Mental Liquidity

by

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Abstract

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 their realization. Purchase prices are common references prices but other prices, such as the maximum price reached during the preceding 12 months, might serve as reference price. The price of a 20-year $1,000 Treasury bond purchased for $1,000 a year ago might have declined to $900 because interest rates increased during the year. That bond is almost perfectly economically liquid; investors can sell it for $900 less a small commission. But the mental liquidity of the bond is impaired if investors are unable to avoid observation of paper losses relative to the purchase price or if they feel compelled to postpone the sale of the bond so as to avoid the realization of losses. Still, the bond is more highly mentally liquid than a stock since bondholders have the option to wait till maturity date and avoid the realization of losses while stockholders do not have that option.

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

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Investors like gains and hate losses so they love investments that combine the prospect of gains with protection from losses. The purpose of this article is to describe some of these investments, 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 and rational

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

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standard finance. Miller and Modigliani (1961) described rational investors as investors 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 unlike rational investors 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 like. The "disposition effect" is one example.

Shefrin and Statman (1985) coined the term "disposition effect" to describe the reluctance of investors to realize losses and attributed 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 now registers a $100 paper loss after its price declined to $900. Normal investors are fooled by hindsight into believing that they could have seen in foresight that the value of the bond was about to decline. They feel the pain of regret when they observe the $100 paper loss and that pain only intensifies when they realize the loss since realization extinguishes all hope of recovery.

Normal investors do not conform to Miller and Modigliani's definition of rational investors since they are not indifferent to the form of wealth. They distinguish paper losses from realized losses which are different only in form, and they are willing to sacrifice wealth for the form of wealth they like, as they forego the tax benefits of realized losses. Yet many studies, including those of Shefrin and Statman (1985) and Odean (1998) demonstrate that investors commonly avoid the realization of losses.

Similarly, the investors that Galai and Sade (2005) describe are normal investors. They found that Israeli investors prefer bank CDs over Treasury bills of the same maturity even though Treasury bills have higher yields and greater economic liquidity. Galai and Sade ascribe the preference to an "ostrich effect" that drives investors away from securities that display market prices because display might expose paper losses.

Karlsson, Loewenstein and Seppi (2005) found that Swedish investors tend to look up the value of their accounts on days when they know from general news that the stock market went up but refrain from looking on days when they know that the market went down. Karlsson et al (2005) wrote, "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) presented a model where changes in the utility of investors depend on changes in the value of their investments, not only the utility of consuming from them, and Benartzi and Thaler (1995) discussed the effect of the frequency of observing change in the value of stocks on the willingness to invest in them.

Security features that allow investors to obscure losses or avoid their realization are not the only features that make securities attractive. They often complement other attractive features, such as the minimization of taxes and the circumvention of regulations. Miller (1986) describes how security designers produce securities to overcome the irritation of taxes and regulations as oysters produce pearls to overcome the irritation of grains of sand. But while features that allow investors to minimize taxes and circumvent regulations are consistent with the behavior of rational investors, features that allow investors to obscure losses or avoid their realization are not. Yet normal investors are

attracted to these features in securities such as bonds, money market funds, stable value funds and indexed annuities. We begin our discussion of mental liquidity with bonds.

Bonds

Consider a 45-year old man who plans to retire on his 65th birthday, precisely 20 years from now. He buys 20-year Treasury bonds with a face value equal to the amount he will need at 65 and plans to use the bond coupons for consumption during the ensuing 20 years. This man bears no risk. Moreover, he needs no economic liquidity.

There might be circumstances where investors know their time horizons with precision and can find bonds with maturities that match these horizons perfectly, but these are not likely to be common. Forty-five-year-olds who plan to retire at 65 might find at 55 that they prefer to retire at 60. Such investors do bear risk because the market value of their bonds when they are 55 might be lower than face value by an amount that depends on uncertain future interest rates. Moreover, such investors care about the economic liquidity of their bonds since transaction costs detract from any amount they receive when they liquidate their bonds.

Normal investors care about economic liquidity but they also care about mental liquidity. Bonds offer mental liquidity because they give bondholders the option to wait 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 20 years from now. You can buy 100 20-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."

We also observe the importance of mental liquidity to investors in commentary about the advantage of individual bonds over bond mutual funds. Individual bonds have greater mental liquidity than bond mutual funds since bondholders have the option to wait till maturity date and receive the bonds' face value. Bond mutual fund holders have no such option since they have no maturity date and the marking-to-market of net asset value implies that investors are never assured that they would receive 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 individual bonds and bond funds 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 that advantage is not very compelling if the time to maturity date of the bond is many years away. The wait might be too long. A bond ladder offers greater mental liquidity than an individual bond. A bond ladder consists of individual bonds at staggered maturities. For example, a ladder might consist of one bond maturing a year from now, another maturing

in two-year and so on to the tenth bond, maturing in 10 years. This bond ladder offers greater mental liquidity than a portfolio composed entirely of 10-year bonds since an investor need wait only a year to receive the face value of the one-year bond. Investors typically replenish bond ladders such that the proceeds of a matured one-year bond is used to buy a 10-year bond such that the composition of the ladder remains intact.

Bond ladders are perceived by normal investors as superior to bond mutual funds. For example, Opdyke and Saha – Bubna (2005) write that bond ladders "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 that preserve capital, improve returns and ward off potential losses better than bond mutual funds is puzzling to rational investors since a bond ladder is, in substance, a "homemade" mutual fund, subject to the same interest rate risk and the same 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 fund since 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 that limited the rate of interest banks could pay for deposits of less than $100,000. They soon became substitutes for bank saving and checking accounts. MMF

investors received checkbooks similar to bank checkbooks and could write checks for use

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 a dollar in a checking account were assured that they would be able to withdraw

a dollar the following day, week, or year. But MMF investors had no such assurance. A

dollar invested in a MMF one day might be worth 98 cents the following day if interest

rates increased. Such investors would have to withdraw 510 shares of the MMF to pay for

a $500 television set. The extra ten shares register as a loss.

The possibility of losses was a design drawback of MMFs relative to checking

accounts because it reduced its mental liquidity. Investors in mentally illiquid investments

face the unpleasant choice between sacrificing time and sacrificing money. They could

sacrifice money by paying 510 shares when the price per share is 98 cents for a television

set that would have cost them 500 shares if the price remained at the original $1 per share.

Or they could sacrifice time by depriving themselves of the television set until the price of

the MMF shares reached $1 gain. Investors like to sacrifice neither time nor money and

MMF executives were soon hearing their voices.

Initially, MMF companies sought to overcome the mental liquidity deficiency of

MMFs by managing their portfolios such that deviations of share prices from $1 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 shares of MMFs

in place of mark-to-market valuation, such that the price of shares remains at $1 even when the market value of the shares departs from it. At last, MMF investors were assured that they cannot lose relative to the $1 purchase price of shares and MMFs became as mentally liquid as checking accounts.

However, the mental liquidity benefits of amortized MMFs came at a cost. Arbitrageurs could switch to amortized MMFs when their rates exceeded interest rates offered by mark-to-market MMFs or other marketed securities, and they could switch back when amortized MMF rates fell below market interest rates.   Lyon (1984) estimated that trading by arbitrageurs cost amortized MMF investors approximately 0.10% per year.

Stable value funds

In his article about money market funds Lyon (1984) writes about Brent Bent of Reserve Management, a mark-to-market MMF in 1977, who asked the SEC not to approve amortized MMFs because such funds would deceive investors. Bent was concerned that amortized cost accounting would conceal fluctuations in market value and possibly losses. He 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 that Bent was quite prescient in foreseeing not only amortized MMFs but also stable value funds.

The Stable Value Association (2005) describes stable value funds as funds that combine, "the best features of bonds and money market funds: bond-like returns with the liquidity and safety of money market funds. Stable value funds remove the negative of bonds, the potential loss or fluctuation of principal."

Stable value funds are able to deliver bond-like returns for a simple reason, they hold bonds. Tobe (2004) writes: "Stable value funds typically maintain 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 the opportunities available in money market funds because fluctuations in the value of fixed income securities with durations of three to five years are greater than fluctuations in the value of securities with duration of less than a year. Stable value funds within defined contribution plans prevent arbitrage with devices that reduce economic liquidity. One device is the absence of a money market fund in the set of funds available in a defined contribution plan. So plan participants cannot convert their money from a stable value fund to a more liquid money market fund. Another is a requirement that participants submit to an "equity wash". In a equity wash, funds withdrawn from a stable value fund must be placed in an equity fund for some period of time before they can be transferred on to a money market fund. Equity washes impair economic liquidity because those who invest in stable value funds to avoid fluctuations in the value of bonds would be reluctant to submit to the even greater fluctuations of stocks.

The short-lived experience of stable value mutual funds demonstrates the likelihood of arbitrage between stable value funds and money market funds in the absence

of devices that constrain it. Stable value mutual funds included such a device, in the form

interest rate "triggers" such that investors who withdraw money when rates on stable value

funds are lower than market rates must pay redemption fees. Deutsche Preservation Plus

Income set that fee at 2% and so did the Garthmore Morley Capital Accumulation IRA.

Redemption fees, like equity washes, reduce the economic liquidity of stable value funds.

Stable value funds offer mental liquidity. Investors in stable value funds never see

losses when they read the quarterly reports of the funds. But the mental liquidity of stable

value funds comes at a cost of economic liquidity and out-of-pocket costs. Stable value

fund "wrap fees" raise the cost of such funds by 7-10 basis points relative to the cost bond

mutual funds that hold the same assets.

Indexed annuities

Consider investors with 10-year investment horizons who hold portfolios

combining 10-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 of their portfolios even if they hold them for the full 10-years.

In the mind of investors the bonds and stocks of the bond-stock portfolio are framed into

two separate mental accounts, one for bonds and one for stocks. 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.

Dean Witter illustrates the strategy with the example of "Mr. Stewart" who has a 10-year horizon and $50,00 to invest. Mr. Stewart would like to add stocks to his portfolio for their potential profits but wants to be assured that he would sustain no loss if the prices of his stocks were to decline. Dean Witter recommends that Mr. Stewart buy zero-coupon U.S. Treasury bonds maturing in 10 years with a face value of $50,000 at their current price, which is lower than $50,000, and invest the remainder in stocks. 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 the prices of each of his stocks were to 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 and 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, but they receive the $10 principal if the index is down 50% at maturity.

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

Indexed annuities are similar in structure to the Principal Guaranteed Strategy of Dean Witter and the MITTS of Merrill Lynch. All are constructed as combinations of zero-coupon bonds and stocks or stock options. But indexed annuities are different from Guaranteed Principal Strategy and MITTS because they do not trade in the market and so indexed annuity investors, like the CD investors in Galai and Sade's (2005) 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 penalties early liquidation according to a specified penalty list. Indexed annuity investors pay substantial costs of security design that they can achieve much more cheaply with a combination of bonds and stocks or stock options similar to that of Dean Witter's Principal Guaranteed Strategy. Commissions on indexed annuities range from 5% to 15%.

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 their realization. Purchase prices are common references prices but other prices, such as the maximum price reached during the preceding 12 months, might also serve as reference prices.

Mental liquidity holds no appeal for rational investors. Miller and Modigliani (1961) described rational investors as investors 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 in substance. Moreover, rational investors hasten to realize losses so as to reap tax benefits that add to their wealth. But 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 that 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 the option to wait until the prices of the bonds equal their face values, knowing that bond prices are sure to do so at maturity. In contrast, Treasury bond mutual funds offer no such mental liquidity option since mutual funds have no maturity dates and the marking-to-market of their net asset values implies that investors

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are never assured that they would be 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. Normal investors are also attracted to securities, such as 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, such as houses, that have more than one function. A house serves an investment function following increases in house prices and a consumption function following decreases. We will return to these and other security features in future work.

References:

Barberis, Nicholas, Ming Huang and Tano Santos (2001). "Prospect Theory and Asset Pricing," *Quarterly Journal of Economics*, vol. 116: 1-53.

Benartzi, Shlomo and Richard H. Thaler (1995). "Mypopic Loss Aversion and the Equity Premium Puzzle," *Quarterly Journal of Economics,* vol. 110, no. 1 (February): 73-92

Galai, Dan and Orly Sade (2005). "The 'Ostrich Effect' and the Relationship Between the Liquidity and the Yields of Financial Assets."

Glassman, James (1997). "A Risk-Free (No Kidding) Bet on the Stock Markets," August 23-24:

Karlsson, Niklas, George Loewenstein and Duane Seppi (2005). "The 'Ostrich Effect': Selective Attention to Information about Investments," Carnegie Mellon University, working paper.

Lyon, Andrew (1984). "Money Market Funds and Shareholder Dilution," Journal of Finance, vol. 39, no. 4 (September): 1011-1020.

Quinn, Jane Bryant (1996). "Weighing the pros and cons of buying bonds vs. bond funds," *San Jose Mercury News*, August 5.

Miller, Merton (1986). "Behavioral Rationality in Finance: The Case of Dividends," *Journal of Business*, vol. 59, no. 4 (October): S451-S468.

Miller, Merton and Franco Modigliani (1961). "Dividend Policy, Growth and the Valuation of Shares," *Journal of Business*, vol. 34, no. 4 (October):411-433.

O'Connell, Vaness (1996). "Zero-Coupon Bonds Offer Safety Net with a Bounce," *Wall Street Journal*, May 29: C1.

Opdyke, Jeff and Aparajita Saha-Bubna (2005). "How to React to Lastest Move from Fed," *Wall Street Journal*, March 23: D1.

Shefrin, Hersh and Meir Statman (1985). "The Disposition to Sell Winners too Early and Ride Losers too Long: Theory and Evidence," *Journal of Finance*, Vol. 40, (July): 777-790.

Stable Value Investment Association, "Questions About Stable Value," taken from www.stablevalue.org/help/faq_dif.asp

Tobe, Christopher B. (2004). "The Constant's Guide to Stable Value," *Journal of Investment Consulting*, vol. 7, no. 1 (Summer): 81-93.

Table 1: Returns of Hueler Analytics Stable Value Pooled Fund Index and the Intermediate-Term U.S. Treasury Fund, 1992-2004.

	Returns of Vanguard Intermediate-Term U.S. Treasury Mutual Fund	Returns of Hueler Analytics Stable Value Pooled Fund Index[1]
1992	7.78%	6.79%
1993	11.43%	5.98%
1994	-4.33%	5.84%
1995	20.44%	6.21%
1996	1.92%	6.01%
1997	8.96%	6.10%
1998	10.60%	6.07%
1999	-3.52%	5.87%
2000	14.03%	6.15%
2001	7.55%	5.87%
2002	14.15%	5.26%
2003	2.37%	4.38%
2004	3.40%	3.95%
Arithmetic mean return	7.29%	5.73%
Geometric mean return	7.07%	5.73%
Standard deviation of returns	7.17%	0.77%
Accumulation by the end of 2004 of $1 invested at the beginning of 1992	$2.43	$2.06

[1] The returns of the Hueler Analytics Stable Value Pooled Fund Index were reduced by 0.34% per year to account for management fees.