to the very foundation of the system, a threat that would throw the entire market-making system into chaos. The Fed acted because it had to act.

Rather than letting the problems of one firm spread to the whole system, the Fed decided to treat the problem at its source. It used the threat of outright default to force LTCM's ultimate creditors to convert their short-term loans into long-term equity positions in the fund. The lenders are now the owners of LTCM's long portfolio, so the LTCM bet is still on, but there will be no more margin calls so the new owners should be able to hold on for the "long term."

Even so, in the days after the restructuring, we saw an inversion of the short-end yield curve, and we saw frozen markets as dealers refused to buy and sell on their own account and retreated instead to acting merely as brokers putting demanders and suppliers together without risking their own capital. Three successive cuts in the federal funds rate kept markets alive, as the Fed increased the supply of liquidity to meet the sharp spike in demand. The system shook, but it did not topple.

Given that the system seems to have survived the moment of stress, the most important question raised by the LTCM experience concerns the relationship between the ideal world of modern financial theory and the real world of modern financial practice. Do dis-

crepancies between the two reflect inefficiencies and therefore opportunities for monetary profit in the real world, or do they represent inadequacies in the theory and therefore opportunities for intellectual advance in the ideal world?

The LTCM bet was that liquidity spreads would narrow, as, in effect, the world of modern finance practice caught up with the ideal world of modern finance theory. From this point of view, the problem that caused the collapse of LTCM is that the road to convergence turned out to have a few bumps, and even some sections of backward progress. It is on one of those backward sections that LTCM got caught short. If LTCM made any mistake, it was to keep its eye too far down the road so that it missed a crucial turn and ran off the road. This is how matters look from the perspective of modern finance theory.

From the point of view of Minsky, things look rather different. The glaring inadequacy of the theory of modern finance is that it abstracts from the scarcity of liquidity. It is therefore highly significant that LTCM ran into trouble precisely because it was unable to raise cash to meet margin calls. What LTCM abstracted from in the theory came back to bite it in reality as arbitrage turned out not to create liquidity, but rather only to stretch what liquidity there is across different markets. LTCM made money for a while by acting as market maker out on the illiquid frontier, stretching liquidity farther than it had ever been stretched before. Conceiving of its own arbitrage trades as liquidity-creating, LTCM seems to have been blissfully unaware of its own vulnerability to a short squeeze in an eventual scramble for liquidity.

One could say that LTCM made the mistake of believing the model too much. From the point of view of Minsky, the main lesson of the LTCM experience is that the modern theory of asset pricing is incomplete and needs to be supplemented by a theory of liquidity.³

CONCLUSION

Minsky and modern finance both grew up in the postwar United States, when the central fault line that organized monetary debate was that separating “Keynesians” on the one side from “monetarists” on the other: the perennial economists’ debate about whether the economy needs a guiding hand every now and then or not. For my purposes, what is important about that debate is that the monetary theory guiding

Keynesians and monetarists is in both cases an updated version of the “currency school” idea.

In the constrained financial conditions of the immediate postwar United States — a consequence of war but also the continuing legacy of the Great Depression and the New Deal banking reforms — the currency school view had a certain resonance. With the recovery of private finance and the push toward deregulation, however, the world began to change. Both Minsky and the progenitors of modern finance were responding to that change, and trying to understand it. Both developed monetary theories that rejected standard Keynesian and monetarist alternatives, and both embraced instead the older tradition of the “banking school.”

Soulmates when it came to understanding money as a natural by-product of business finance, Minsky and modern finance nevertheless were worlds apart when it came to policy implications, as far apart in fact as the Keynesians were from the monetarists, and this is the point. The perennial economists’ debate about intervention versus laissez-faire continues, but today the most compelling positions in the subdebate about money both emerge from the banking school tradition. No longer Keynesians versus monetarists, the real debate is between Minsky (and the central bankers) on the one side and modern finance on the other.

We will know that economics has caught up with changes in the world when that debate becomes the focus of graduate money courses, as indeed it is beginning to do around the edges. Post-Keynesians have taught Minsky for years, and now postmonetarists (to coin a phrase) are beginning to teach...Fischer Black [1987]. Both groups still teach their heterodoxy as an alternative to the supposed mainstream orthodox debate between Keynesians and monetarists. The next step forward is for post-Keynesians to teach critique of Black, for postmonetarists to teach critique of Minsky, and for both to leave antiquated orthodoxy behind.

Toward that end, let me close with the words of Fischer Black, written, like the earlier quotation from Minsky, in the form of a manifesto. Black wrote in 1976:

I believe that in a country like the US, with a smoothly working financial system, the government does not, cannot, and should not control the money stock in any significant way. The government does, can only, and should simply respond passively to shifts in the private sector’s

demand for money. Monetary policy is passive, can only be passive, and should be passive [1987, p. 89].

This is the postmonetarist position. Let the debate begin.

ENDNOTES

¹For a fuller treatment of Minsky's theories in the context of his life and times, see Mehrling [1999]. For an account of the broader American tradition of monetary thought to which Minsky belongs, see Mehrling [1997].

²These arguments build on the analysis of Garber and Weisbrod [1992, Ch. 13].

³Amihud and Mendelson [1986], Black [1986], and Bernstein [1987] offer classic presentations of the problem from a point of view sympathetic to modern finance.

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