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Leverage

MERTON H. MILLER*

ABSTRACT

Nobel Memorial Prize Lecture for presentation at the Royal Swedish Academy of Sciences in Stockholm, December 7, 1990. Helpful comments on an earlier draft were made by my colleagues Steven Kaplan and Robert Vishny.

1.0. Introduction

UNDER THE TERMS OF Alfred Nobel's will, the Prizes were to be awarded for an "important discovery or invention." Let it be clear from the outset, therefore, that my case must be one of the former, not the latter. Contrary to what you may have read in some press accounts following the announcement of the 1990 Nobel Prizes in Economic Sciences, I am not the co-inventor of the leveraged buyout—the transaction that perhaps more than any other has come to symbolize the supposed financial excesses of the 1980's. Leveraged buyouts (LBO's), in which the younger, active managers of a firm borrowed the funds to buy the controlling shares from a firm's retired founder (or from his estate) were an established feature of the corporate landscape long before Franco Modigliani, the 1985 laureate, and I published our first joint paper on leverage and the cost of capital in 1958. The LBO's of the 1980's differed only in scale, in that they involved publicly-held rather than privately-held corporations and in that the takeovers were often hostile.

That Franco Modigliani and I should be credited with inventing these takeovers is doubly ironic since the central message of our M&M Propositions was that the value of the firm was independent of its capital structure. Subject to one important qualification to be duly noted below, you couldn't hope to enhance shareholder value merely by leveraging up. Investors would not pay a premium for corporate leverage because they could always leverage up their own holdings by borrowing on personal account. Despite this seemingly clear prediction of the M&M analysis, the LBO's of the 1980's were routinely reporting premiums to the shareholders of more than 40 percent, running in some cases as high as 100 percent and all this, mind you even after the huge fees the deal-making investment bankers were extracting.

The qualification to the M&M value-invariance proposition mentioned earlier concerns the deductibility of interest payments under the uninte-

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grated U.S. corporate income tax. That deductibility can lead, as we showed in our 1963 article, to substantial gains from leveraging under some conditions, and gains of this tax-driven kind have undoubtedly figured both in the rise of corporate debt ratios generally in the 1980's and in some recent LBO's and voluntary restructurings in particular. But after netting out the offsetting tax costs of leveraged capital structures (such as those discussed in my paper "Debt and Taxes" (1977) and its follow-up literature), tax savings alone cannot plausibly account for the observed LBO premiums.

1.1. Leveraged Buyouts: Where the Gains Came from

The source of the major gains in value achieved in the LBO's of the 1980's lies, in fact, not in our newly-recognized field of finance at all, but in that older, and long-established field of economics, industrial organization. Perhaps industrial reorganization might be an apter term. Mikhail Gorbachev, the 1990 Peace Prize Winner, may have popularized the term *perestroika*, but the LBO entrepreneurs of the 1980's actually did it, and on a scale not seen since the early years of this century when so much of what we think of as big business was being put together by the entrepreneurs of consolidation like J. P. Morgan and John D. Rockefeller.

That the LBO entrepreneurs have achieved substantial real efficiency gains by reconcentrating corporate control and redeploying assets has been amply documented in a multitude of academic research studies. (See Kaplan (1989).) But this basically positive view of LBO's and takeovers is still far from universally accepted among the wider public. Some are reacting to the layoffs and factory closings that have sometimes followed hostile takeovers, although far more of both have occurred in our automobile industry which has so far been immune from takeovers. Others worry that these short-run gains may represent merely the improvident sacrifice of opportunities for high, but long deferred future profits—an argument presuming among other things, that the market cannot properly compute discounted present values. Even more fear that the real efficiency gains, if any, will be more than offset by the collateral damage from the financial leveraging used to bring about the restructuring.

1.2. The Problems of Corporate Leveraging: Real or Imagined?

These fears will be the main focus of this lecture. The statutes of the Nobel Foundation stipulate that the subject of the Nobel Lecture "should be on or associated with the work for which the prize was awarded," which, in my case means the M&M propositions. Rather than simply reviewing them, however, or discussing the subsequent research they have inspired (a task already undertaken in Miller (1988)) I propose here instead to show how those propositions bear on current concerns about overleveraging—concerns that in some quarters actually border on hysteria. In particular I will argue, first, that the highly visible losses and defaults on junk bonds do not mean that overleveraging did in fact occur; second, paradoxical as it may sound,

that increased leveraging by corporations does not imply increased risk for the economy as a whole; third, that the financial distress being suffered by some highly leveraged firms involves mainly private, not social costs; and finally, that the capital markets have built-in controls against overleveraging—controls, moreover, very much in evidence at the moment. Recent efforts by our regulators to override these built-in market mechanisms by destroying the junk bond market and by imposing additional direct controls over leveraged lending by banks will thus have all the unintended consequences normally associated with such regulatory interventions. They will lower efficiency and raise costs (in this case, the cost of capital) to important sectors of our economy.

That the current emphasis on the evils of overleveraging may be misplaced does not mean, of course, that all is well. My message is not: “Relax. Be happy. And, don’t worry.” Worry we should, in the U.S. at least, but about the serious problems confronting us, such as our seeming inability to bring government spending under rational control or to halt the steady deterioration of our once-vaunted system of public education. Let us not waste our limited worrying capacity on second-order and largely self-correcting problems like financial leveraging.

I hope I will be pardoned for dwelling in what follows almost exclusively on U.S. examples. It’s just that a particularly virulent strain of the antileveraged hysteria seems to have struck us first. Perhaps others can learn from our mistakes.

2.0. The Private and Social Costs of Corporate Leveraging

The charge that the U.S. became overleveraged in the 1980’s will strike some as perhaps too obvious to require any extensive documentation. What could offer more compelling evidence of the overissuance of debt than the defaults of so many junk-bond issuers in late 1989, with news of additional or pending defaults now almost a daily occurrence?

2.1. *The Junk Bonds as Just Another Risky Security*

To argue in this all too natural way, however, is to put too much emphasis on the word “bond” and not enough on the word “junk.” Bonds are, indeed, promises to pay. And certainly the issuers of the bonds hoped to keep those promises. But if the firm’s cash flow, for reasons competitive or cyclical, fails to cover the commitments, then the promises cannot be kept, or at least not kept in full.

The buyers of the junk bonds, of course, also *hoped* that the promises would be kept. But they clearly weren’t counting on it! For all save the most hopelessly gullible, the yields *expected* (in the Markowitz sense of yield outcomes weighted by probability of occurrence) on junk bonds, were below the nominal or promised yields. The high promised yields that might be earned during the good years were understood as compensation for the possible bad years in time and bad bonds in the total junk bond portfolio. The

high nominal yields, in short, were essentially risk premiums. And in 1989, for many of the junk bonds issued earlier, the risk happened.

Although the presumption in finance is that defaults represent bad outcomes *ex post*, rather than systematic misperception of the true *ex ante* odds, as seems to be the conventional view, that presumption cannot yet be established conclusively. The time series of rates of return on junk bonds is still too short for judging whether those returns are indeed anomalously too low (or perhaps even anomalously too high) relative to accepted asset-pricing models like those of my co-laureate William Sharpe and his successors. Few such anomalous asset classes have so far been identified; and nothing in the nature of high-yield bonds strongly suggests that they will wind up on that short list.

Some may question the fairness of my treating these realized risks on junk bonds as essentially exogenous shocks, like earthquakes or droughts. Surely, they would contend, the very rise of corporate leverage that the junk bonds represent must itself have increased the total risk in the economy. On that point, however, modern finance in general and the M&M propositions in particular offer a different and in many respects, a counter-intuitive perspective.

2.2. Does Increased Corporate Leverage Add to Society's Risk?

Imagine that you, as a venerable academic professor of finance are in a dialogue with an equally grizzled corporate treasurer who believes, as most of them probably do, that leveraging *does* increase total risk. "You will surely concede, Professor," he is likely to begin, "that leveraging up the corporate capital structure will make the remaining equity riskier. Right?" "Right," you say. A company with a debt/equity ratio of 1, for example, earning a 20 percent rate of return on its underlying assets and paying 10 percent on its bonds, which, of course, have the first claim on the firm's earnings, will generate an enhanced 30 percent rate of return for its equity holders. Should the earning rate on the underlying assets decline by 25 percent, however, to 15 percent, the rate of return on equity will fall by an even greater extent (33 1/3 percent in this case). That, after all, is why we use the graphic term leverage (or the equally descriptive term gearing that the British seem to prefer). And this greater variability of prospectiv rates of return to leveraged shareholders means greater risk, in precisely the sense used by my colleagues here, Harry Markowitz and William Sharpe.

That conceded, the corporate treasurer goes on to ask rhetorically: "And, Professor, any debt added to the capital structure must, necessarily, be riskier debt, carrying a lower rating and bearing a higher interest rate than on any debt outstanding before the higher leveraging. Right?" "Right," you again agree, and for exactly the same reason as before. The further a claimant stands from the head of the line at payoff time, the riskier the claim.

Now the treasurer moves in for the kill. "Leveraging raises the risk of the equity and also raises the risk of debt. It must, therefore, raise the total risk.

Right?" "Wrong," you say, preparing to play the M&M card. The M&M propositions are the finance equivalents of conservation laws. What gets conserved in this case is the risk of the earning stream generated by the firm's operating assets. Leveraging or deleveraging the firm's capital structure serves merely to partition that risk among the firm's security holders.¹

To see where the risk goes, consider the following illustrative example. Suppose a firm has 10 security holders of whom 5 hold the firm's bonds and the remaining 5 hold equal shares in the firm's leveraged equity. Suppose further that the interest due on the 5 bonds is covered sufficiently for those bonds to be considered essentially riskless. The entire risk of the firm must thus be borne by the 5 shareholders who will, of course, expect a rate of return on their investments substantially higher than on the assumed riskless bonds. Let 2 of the common stockholders now come to feel that their share of the risks is higher than they want to bear. They ask to exchange their stockholdings for bonds, but they learn that the interest payments on the 2 additional bonds they will get in exchange could not be covered in all possible states of the world. To avoid diluting the claims of the old bondholders, the new bonds must be made junior to the old bonds. Because the new bonds are riskier, the 2 new bondholders will expect a rate of return higher than on the old riskless bonds, but a rate still less, of course, than on their original, and even higher-risk holdings of common stock. The *average* risk and the average expected interest rate of the 7 bondholders taken together has thus risen. At the same time, the risk assumed by the remaining 3 equity holders is also higher (since the 2 shifting stockholders now have taken a prior claim on the firm's earnings) and their expected return must rise as well. Both classes of securities are thus riskier on average, but the *total* risk stays exactly the same as before the 2 stockholders shifted over. The increased risk to the 3 remaining stockholders is exactly offset by decreased risk to the 2 former stockholders who have moved down the priority ladder to become junior bondholders.²

2.3. *Leverage and the Deadweight Costs of Financial Distress*

That aggregate risk might be unaffected by modest changes of leverage some might willingly concede, but not when leverage is pushed to the point that bankruptcy becomes a real possibility. The higher the leverage, the

¹In the original M&M paper, that underlying real earning stream was taken as a given, independent of the financing decisions. Subsequent research has identified many possible interactions between the real and the financial sides of the firm, but their effects on risk are not always in the same direction and for present purposes, they can be regarded as of only second-order importance.

²Note, incidentally, that this story would have exactly the same conclusions if the 2 defecting common stockholders had opted for preferred stocks rather than junior bonds. Even though accountants classify preferred stocks as equity, preferreds are functionally equivalent to junior debt. Preferred stocks, in fact, were effectively the junk bonds of finance (often with the same bad press) prior to the 1930's when the steep rise in corporate tax rates made them less attractive than tax-deductible, interest-bearing securities of equivalent priority.

greater the likelihood, of course, that just such an unfortunate event will occur.

Actually, however, the M&M conservation of risk continues to hold, subject to some qualifications to be duly noted below, even in the extreme case of default. That result seems paradoxical only because the emotional and psychological overtones of the word bankruptcy give that particular outcome more prominence than it merits on strictly economic grounds. From a bloodless finance perspective, a default signifies merely that the stockholders have now lost their entire stake in the firm. Their option, so to speak, has expired worthless. The creditors now become the new stockholders and the return on their original debt claims becomes whatever of value is left in the firm.

The qualification to the principle of risk conservation noted earlier is that the very process of transferring claims from the debtors to the creditors can itself create risks and deadweight costs over and beyond those involved when the firm was a going concern. Some of these “costs of financial distress,” as they have come to be called, may be incurred even before a default occurs. Debtors, like some poets, do not “go gentle into that good night.” They struggle to keep their firms alive, even if sometimes the firm would be better off dead by any rational calculation. They are often assisted in those efforts at life-support by a bankruptcy code that materially strengthens their hands in negotiations with the creditors. Sometimes, of course, the reverse can happen and over-rapacious creditors can force liquidation of firms that might otherwise have survived. About all we can safely conclude is that once the case is in bankruptcy court, all sides in these often-protracted negotiations will be assisted by armies of lawyers whose fees further eat away the pool of assets available to satisfy the claims of the creditors. For small firms, the direct costs of the bankruptcy proceedings can easily consume the entire corpus (an apt term), but they are essentially fixed costs and hence represent only a small portion of the recoveries in the larger cases. In the aggregate, of course, direct bankruptcy costs, even if regarded as complete social waste, are minuscule relative to the size of the economy.³

2.4. The Costs of Financial Distress: Private or Social?

Small as the aggregate deadweight costs of financial distress may be, bankruptcies can certainly be painful personal tragedies. Even so generally unadmired a public figure as Donald Trump has almost become an object of public sympathy as he struggles with his creditors for control over his garish Taj Mahal Casino. But even if he does lose, as seemed probable at the time of this writing, the loss will be his, not society's. The Trump casino and

³The deadweight costs of bankruptcy, and of financial distress more generally, may be small in the aggregate, but they do exist. A case can be made, therefore, on standard welfare-economics grounds for eliminating the current tax subsidy to debt implicit in our current unintegrated corporate income tax. Achieving complete neutrality between debt and equity, however, would require elimination of the corporate tax—a step not likely to be undertaken in the foreseeable future.

associated buildings will still be there (perhaps one should add, alas). The only difference will be the sign on the door: Under New Management.⁴

The social consequences of the isolated bankruptcy can be dismissed perhaps, but not, some would argue, bankruptcies that come in clusters. The fear is that the bankruptcy of each overindebted firm will send a shock wave to the firm's equally overindebted suppliers leading in turn to more bankruptcies until eventually the whole economy collapses in a heap. Neither economics generally nor finance in particular, however, offer much support for this notion of a leverage-induced "bankruptcy multiplier" or a contagion effect. Bankrupt firms, as noted earlier, do not vanish from the earth. They often continue operating pretty much as before, though with different ownership and possibly on a reduced scale. Even when they do liquidate and close down, their inventory, furniture and fixtures, employees and their customers flow to other firms elsewhere in the economy. Profitable investment opportunities that one failing firm passes up will be assumed by others, if not always immediately, then later when the economic climate becomes more favorable. Recent research in macro-economics suggests that much of what we used to consider as output irretrievably lost in business cycles is really only output postponed, particularly in the durable goods industries.

To say that the human and capital resources of bankrupt firms will eventually be reemployed, is not to deny, of course, that the personal costs of disemployment merit consideration, particularly when they become widespread. All modern economies take steps to ease the pains of transferring human resources to other and better uses, and perhaps they should do even more. But delaying or preventing the needed movements of resources will also have social costs that can be even higher over the long run as the economies of Eastern Europe are discovering.

The successive waves of bankruptcies in the early 1930's may seem to belie this relatively benign view of bankruptcy as a matter essentially of private costs with no serious externalities, but not really.⁵ Contrary to widely-held folk beliefs, bankruptcies did not bring on the Great Depression. The direction of causation runs from depressions to bankruptcies, not the other way around. The collapse of the stock market in 1929 and of the U.S. banking system during 1931-1932 may well have created the appearance of a finance-driven disaster. But that disaster was not just the inevitable bursting

⁴Actually, according to recent press reports, Trump's creditors have allowed him to keep control, at least temporarily. Should he fail to meet stipulated cash-flow targets, however, the creditors can take over his remaining interests in a so-called "pre-packaged" bankruptcy, that is, one without formal bankruptcy proceedings (and expenses). Further use of this ingenious and efficient method for transferring control can confidently be expected.

⁵True externalities arise, as in the case of air pollution, only when actions by one firm increase the costs of others. A possible analog to pollution for corporate debt might be the shifting to the government and hence to the taxpayers, of the pension costs of failed firms. Once again, however, the aggregate impact is of only second-order significance.

of another overleveraged tulip bubble as some have suggested. (Actually recent research has cast doubt on the existence of even the *original* tulip bubble. But that is another story. See Garber (1989).) Responsibility for turning an ordinary downturn into a depression of unprecedented severity lies primarily with the managers of the Federal Reserve System. They failed to carry out their duties as the residual supplier of liquidity to the public and to the banking system. The U.S. money supply imploded by 30 percent between 1930 and 1932, dragging the economy and the price level down with it. When that happens even AAA credits get to look like junk bonds.

That such a nightmare scenario might be repeated under present day conditions is always possible, of course, but, until recently at least, most economists would have dismissed it as extremely unlikely. The current chairman of the Federal Reserve Board himself, as well as his staff, are known to have studied the dismal episode of the early 1930's in great depth and to be thoroughly aware of how and why their ill-fated predecessors had blundered. The prompt action by the Federal Reserve Board to support the liquidity of the banking system after the stock market crash of October 19, 1987 (and again after the mini-crash of October 13, 1989) is testimony to the lessons learned. The fear of some at the moment, however, is that both the willingness and the ability of the Federal Reserve to maintain the economy's liquidity and its credit system are being undermined by regulatory overreaction to the S&L crisis—an overreaction that stems in part from underestimating the market's internal controls on overleveraging.

3.0. The Self-Correcting Tendencies in Corporate Leveraging

Just what combination of demand shifts and supply shifts triggered the big expansion in leveraged securities in the 1980's will eventually have to be sorted out by future economic historians. The main point to be emphasized here is that whether we are talking automobiles or leveraged equity or high-yield bonds the market's response to changes in tastes (or to changes in production technology) is limited and self-regulating. If the producers of any commodity expand its supply faster than the buyers want, the price will fall and output eventually will shrink. And similarly, in the financial markets. If the public's demand for junk bonds is overestimated by takeover entrepreneurs, the higher interest rates they must offer to junk-bond buyers will eat into the gains from the deals. The process of further leveraging will slow and perhaps even be reversed.

Something very much like this endogenous slowing of leveraging could be discerned in early 1989 even before a sequence of government initiatives (including the criminal indictments of the leading investment bankers and market makers in junk bonds, the forced dumping of junk bond inventories by beleaguered S&L's and the stricter regulations on leveraged lending by commercial banks) combined to undermine the liquidity of the high-yield bond market. The issuance of high-yield bonds not only ground to a halt, but

many highly-leveraged firms moved to replace their now high-cost debts with equity.⁶

3.1. *Junk Bonds and the S&L Crisis*

To point out that the market has powerful endogenous controls against overleveraging does not mean that who holds the highly leveraged securities is never a matter of concern. Certainly the U.S. Savings and Loan institutions should not have been using government-guaranteed savings deposits to buy high-risk junk bonds. But to focus so much attention on the junk bond losses of a handful of these S&L's is to miss the main point of that whole sorry episode. The current hue and cry over S&L junk bonds serves merely to divert attention from those who expanded the government deposit guarantees and encouraged the S&L's to make investments with higher expected returns, but alas, also with higher risk than their traditional long-term home mortgages.

Some, at the time, defended the enlargement of the government's deposit guarantee as compensation for the otherwise disabling interest rate risks assumed by those undertaking the socially-desirable task of providing fixed rate, long-term mortgages. Quite apart, however, from the presence even then of alternative and less vulnerable ways of supplying mortgage money, the deposit guarantees proved to be, as most finance specialists had predicted at the time, a particularly unfortunate form of subsidy to home ownership. Because the deposit guarantees gave the owners of the S&L's what amounted to put options against the government, they actually encouraged the undertaking of uneconomic long-odds projects, some of which made junk bonds look safe by comparison. The successes went to the owners; the failures, to the insurance fund.

More is at stake, however, than merely assigning proper blame for these failed attempts to overrule the market's judgment that this politically powerful industry was not economically viable. Drawing the wrong moral from the S&L affair can have consequences that extend far beyond the boundaries of this ill-fated industry. The American humorist, Mark Twain, once remarked that a cat, having jumped on a hot stove, will never jump on a stove again, even a cold one. Our commercial bank examiners seem to be following precisely this pattern. Commercial banking may not quite be a cold stove at the moment, but it is, at least, a viable industry. Unlike the S&L's, moreover, it plays a critical role in financing businesses, particularly, but not only, those too small or too little known to support direct access to the public security markets. Heavy-handed restrictions on bank loans by examiners

⁶The process of swapping equity for debt (essentially the reverse of the parable in Section 2.2) would have gone even further by now but for an unfortunate feature of U.S. tax law. Swapping equity for debt selling at less than face value creates taxable income from "cancellation of indebtedness." An exception is made for firms in bankruptcy making that option more attractive than it otherwise might be for firms whose debts are at a sizeable discount.

misreading the S&L experience will thus raise the cost of capital to, and hence decrease the use of capital by, this important business sector.⁷

Whether regulatory restrictions of these and related kinds have already gone so far as to produce a "credit crunch" of the kind associated in the past with monetary contraction is a subject much being argued at the moment, but one I prefer to leave to the specialists in money and banking. My concerns as a finance specialist are with the longer-run and less directly visible consequences of the current anti-leverage hysteria. This hysteria has already destroyed the liquidity of the market for high-yield bonds. The financial future markets, currently under heavy attack for their supposed overleveraging are the next possible candidates for extinction, at least in their U.S. habitats.

Many in academic finance have viewed these ill-founded attacks on our financial markets, particularly the newer markets, with some dismay. But they have, for the most part, stood aside from the controversies. Unlike some of the older fields of economics, the focus in finance has not been on issues of public policy. We have emphasized positive economics rather than normative economics, striving for solid empirical research built on foundations of simple, but powerful organizing theories. Now that our field has officially come of age, as it were, perhaps my colleagues in finance can be persuaded to take their noses out of their data bases from time to time and to bring the insights of our field, and especially the public policy insights, to the attention of a wider audience.

⁷Examples of such restrictions are the guidelines, recently promulgated jointly by the Federal Deposit Insurance Corporation, the Comptroller of the Currency and the Federal Reserve Board governing so-called Highly Leveraged Transactions (HLT's). These guidelines have effectively shut off lending for corporate restructuring, whether friendly or hostile. But the rules are so vaguely drawn and so uncertain in their application as to be inhibiting other kinds of loans as well. Bank loans these days often carry provisions calling for automatic interest rate increases of 100 basis points or more if the loans are later classified by the bank examiners as HLT's.

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