

Mental Liquidity

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Assets are considered economically liquid when they can be sold quickly with no loss relative to their fair market value. Assets are considered “mentally liquid” when they offer investors options to obscure losses relative to reference prices, and options to avoid loss realization. Purchase prices are common reference prices, but others, such as the maximum price reached over the preceding twelve months, are often adopted as well.

Consider that the price of a twenty-year \$1,000 Treasury bond purchased for \$1,000 one year ago may decline to \$900 if interest rates increase during the year. That bond is almost perfectly economically liquid; investors can sell it for \$900, minus a small commission. But the mental liquidity of the bond is impaired because investors notice paper losses relative to the purchase price, or they may feel compelled to postpone selling it to avoid realizing the loss. Still, the bond is more highly mentally liquid than a stock, because bondholders can wait until the maturity date to avoid realizing a loss, while stockholders cannot.

Because investors like gains and hate losses, they tend to prefer investments that combine the prospect of gains with protection from losses. The purpose of this article is to describe some of these investments, while highlighting the features designed to obscure losses or avoid their realization. These securities include bonds, money market funds, stable value funds, and indexed annuities.

Normal Investors versus Rational Investors

The preference for mental liquidity is common among the normal investors who populate behavioral finance, but it is absent among the rational investors who populate standard finance. Miller and Modigliani [1961] described rational investors as those who “always prefer more wealth to less and are indifferent as to whether a given increment to their wealth takes the form of cash payments or an increase in the market value of their holdings of shares.” Normal investors, like rational ones, prefer more wealth to less, but they prefer some forms of wealth over others. Moreover,

normal investors are often willing to sacrifice wealth for the utility they derive from forms of wealth they prefer. The “disposition effect” is one example.

Shefrin and Statman [1985] coined the term “disposition effect” to describe the reluctance of investors to realize losses. They attribute it to cognitive biases, namely mental accounting and hindsight, and the emotion of regret. Normal investors frame a bond purchased for \$1,000 into a mental account, distinct from mental accounts that contain their other assets. This bond mental account would register a \$100 paper loss if its price declines to \$900. Normal investors are fooled by hindsight into believing they could have foreseen that the value of the bond would decline. They feel the pain of regret when they observe the \$100 paper loss, and that pain intensifies when they realize the loss because it extinguishes all hope of recovery.

Normal investors differ from Miller and Modigliani’s [1961] definition of rational investors primarily because they are not indifferent to the form of wealth. They distinguish paper losses from realized losses, which are different only in form. They are also willing to sacrifice wealth for the form of wealth they prefer, because they forego the tax benefits of realized losses. Yet many studies, including Shefrin and Statman [1985] and Odean [1998], have demonstrated that investors commonly avoid realizing losses.

Similarly, Galai and Sade [2006] study (normal) Israeli investors, and find they prefer bank CDs over Treasury bills of the same maturity even though Treasury bills have higher yields and greater economic liquidity. Galai and Sade [2006] ascribe this preference to an “ostrich effect,” which drives investors away from securities that display market prices because this might expose paper losses.

Karlsson, Loewenstein, and Seppi [2005] find that Swedish investors are more likely to check the value of their stock accounts on days the market has risen, and to refrain from checking on days the market has declined. They write: “People clearly derive pleasure and pain directly from shifts in the value of their portfolios prior to consuming the actual underlying cash flows” (p. 1).

Barberis, Huang, and Santos [2001] present a model where changes in the utility of investors depend on changes in the value of their investments. Benartzi and Thaler [1995] discuss how the frequency of observing changes in stock values may affect the willingness to invest in stocks.

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Security features that allow investors to obscure losses or to avoid realization are not the only features that make securities attractive, however. Others include minimizing taxes and circumventing regulations. Miller [1986] describes how security designers produce securities to overcome the irritation of taxes and regulations, in much the same way that oysters produce pearls to overcome the irritation of grains of sand. But while features to minimize taxes and circumvent regulations are consistent with rational investor behavior, features to obscure losses or avoid their realization are not. Yet normal investors are attracted to these features in securities like bonds, money market funds, stable value funds, and indexed annuities. We begin our discussion of mental liquidity with bonds.

Bonds

Consider a forty-five-year-old man who plans to retire in twenty years on his sixty-fifth birthday. He buys twenty-year Treasury bonds with a face value equal to the amount he will need at sixty-five, and plans to use the bond coupons for consumption during the ensuing twenty years. This man bears no risk. Moreover, he needs no economic liquidity.

However, circumstances where investors know their time horizons with precision and can find bonds with maturities that perfectly match these horizons are unlikely. Forty-five-year-olds who plan to retire at sixty-five might find at fifty-five that they prefer to retire at sixty. Such investors do bear risk because the market value of their bonds when they are fifty-five might be lower than face value because of uncertain future interest rates. Moreover, such investors do care about the economic liquidity of their bonds because transaction costs detract from the amount they receive upon liquidation.

Normal investors care about economic liquidity but they also care about mental liquidity. Bonds offer mental liquidity because they give bondholders the option of waiting until the price of the bond equals its face value. This mental liquidity option is reflected in O'Connell's [1996] description of a zero-coupon Treasury bond as a "safety net with the bounce" of a trampoline. "Suppose you want at least \$100,000 when you retire twenty years from now. You can buy 100 twenty-year Treasury strips, each with a face value of \$1,000. Your cost: about \$25,000, including a broker's markup of some \$675. Your yield would be about 7%. If rates drop this year, with new strips yielding 6.5%, you could sell yours, pocketing a 21% gain. And if you held the strips until they matured . . . you would be guaranteed to gain."

Commentary on the advantage of individual bonds over bond mutual funds also illustrates how important mental liquidity is to investors. Individual bonds

have greater mental liquidity than bond mutual funds because bondholders have the option to wait until the maturity date and receive face value. Bond mutual fund holders do not have this option. Mutual Funds have no maturity date, and the marking-to-market of net asset value implies they are not assured of receiving a certain amount no matter how long they wait.

Quinn [1996] explains the mental liquidity advantage of individual bonds over bond funds, noting that while prices of both fluctuate, "investors rarely pay attention" to the price fluctuations of individual bonds, and have "less to worry about." This is because "If you sell before maturity, you'll get the current market price which, as with bond funds, could either be more or less than you originally paid. If you hold to maturity, however, you're guaranteed your principal back – something bond funds never do."

An individual bond has a mental accounting advantage over a bond mutual fund, but it will be less compelling if the time to maturity is many years away. A bond ladder, however, which consists of individual bonds at staggered maturities, is another option that offers greater mental liquidity than an individual bond. As an example, consider a ladder with one bond maturing one year from now, another maturing in two years, and so on until the tenth bond maturing in ten years. A bond ladder offers greater mental liquidity than even a portfolio of ten-year bonds, because an investor only needs to wait one year to receive the face value of the one-year bond. And investors typically replenish bond ladders so that the proceeds of a matured one-year bond can be used to buy a ten-year bond, thus leaving the composition intact.

Bond ladders are perceived by normal investors as superior to bond mutual funds. Opdyke and Saha-Bubna [2005], for example, write that a bond ladder can "help investors preserve their capital and improve their return. . . . It also will help ward off potential losses that bond funds are likely to suffer as the Fed pushes interest rates higher" (D1).

That perception of bond ladders as instruments to preserve capital, improve returns, and ward off potential losses better than bond mutual funds is puzzling to rational investors. They note that a bond ladder is, in essence, a "homemade" mutual fund, subject to the same interest rate risk and default risk as a mutual fund holding the same bonds. Indeed, the default risks of typical bond ladders are likely to be greater than those of bond mutual funds, because mutual funds tend to be more diversified among many bonds. The real advantage of a bond ladder over a bond mutual fund is its greater mental liquidity.

Money Market Funds

Money market funds (MMFs) are an example of Miller's [1986] description of regulations as irritating

grains of sand, and newly innovated securities as pearls created to circumvent this irritation. MMFs were introduced in the early 1970s to circumvent Regulation Q, which limited the interest rate banks could pay for deposits of less than \$100,000. They soon became substitutes for bank savings and checking accounts. MMF investors received checkbooks similar to bank checkbooks and could write checks everywhere, as long as the amount exceeded some threshold, typically \$250. MMFs were as economically liquid as checking accounts, but they were not as mentally liquid.

The prices of shares of early MMFs were marked-to-market, as are prices of shares of other mutual funds. That made MMFs different from checking accounts. Investors who deposited \$1 in a checking account were assured they could withdraw \$1 the following day, week, or year. But MMF investors had no assurance: \$1 invested in an MMF one day might be worth \$0.98 the following day if interest rates increased. MMF investors would then need to withdraw, say, 510 shares to pay for a \$500 television set, with the extra ten shares registering as a loss.

The possibility of losses was a design drawback of MMFs relative to checking accounts because it reduced mental liquidity. Investors in mentally illiquid investments face the unpleasant choice between sacrificing time and sacrificing money. On the one hand, they can sacrifice money by paying 510 shares when the price per share is \$0.98 for something that would have cost 500 shares if the price remained at the original \$1 per share. On the other hand, they could sacrifice time by depriving themselves of the television set until the price of the MMF shares again reached \$1. Investors like to sacrifice neither time nor money, and they were soon making themselves heard to MMF executives.

Initially, MMF companies sought to overcome this mental liquidity deficiency by managing their portfolios so that deviations from the \$1 share price were small. That was good, but not good enough. In 1977, following much lobbying by mutual fund companies, the SEC approved the use of amortized cost valuation of MMF shares in place of mark-to-market valuation. As a result, the share price remains at \$1 even when the market value departs from it. At last, MMF investors were assured that their \$1 purchase price would not decline, and MMFs became as mentally liquid as checking accounts.

However, the mental liquidity benefits of amortized MMFs come at a cost. Arbitrageurs can switch to amortized MMFs when their rates exceed those offered by mark-to-market MMFs or other marketed securities, and they can switch back when amortized MMF rates fall below market interest rates. Lyon [1984] estimates that trading by arbitrageurs costs amortized MMF investors approximately 0.10% per year.

Stable Value Funds

Stable value funds, which feature “bond-like returns with the liquidity and safety of money market funds” were created in response to growing concerns about the shortcomings of MMFs (Stable Value Association [2005]). In an article about money market funds, Lyon [1984] discusses Brent Bent of Reserve Management, a mark-to-market MMF in 1977. Bent asked the SEC not to approve amortized MMFs because he felt such funds would deceive investors. He was concerned that amortized cost accounting would conceal market value fluctuations and possibly losses. Bent wrote that amortized cost accounting “presents the illusion of high rates” in times of declining rates, and makes MMFs “appear to overcome the risk” of fluctuating interest rates. It turns out Bent was quite prescient in foreseeing not only amortized MMFs but also stable value funds.

The Stable Value Association [2005] says that stable value funds combine “the best features of bonds and money market funds. . . they remove the negative of bonds, the potential loss or fluctuation of principal.” Stable value funds deliver bond-like returns for a simple reason: They hold bonds. Tobe [2004] writes: “Stable value funds typically maintain for a duration of three to five years, so they are able to capture returns at the intermediate range of the yield curve. In contrast, money market funds typically have a duration of less than one year, so they are able to capture returns at only the short end of the curve” (p. 84). Amortized cost accounting allows stable value funds “to report smooth returns, regardless of fluctuations in the underlying portfolios” (p. 84).

The arbitrage opportunities available in stable value funds are greater than those available in money market funds because fluctuations in the value of fixed-income securities with three- to five-year durations are greater than fluctuations in the value of securities with durations of less than one year.

And stable value funds within defined contribution plans prevent arbitrage with devices that reduce economic liquidity, such as the absence of a money market fund in the set of available funds. This means plan participants cannot convert their money from stable value funds to more liquid MMFs. Another device is the requirement that participants submit to an “equity wash,” in which funds withdrawn from a stable value fund must be placed in an equity fund for some period before they can be transferred to a money market fund. Equity washes impair economic liquidity because those who invest in stable value funds to avoid fluctuations in bond value tend to be reluctant to submit to the even greater fluctuations of stocks.

The short-lived experience of stable value mutual funds demonstrates that arbitrage between stable value

funds and money market funds is likely in the absence of devices to constrain it. Stable value mutual funds included such a device in the form of interest rate “triggers,” meaning investors who withdraw money when rates are lower than market rates pay redemption fees. Deutsche Preservation Plus Income set that fee at 2%, as did the Garthmore Morley Capital Accumulation IRA.

Note, however, that stable value funds offer mental liquidity. Investors in stable value funds do not see losses when they read quarterly reports. But the mental liquidity of stable value funds comes at the cost of economic liquidity and out-of-pocket costs. Stable value fund “wrap fees” raise their cost by 7-10 basis points over bond mutual funds that hold the same assets.

Indexed Annuities

Consider investors with ten-year investment horizons who hold portfolios combining ten-year U.S. Treasury zero-coupon bonds with stocks. These investors cannot lose on the bond portion of their portfolios if they hold the bonds until maturity. But they can lose on the stock portion if they hold them for the full ten years. In the minds of investors, the bonds and stocks of the bond-stock portfolio are framed in two separate mental accounts. The prospect of loss in the stock mental account detracts from the attractiveness of the bond-stock portfolio.

Now consider a variation of the bond-stock portfolio proposed some years ago by the Dean Witter brokerage firm. This variation is identical in substance to the bond-stock portfolio but different in form. The Dean Witter form combines the bonds and stocks into a single mental account in an investment strategy they call Principal Guaranteed Strategy. To illustrate, Dean Witter uses the example of “Mr. Stewart,” who has a ten-year horizon and \$50,000 to invest. Mr. Stewart would like to add stocks to his portfolio for their potential profits, but wants to be assured he will not sustain losses if stock prices decline. Dean Witter recommends that Mr. Stewart buy zero-coupon U.S. Treasury bonds maturing in ten years with a face value of \$50,000 at their current price, which is lower than \$50,000, and invest the remainder in stocks. As a result, Mr. Stewart and similar investors are “guaranteed to receive all of their original principal back – regardless of how the stocks perform.” An increase in the price of the stocks would add to Mr. Stewart’s gain, but he would have his \$50,000 principal back when the zero-coupon bonds mature even if all his stocks decline to zero.

The Dean Witter Principal Guaranteed strategy is a homemade version of indexed annuities sold by many insurance companies and of index target-term securities (MITTS) sold by Merrill Lynch. Glassman [1997] described MITTS as “having your cake and eating it

too,” writing, “What if I told you there’s an investment that will give you no downside but an unlimited upside? An investment with a guarantee against loss but no restrictions on gain?” Merrill Lynch describes a hypothetical MITTS linked to an ABC stock index in its brochure “Protected Growth Investing.” The MITTS security is offered to investors at \$10; at maturity investors are entitled to receive their \$10 back, plus 100% of the price appreciation of the ABC index between the offering date of the MITTS and its maturity date. Investors receive \$15 if the ABC index is up 50% at maturity, and they receive their \$10 principal back if the index is down 50% at maturity.

Dean Witter’s Principal Guaranteed Strategy and Merrill Lynch’s MITTS have economic liquidity. Principal Guaranteed Strategy investors can sell their bonds and their stocks in the market at any time for small transaction fees, just as MITTS investors can sell their MITTS. However, neither has perfect mental liquidity other than at maturity, because sales before maturity might bring the realization of losses. Moreover, MITTS, like the bonds and stocks of the Principal Guaranteed Strategy, are traded in the market, so investors may be exposed to the painful observation of paper losses.

Indexed annuities are similar in structure to the Principal Guaranteed Strategy and to MITTS. All are constructed as combinations of zero-coupon bonds and stocks or stock options. But indexed annuities differ in that they do not trade in the market. Thus indexed annuity investors, like the CD investors in Galai and Sade’s [2006] study, are spared observation of paper losses. Investors who want to liquidate their indexed annuities before maturity must submit them to the issuing company, which charges various early liquidation penalties.

Indexed annuity investors pay substantial costs for security design. Commissions range from 5% to 15%. These investors can achieve the same results more cheaply with a combination of bonds and stocks or stock options similar to Dean Witter’s Principal Guaranteed Strategy.

Conclusion

Assets are economically liquid when they can be sold quickly with no loss relative to their fair market value. Assets are mentally liquid when they offer investors options to obscure losses relative to reference prices and options to avoid loss realization. Purchase prices are common reference prices, but measures such as the maximum price reached over the preceding twelve months are also used.

Mental liquidity holds no appeal for rational investors. Miller and Modigliani [1961] described rational investors as those who “always prefer more wealth

to less and are indifferent as to whether a given increment to their wealth takes the form of cash payments or an increase in the market value of their holdings of shares.” Rational investors know that paper losses are different from realized losses only in form, not substance. Moreover, rational investors hasten to realize losses so as to reap tax benefits that add to their wealth.

Normal investors distinguish paper losses from realized losses and are willing to sacrifice economic liquidity and tax benefits for the utility they derive from obscuring paper losses and avoiding their realization. Normal investors feel the pain of regret as they find in hindsight that they would have been better off had they not bought the losing security. The pain of regret only intensifies when normal investors realize their losses.

Security designers are aware of the attraction of mental liquidity and design securities specifically to provide it. We discuss the mental liquidity features of bonds, money market funds, stable value funds, and indexed annuities. For example, Treasury bonds bought at face value offer mental liquidity in their option to wait until the prices of the bonds equal face value, knowing that bond prices are guaranteed to do so at maturity. In contrast, Treasury bond mutual funds offer no mental liquidity option, because 1) they have no maturity dates, and 2) the marking-to-market of their net asset values implies that investors are never assured of being able to sell their mutual fund shares without realizing losses.

Mental liquidity is only one of many features that make securities attractive to normal investors. They also tend to be attracted to securities like covered calls, where immediate gains in the form of an option premium are transparent, but potential losses in the form of lost stock appreciation are opaque. And normal investors are attracted to assets like houses, which have more than one function. A house serves an investment

function as a result of increases in house prices, and a consumption function following decreases. We return to these concepts and other security features in future work.

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