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MEASURING THE FAIR VALUE OF ILLIQUID ASSETS UNDER GAAP¹

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Fair value measurements required under GAAP cover a variety of assets and liabilities. However, the value of many assets and liabilities cannot be determined easily or consistently. This problem is exaggerated when financial markets are in turmoil, as they were during the 2007-2009 crisis and sell off. Estimating the values of illiquid or infrequently traded assets and liabilities in such circumstances is some combination of art and science. Market data from similar assets (or asset classes) can help companies and analysts more accurately measure those uncertain values. Information from one semi-liquid asset class—auction rate securities—provides additional market data about the impact of illiquidity and market pricing of other illiquid assets.

I. FAIR VALUE IN GAAP

Fair Value Requirements Generally

Under the evolving rules of “fair value” in GAAP, companies must report the value of some assets (primarily securities) and some liabilities on the balance sheet at what they believe the market would pay³ for that asset (its fair value) at the reporting date, not what the company paid for them at some prior date (the historical cost). Some assets are fairly easy to measure (or “price”)—like a portfolio of publicly traded stocks or bonds. Other financial instruments, like private equity positions or some foreign currency exchange contracts, have no active markets and their values may not be known until several years after the investment is made when the asset is finally converted to cash, or determined to be worthless.

The Financial Accounting Standards Board (FASB) under Accounting Standards Codification (ASC) Topic 820, “Fair Value Measurement,” defines fair value as “The price that would be received to sell an

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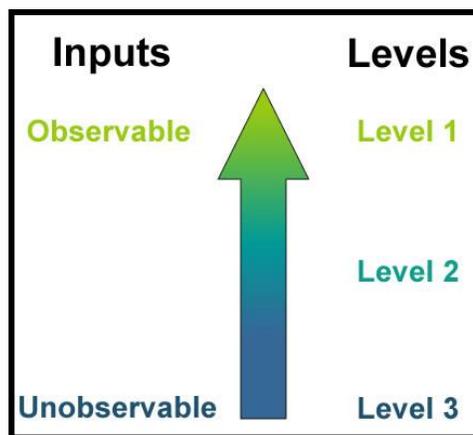
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³ In the case of liabilities, such as deferred revenue or bonds payable, the question is what the company would have to *pay* another party to assume the liability from the obligated party. During the economic meltdown, when many large banks saw the market value of their long term debt fall, GAAP’s fair value had the perverse effect of *increasing* the issuer’s equity since the value of its liabilities had gone down. The issuers could repurchase the debt for less than they received when it was sold, resulting in hypothetical gains when the bonds were marked down to their market values.

asset paid to transfer a liability in an orderly transaction between market participants at the measurement date.” This is commonly known as the asset’s “exit value,” or the expected proceeds upon transfer. The fair value of a liability is the amount at which that liability could be incurred or settled in a current transaction.

Accounting standards require the use of “market inputs” when estimating the fair value of an asset or liability. Examples of market inputs are quoted prices (for the same or similar securities), credit data, the yield curve, and so on. Actual market prices for an asset are the most accurate measurement of its fair value, though an active market may not always exist for an asset, so other methods have to be used to estimate the fair value on an asset or liability. The guidance emphasizes that assumptions used to estimate fair value should be from the perspective of a third party “market participant,” or others who may be buying and selling similar assets.

The value of assets and liabilities under fair value fall into a three level hierarchy based on the level of judgment required to assign a value to the asset/liability. Level one is where an active market exists for that asset, such as a share traded on an active exchange. Level two uses “market observables,” which are, essentially, market comparables on which the value is based, such as options or other derivatives with features similar to exchange-traded options. The values are estimated based on standard models and techniques used by market participants. Level three also uses standard tools and methods but relies on “unobservable” data that the reporting company thinks market participants would use in measuring the asset/liability.



Determining the value for the many illiquid assets held by companies reporting under GAAP requires the company’s financial personnel to *estimate* the value of those assets (and liabilities), using market evidence where available. Of necessity, the accountants and appraisers tasked with determining those values frequently look to comparable securities to price those assets, just as a homeowner might look at sales of comparable homes in her neighborhood to estimate the value of her property. As with the pricing of such assets—whether homes or infrequently traded financial instruments—some amount of judgment is required. For example, can sales data on townhomes be used in estimating the value of a single family detached residence? What is a good or valid comparable (or “comp”) to use? The same question arises when attempting to use market data on one type of financial instrument to estimate the value of a different type of security.

How to Measure the Fair Value of an Illiquid Security?

A consistent issue in measuring illiquid instruments or securities is how to account for the difference between fully liquid comparable assets like publicly traded stocks and bonds and their illiquid counterparts such as private equity or shares that only trade infrequently. Appraisers often look to market data, where available, to estimate and account for this difference. It is well established that investors in

illiquid (or less liquid) securities demand higher rates of return on those instruments to compensate them for the lack of liquidity.⁴

In corporate financial reporting, for example, if a financial services firm (a bank, broker, or insurance company) holds in its portfolio a private mortgage with features very similar to other mortgages that are regularly bought and sold among market participants, the owner of that illiquid note has to value (or price) that instrument on its balance sheet as part of its regular reporting. If the mortgage held by the investor is a private contract between parties with no ready market to buy and sell it in, but it is comparable to other market-traded instruments, how would that holder, the financial services firm, determine the fair value of that asset? If, for example, in this simple hypothetical, the private mortgage involved had a variable interest rate and other features similar to standard, market-traded mortgages, how would the investor account for the mortgage's lack of liquidity in measuring its value? In this case the holder of the private mortgage might price the note using the market-based data for similar loans and then apply an adjustment, or discount, to that indicated value for the note's lack of liquidity (or marketability). This final amount is what the company holding the note calculates someone in the market would pay for it based on the available information.

In this case, the adjustment (a discount) for lack of marketability might be estimated as a broker's commission, a bid-ask spread, or the costs involved in finding a buyer and transferring the instrument. There are other methods and market data that speak to how actual buyers and sellers in the market adjust for an instrument's lack of marketability.⁵ The exercise of determining an asset's fair value becomes more complicated as the nature of the instrument becomes more complex. For many financial assets held by investors, there is not even a remote market equivalent which the position can be compared to. Calculating the value of those investments is much harder and more uncertain than the simple example of the private mortgage.

II. ANOTHER SOURCE FOR MEASURING ILLIQUIDITY AMONG COMPARABLE ASSETS

The recent economic crisis, and the collapse of various security markets, provides further data on how investors react to lack of liquidity and how they price illiquid securities relative to those that can be readily converted to cash. Data on these two groups provides information on *how much less* investors will pay for illiquid instruments compared to their fully liquid counterparts. An alternative perspective is

⁴ For a review of studies discussing marketability (or liquidity) discounts, see Robert Reilly and Aaron Rotkowsky (Fall 2007), "The Discount for Lack of Marketability: Update on Current Studies and Analysis of Current Controversies," 61:1 Tax Lawyer 241-286.

⁵ See, for example, Robert Reilly and Aaron Rotkowsky (Fall 2007), "The Discount for Lack of Marketability: Update on Current Studies and Analysis of Current Controversies," 61:1 Tax Lawyer 241-286; Shannon P. Pratt (2001), *Business Valuation: Discounts and Premiums*, Hoboken, NJ: John Wiley & Sons, Inc.

that investors *require higher returns* to invest in illiquid positions versus their liquid counterparts and achieve this by paying a lower price.

A more recent example is the comparison of auction rate securities (“ARS”) to money market funds (“MMR”). While money market accounts offer daily liquidity, like checking accounts, ARS are an alternative that, for a long period of time, provided liquidity through frequent auctions held at set intervals.⁶ Before 2007, market returns on ARS were similar to, or slightly higher than, national average MMR generally. During the financial crises and the “freeze” of the ARS market, spreads between ARS and money market yields changed dramatically. Yields on ARS jumped substantially, primarily due to the inability of investors to get liquidity on those positions and their willingness to sell them at very low prices.⁷ The relative behavior of ARS to a fully liquid comparable before, during, and after the meltdown provides additional market data on the effect of illiquidity on returns required by the market.

III. AN OVERVIEW OF AUCTION RATE SECURITIES⁸

An ARS is a debt instrument that acts like a long-term bond for the issuer but resembles a short-term security for the investor, who can purchase and re-sell it at fairly regular intervals—the auctions. The time to maturity of an ARS instrument is typically 20 years or longer, and its interest rate is re-set at fixed intervals through a “Dutch auction”⁹ among regular market participants. The bonds, like U.S. Treasuries, are issued with the expectation that they will be bought and sold frequently over their lives. During the auction, potential buyers/investors specify the amount of securities they want to buy and the minimum interest rate they will accept from the existing holders of these securities, which results in a price determined by the required return. A higher required rate means the investor pays less for the stream of income; a lower acceptable rate results in a higher “bid” price. The lowest rate that clears the market—matching buyers and sellers—is known as the “clearing rate.” Securities are allocated among bidders who specified an interest rate that was at or below the clearing rate. Consistent with a “Dutch auction,” all investors receive the clearing rate for their holding, regardless of the specific rate they bid. Because an ARS holder had the option of redeeming its holding at the next auction, the ARS was considered to be a

⁶ Stephanie Lee, NERA Economic Consulting, *Auction-Rate Securities: Bidder’s Remorse? A Primer* (May 6, 2008).

⁷ This was part of the larger “flight to safety” when investors fled to the least risky assets available. For a brief period, returns on some treasuries were negative, meaning investors paid more than they expected to get back when the instruments matured.

⁸ Some of the material in this section is adapted from Adrian D’Silva et al., The Federal Reserve Bank of Chicago, *Explaining the Decline in the Auction Rate Securities Market*, (Nov. 2008); Stephanie Lee, NERA Economic Consulting, *Auction-Rate Securities: Bidder’s Remorse? A Primer* (May 6, 2008); John J. McConnell and Alessio Saretto (Apr. 2009), “Auction Failures and the Market for Auction Rate Securities,” 97 *Journal of Financial Economics* 451-469.

⁹ A “Dutch auction” is a market mechanism where an object, in this case a bond, is offered by the seller and the price is reduced in increments until a buyer for the entire allotment is found. U. S. Treasury securities are sold in this way.

fairly liquid asset. Auctions were held at a variety of different intervals, including one, four, five, or seven weeks.

ARS were historically issued by municipalities, student loan finance authorities, and other tax-exempt entities. They were viewed as relatively low-risk securities and as a result, earned high credit ratings from the rating agencies. Before the 2008 market crash, it was also common for issuers to purchase insurance to enhance the credit-worthiness of their bonds and to make them even more attractive to potential investors, thereby lowering the interest rate on the bond even further.

As long as there was sufficient interest in holding ARS, auctions proceeded with few recorded failures. Because interest rates adjusted smoothly and frequently over short intervals between auctions, in what appeared to be well-functioning, regular sales, it was always easy to re-sell the bonds quickly, at par value (or face value). These observed characteristics led issuers to characterize and market ARS as virtually fully liquid securities, directly comparable to money market funds and other assets considered to be “cash-equivalents.” This perceived liquidity was attractive to corporate investors and other conservative investors seeking slightly higher returns by slightly compromising liquidity.

From the inception of ARS, it was understood that the auction process could fail. However, according to Moody’s, between 1984 and 2006, there were a total of only 13 auction failures out of more than 100,000 auctions.¹⁰ An auction is said to have failed when there are not enough bids to cover the number of securities offered for sale. In those cases, the rate reverts to the “penalty” rate set in the bond’s prospectus. A failed auction results in the current holder of the bond being unable to liquidate its position and forces the issuer to pay a higher rate than expected until another attempt can be made to re-sell the position at the next auction.

IV. OVERVIEW OF THE ARS MARKET¹¹

The first ARS security was issued in 1984 and the market expanded significantly during the early part of the current decade and was estimated to have reached about \$330 billion by 2007. While the ARS market freeze in 2008 was unexpected, there were some signs that indicated significant changes or expected trouble before then. In May 2006, the SEC had imposed a \$13 million fine against 15 broker-dealers for engaging in questionable auction practices, such as intervening in the auction process to

¹⁰ See citation to “Prolonged disruption of the auction rate market could have negative impact on some ratings: absence of liquidity jars market’s orderly functioning,” *Special Report, Moody’s Investors Service*, February 20, 2008 in John J. McConnell and Alessio Saretto (Apr. 2009), “Auction Failures and the Market for Auction Rate Securities,” 97 *Journal of Financial Economics* 451-469, at footnote 6.

¹¹ Some of the material in this section is adapted from Adrian D’Silva et al., The Federal Reserve Bank of Chicago, *Explaining the Decline in the Auction Rate Securities Market*, (Nov. 2008); Stephanie Lee, NERA Economic Consulting, *Auction-Rate Securities: Bidder’s Remorse? A Primer* (May 6, 2008); Gretchen Morgenson, “It’s a Long, Cold, Cashless Siege,” *The New York Times* (Apr. 13, 2008).

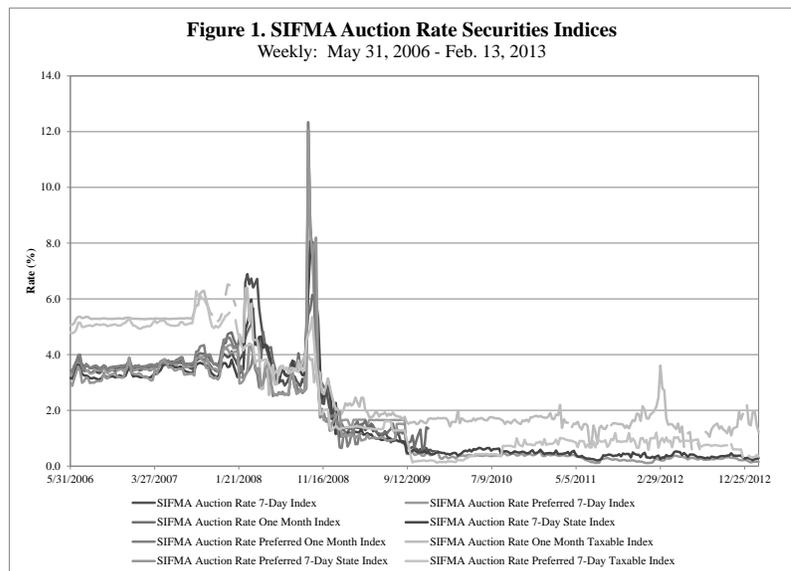
prevent failure, and not disclosing those actions to investors. In the same year, institutional investors¹² held the majority of all ARS issues, at 80%. By the end of 2007, they only held 30%. Additionally, in July 2007, corporations owned approximately \$170 billion of ARS, which decreased to \$98 billion (a 42% drop) by the end of 2007. These changes in the investor base indicated an expectation—or a fear—that a decline of the ARS market was looming, followed by a significant jump out of the market by normal investors. This specific panic, like others, may have been self-fulfilling.

In 2007, defaults on subprime mortgages were also increasing. This led to some doubt on whether monoline insurers¹³ would be able to support their obligations, which included backing ARS. As a result, rating agencies began to downgrade insurers such as Ambac, MBIA, FGIC and XL Capital, leading to a decline in value of their insured securities.

Many investors buying ARS during 2007 were unaware of any liquidity or credit risks. They were under the assumption that these securities were as liquid as money market funds. However, increasing turbulence in financial markets in 2007 led to the decline and ultimate freeze of the ARS market, demonstrating its risky nature.

Source: Bloomberg

Figure 1 shows a history of rates on various types of ARS from May 2006 to the present. The first spike in the graph—January and February 2008—represents an increase in rates caused by illiquidity in the ARS market due to numerous auction failures. The second, larger spike—October and November 2008—occurs around the time of the Lehman Brothers bankruptcy, when credit markets froze up, investor uncertainty skyrocketed, and the value of many types of securities either collapsed or could not be measured at all. Rates fell precipitously after November 2008 after many banks were required to repurchase their issued securities at or close to par. This mandatory or artificial market brought prices and returns back to pre-crisis levels.



¹² “Institutional investors” are entities like banks, insurance companies, pension funds, or mutual fund, and the like that are financially sophisticated and hold large positions in large portfolios. They are typically investing on behalf of others. “Retail” investors are typically individuals.

¹³ An insurance company that provides guarantees to issuers, often in the form of credit wraps, that enhance the credit of the issuer

V. LIQUIDITY AND RETURNS ON ARS COMPARED TO MONEY MARKET FUNDS

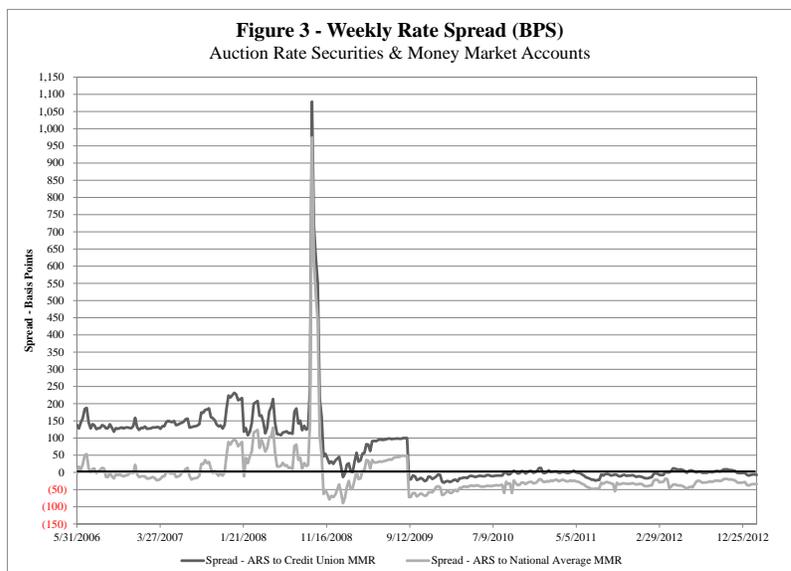
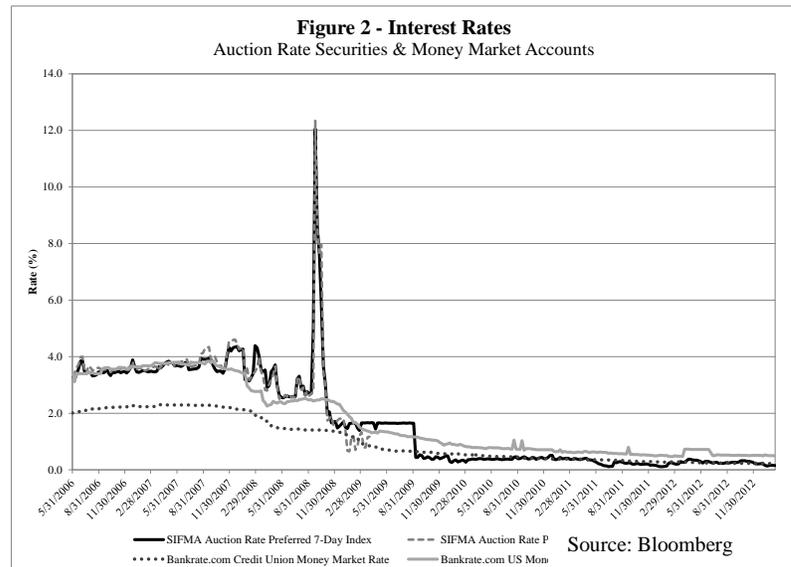
Source: Bloomberg

In order to measure the effects of illiquidity on returns, we have used index data tracking returns required by investors to compare average rates on ARS and fully liquid money market instruments.

As previously noted, ARS were considered for many years to be relatively safe, highly-liquid investments and as such, offered rates (short term yields) comparable to, or higher than, rates on money market accounts nationwide. Figure 2 shows a comparison between various auction rate indices¹⁴ and money market indices¹⁵ between May 2006 and February 2013.

We have adapted the rate index data to chart historical spreads—rate differentials—between ARS and Money Market Accounts (See Figure 3). To calculate the spread, we took the average of the SIFMA Auction Rate Preferred 7-day Index and the SIFMA Auction Rate Preferred One Month Index and compared it to the average Credit Union MMR and the National Average MMR.

Figure 3 shows that through



¹⁴ Source: SIFMA Auction Rate Securities Indices. The Securities Industry and Financial Markets Association (SIFMA) is a trade association representing securities firms, banks, and asset management companies. Members provide research and historical statistics on financial markets and the general economy. The SIFMA ARS Indices, produced by Municipal Market Data, are indices of actual ARS issues provided by broker dealers and auction agents. The number of issues used to calculate the Indices may vary from week to week as new issues come to market, are called, converted, or mature.

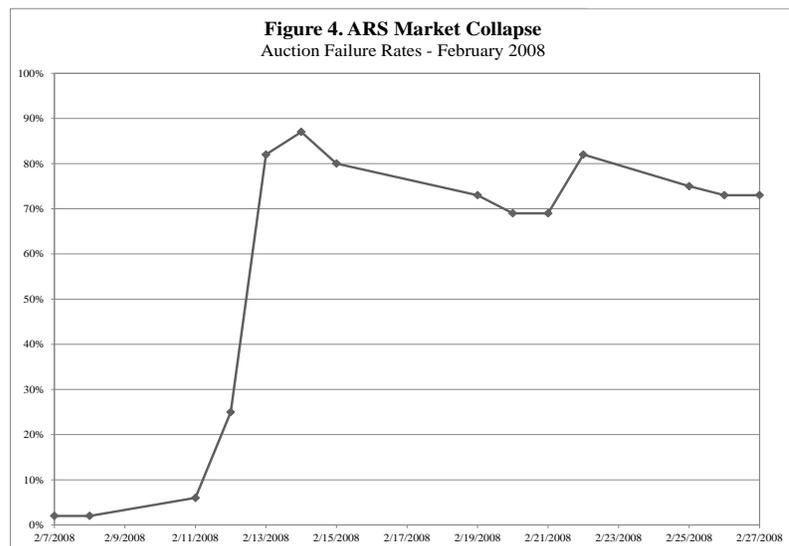
¹⁵ Source: Bankrate.com Money Market Indices. Bankrate, Inc. is an aggregator of financial rate information. Bankrate regularly surveys approximately 4,800 financial institutions in all 50 states.

November 2007, there was a very small spread between the ARS indices and the National Average MMR, with ARS averaging one basis point¹⁶ higher over the period. Both rates fluctuated between approximately 3.5%-4.0%. A larger spread is shown through November 2007 between the ARS indices and the Credit Union MMR, averaging around 142 basis points in the same period through November 2007.

During 2007, the subprime mortgage crises intensified and banks were forced to write down the value of many of their holdings across many asset classes beyond their subprime portfolios. It was also revealed that Wall Street firms in charge of auctions had been bidding with their own capital to artificially prop up the market instead of finding the thousands of market participants necessary to “clear” the auctions each week.¹⁷ As the credit crises emerged with the recession and market sell offs continued, brokerage firms were no longer willing to put their own capital at risk to keep auctions running smoothly.¹⁸ The absence of buyers and motivated (fearful) sellers led to a price collapse and yields to soar.

Source: NERA

At the beginning of 2008, auctions began to fail and the *Wall Street Journal* noted that the ARS market had “virtually collapsed” in February 2008.¹⁹ Figure 4 shows that auction failure rates peaked at close to 90% during the month and in just one week, almost 1,000 separate auctions failed.²⁰ Spreads between ARS and MMR not only



widened but also began to fluctuate more dramatically than they had historically. During this period, significantly different rates were produced for virtually identical ARS, demonstrating increased difficulty with accurately pricing these instruments.²¹ Investors were no longer able to readily liquidate their

¹⁶ A basis point (or “bp”) is one one-hundredth of a percent (.0001 or .01%). Two instruments with rates of 2.25% and 2.50% have a spread or rate differential of 25 basis points.

¹⁷ Gretchen Morgenson, “It’s a Long, Cold, Cashless Siege,” *The New York Times* (Apr. 13, 2008).

¹⁸ Gretchen Morgenson, “It’s a Long, Cold, Cashless Siege,” *The New York Times* (Apr. 13, 2008).

¹⁹ Liz Rappaport, “Auction-Rate Debt Market Faces Probe,” *The Wall Street Journal* (Apr. 18, 2008).

²⁰ There is a gap in the failure rate data on 2/18/2008 due to a market holiday.

²¹ For example, the East Bay Municipal Utility District in California issued two ARSs with virtually identical terms, except for the original underwriter—one was underwritten by Merrill Lynch, the other by Citigroup. On February 19, 2008, the reset auction for the Merrill Lynch issue produced a clearing rate of 7.98%, while that for the Citigroup issue produced a clearing rate of 5.0%. (The previous week’s auctions for the same securities had produced interest rates of 4.25% for the Merrill issue versus 7.0% for the Citigroup issue.) See Adrian D’Silva et al., *The Federal Reserve Bank of Chicago, Explaining the Decline in the Auction Rate Securities Market*, (Nov. 2008)

holdings in the securities in the now illiquid market and many holders were stuck with large holdings of what had once been regarded as a “cash-equivalent.” This was not only a liquidity crisis but, for some investors, required reclassification of the instruments in their financial statements from the “cash-equivalent” category to long-term asset classes and uncertain pricing.

From December 2007 to the end of October 2008, the spread between auction rate indices and the national average MMR increased from an average of one basis point (.01%) to an average of 109 basis points (1.09%). In the same period, the spread between the ARS indices and the Credit Union MMR increased from an average of 142 basis points to 208 basis points.

Extreme volatility came in the wake of the Lehman Brothers bankruptcy filing on September 15, 2008. Financial markets were in chaos and the value of many types of securities became almost impossible to determine given the lack of active buying and selling. Investors were desperate to liquidate riskier positions. Many of the holders like brokerages and mutual funds were facing waves of redemptions and had to convert their positions to cash during the downward spiral.²² During the week of September 24, 2008, the spread between ARS rates and the national average MMR jumped to 975 basis points (nearly 10%). Rates on illiquid ARS were 12.2% while rates on fully liquid money market accounts held at around 2.45%. Many ARS defaulted to their “penalty rates,” which was slightly above LIBOR in some cases and in excess of 20% in others.

Investors filed numerous lawsuits against ARS issuers claiming the securities had been falsely marketed to them as safe, liquid investments. Between August 2008 and the present, many banks have entered into settlements with investors to repurchase outstanding ARS holdings.²³ As a result, ARS rates stabilized near or below money market fund rates, which have currently dropped to well below 1%.

VI. PRESENT SITUATION

From November 2008 to the present, the spread between Auction Rate indices and the National Average MMR fell to *minus* 30 basis points, with money market funds paying higher returns on average. In the same period, the spread between the ARS indices and the Credit Union MMR decreased to seven basis points, with ARS investors still demanding slightly higher returns.

Since the collapse of the market in February 2008, there have been no new municipal auction rate issuances.²⁴ In March 2009, SIFMA announced its plans to end coverage of many of its auction rate indices. Due to the decrease in the amount of auction rate security issues outstanding and the stagnant

²² On September 16, 2008, the day after Lehman Brothers filed for bankruptcy, the Reserve Primary Fund, a giant money market fund, “broke the buck” due to exposure to Lehman Brothers’ debt securities. This happens when a money market fund’s shares fall below a dollar in value. *See* Tara Siegel, “Money Market Funds Enter a World of Risk,” *New York Times* (Sep. 17, 2008).

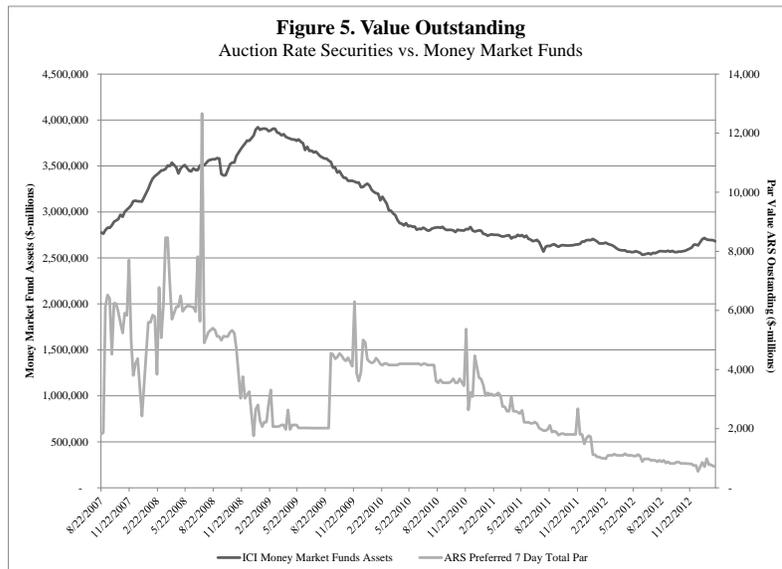
²³ “More Banks Make Auction-Rate Deals,” *Financial Times* (Aug. 22, 2008).

²⁴ SIFMA, “Auction Rate Securities Resource Center – Overview,” <http://www.sifma.org/issues/capital-markets/auction-rate-securities/overview/> (visited Feb. 25, 2012).

outlook for future issuances, SIFMA felt there were no longer enough data for the indices to give an accurate picture of the market.²⁵

Source: Bloomberg and SIFMA

Figure 5 shows that the ARS market was unable to recover from the liquidity crises it faced in 2008. Due to bank repurchases and lack of new issuances, the ARS market was estimated to be shrinking by \$15 billion annually in 2010.²⁶ At that rate and assuming no new issuance, the ARS market could be extinct within the next few years. The value of assets in money market funds also decreased during the recession period, but is still significant and markets are functioning.



VII. CONCLUSION

The market conditions described above provide reliable market data about the impact of illiquidity on otherwise comparable investments. Before November 2007, the possibility of being “stuck” with an illiquid ARS holding was remote and returns on those investments were only slightly higher than those of fully liquid money market accounts. However, our analysis shows that as the probability of auction failure increases, causing liquidity to decrease, investors require increasingly higher returns to compensate for the additional risk they take on. In this case, it’s the risk of not being able to convert that position to cash. The total amount of ARS outstanding dropped as investor’s factored illiquidity and future uncertainty into the pricing of ARS positions.

²⁵ Katrina Cavalli, SIFMA, “SIFMA to Terminate Auction Rate Securities Indices,” <http://www.sifma.org/news/news.aspx?id=10622> (Mar. 12, 2009).

²⁶ Figure 5 only shows the Face Value of 7-Day Preferred ARS outstanding, but the downward trend in value outstanding is representative of the entire ARS market.

Figure 6. ARS-to-MMR Spread Comparison			
Era	Period	Average Spread - ARS to:	
		National MMR	Credit Union MMR
1	05/2006 – 11/2007 (ordinary market)	1	142
2	12/2007 – 09/15/2008 (accelerating risk)	58	156
3	09/16/2008 – 10/31/2008 (maximum illiquidity)	407	514
4	11/2008 – Present (mandatory, shrinking market)	-30	7
Maximum	Maximum Spread (Sept. 24, 2008)	975	1,079

The data in the ARS market show that minor illiquidity – such as one week between markets – results in higher returns of one basis point on average when compared to National MMR and 142 basis points on average when compared to Credit Union MMR. (See period 1, Figure 6)

When auctions fail completely and illiquidity expands to weeks, or even months, higher average returns of 58 basis points (above National MMR) and 156 basis points (above Credit Union MMR) were required by investors. (See period 2, Figure 6)

Further, under extreme market illiquidity and uncertainty, as in the period immediately following the Lehman Brothers Bankruptcy, even higher required returns of 407 basis points (above National MMR) and 514 basis points (above Credit Union MMR) were recorded. (See period 3, Figure 6)

The maximum spreads of ARS above MMR were observed during the week of September 24, 2008. Spreads above national MMR rose to 975 while spreads above credit union MMR rose to 1,079. (See Maximum, Figure 5)

Though this is an extreme example of the impact of illiquidity on otherwise similar assets, the data detailed above are consistent with other research and market realities: investors *require higher returns* to invest in illiquid positions compared to their liquid counterparts and these higher returns result in a lower “price” on the security.

Appraisers and others must consider many factors, such as illiquidity or marketability, when pricing assets at fair value under GAAP. Historical market data, as outlined in this article, provide evidence of the impact of these factors.

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