

Clear perspectives on bond market liquidity

Vanguard commentary

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- Since the global financial crisis, bond dealers' expected profits from facilitating bond purchases and sales have declined. The change has diminished their appetite for market making. Over the same period, bond mutual fund assets have grown significantly.
- This combination has given rise to speculative concerns. As interest rates rise, investors will experience at least a temporary decline in the value of their bond funds. The fear is that investors will panic and redeem their shares. Funds would then have to unload their portfolios into markets that would be unable to absorb them. The result would be a destabilising collapse in prices.
- This scenario reflects misperceptions about the nature of liquidity and the behaviour of mutual fund investors. Liquidity is not a fixed quantity. It is dynamic. In our experience, participants in large, broadly diversified markets consistently find a market-clearing price for high-quality assets. And mutual funds are not a single entity. They act as agents for millions of investors, all with their own time horizons, risk preferences, and investment goals. Indeed, mutual funds are much like the capital markets themselves.

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Introduction

Since December 2008, the shortest-term interest rates have hovered near 0%, a consequence of the global financial crisis, its economic aftershocks, and monetary policy intended to repair the damage. Corporate borrowers have capitalised on rock-bottom financing costs with record levels of new bond issuance.

The new issuance has found buyers among investors hoping to earn higher returns than those available from the safest assets — bank savings accounts, certificates of deposit, and US Treasury securities. But even as the outstanding value of the bond market has increased, new regulation has altered the role of a key participant: the dealer.

The new dealer

Dealers facilitate transactions between buyers and sellers by quoting a “bid” to investors who want to sell a bond and an “ask” to those who hope to buy. The difference between these prices is the dealer’s profit. Since the financial crisis, dealers’ expected profit from these transactions has declined because of new regulations, more stringent capital requirements, and low levels of bond market volatility in the low-interest-rate environment.

The combination of bond market growth and traditional dealers’ reduced appetite for trading has raised concern among regulators and policymakers about liquidity. In this context, “liquidity” means, roughly, the ability to convert an asset to cash in a reasonable amount of time and in a prudent manner.

The sensational scenario

On 16 December 2015, the US Federal Open Market Committee raised its target for the federal funds rate, a benchmark for the shortest-term interest rates, by 25 basis points. (A basis point is equal to 1/100th of 1 percentage point.) The decision, which was widely expected, marked a break with the zero-interest-rate policy in place since the financial crisis.

Over time, as shorter and longer-term interest rates return to more normal levels, bonds and bond mutual funds will at least temporarily decline in value. Will investors, some new to the capital markets, rush to sell? What if the diminished dealers are unable to take the other side of the trade? Will prices collapse regardless of the securities’ intrinsic values, precipitating a new financial crisis?

The questions follow their own frightening logic. We believe the logic is flawed. In this paper, we draw on decades of experience in managing bond portfolios for millions of individual and institutional investors to highlight three myths about bond market liquidity that distort discussion about risks in the bond market and how to evaluate them.

Notes about risk and performance data: All investing is subject to risk, including the possible loss of the money you invest. Past performance is no guarantee of future returns. The performance of an index is not an exact representation of any particular investment, as you cannot invest directly in an index. There may be other material differences between products that must be considered prior to investing. Diversification does not ensure a profit or protect against a loss in a declining market. There is no guarantee that any particular asset allocation or mix of funds will meet your investment objectives or provide you with a given level of income. Be aware that fluctuations in the financial markets and other factors may cause declines in the value of your account. Bond funds are subject to the risk that an issuer will fail to make payments on time and that bond prices will decline because of rising interest rates or negative perceptions of an issuer’s ability to make payments. Investments in Target Retirement Funds are subject to the risks of their underlying funds. The year in the fund name refers to the approximate year (the target date) when an investor in the fund would retire and leave the workforce. The fund will gradually shift its emphasis from more aggressive investments to more conservative ones based on its target date. An investment in a target retirement fund is not guaranteed at any time, including on or after the target date.

Myth: Liquidity is static

The most pervasive myth is that liquidity is static, much like bank reserves. As a fixed quantity, the liquidity of a bond holding or portfolio can be easily measured and potentially exhausted.

For example, an investor holding \$60 million in a bond with daily trading volume of \$4 million in face value would need 15 days to sell the entire position. Try to sell more quickly, the thinking goes, and the investor would run out of liquidity, which would potentially have an outsized impact on prices.¹

The reality is more complex. Liquidity is dynamic. It can change in response to shifts in investor risk preferences, dealer financing costs and profit opportunities, or any of the other variables that influence capital market activity. Liquidity has, in effect, a price. That price responds to changes in the supply of and demand for liquidity. In our experience, participants in large, broadly diversified markets consistently manage to find a market-clearing price for high-quality securities.

The effect of a “credit event” (a development that may lead to a rating downgrade for a corporate borrower) and the behaviour of target-date mutual funds provide two examples of how liquidity can emerge quickly to meet investor demand.

Credit events

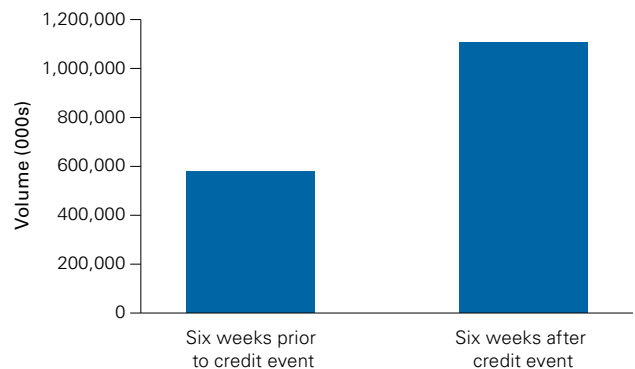
We reviewed bonds from eight different issuers that experienced a credit event during late 2013 and 2014. Examples of these events include an announcement of large losses in an important business line and an acquisition that added significant debt to the buyer’s balance sheet. **Figure 1** shows the bonds’ average trading volume in the six weeks before and after the credit event was announced.

As new information entered the market, investors had a new reason to trade. Liquidity materialised to facilitate these transactions. Daily volume nearly doubled, a development that couldn’t have been anticipated from metrics such as average daily trading volume. In some cases, the credit event made the bonds more expensive to trade (on average, bid-ask spreads rose by 5 basis points, motivating dealers to participate); in others, there was no change in transaction costs.

Target-date funds

Target-date funds, sometimes called target retirement funds, which typically maintain relatively fixed allocations to stocks and bonds over shorter periods, act as a source of liquidity for both the stock and bond markets. According to the Investment Company Institute, target-date mutual fund assets in the United States at the end of 2014 totalled more than \$1 trillion, a reflection of their widespread adoption in workplace retirement plans.² When bond prices decline — when selling drives them lower — target-date funds emerge as a stabilising source of liquidity.

Figure 1. Average trading volume before and after a credit event



Notes: The sample for this analysis included the 75 largest issuers in the Barclays U.S. Credit Corporate Index as well as additional issuers that experienced a credit event over the two-year period 2013–2014. The figure includes trading volume data from the eight issuers in this sample that experienced a significant credit event.

Source: FINRA/TRACE.

¹ See, for example, “The New Bond Market: Some Funds Are Not as Liquid as They Appear” (Wirz and McGinty, 2015).

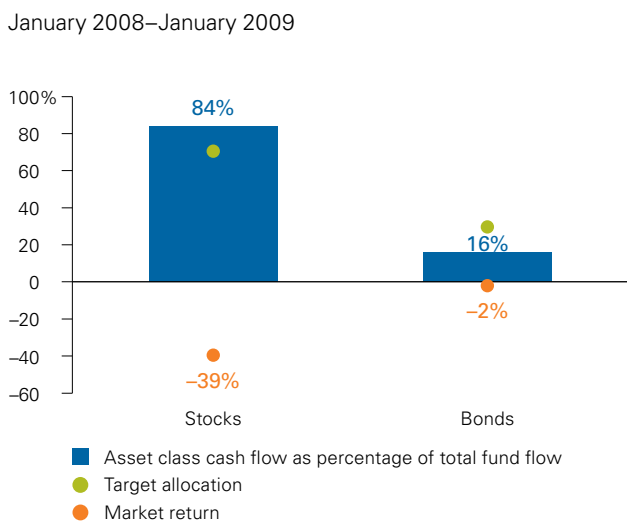
² *How America Saves 2015* (The Vanguard Group) found that “use of target-date strategies in DC plans continues to grow. Eighty-eight percent of plan sponsors offered target-date funds at year-end 2014, up 17% compared with year-end 2009.”

The activity of a Vanguard target retirement fund during the financial crisis and the 2013 drop in bond prices (the “Taper Tantrum”) illustrates how this type of fund can play a role as a liquidity provider during periods of market stress. We look, for example, at the activity of a Vanguard target retirement fund designed for individuals retiring in 2020.

From January 2008 through January 2009, global stocks fell sharply, returning -39%. As they tumbled, the fund, which had a target allocation to stocks of 71.3% at the time, directed 84% of its net new cash flow into stocks and the remainder into bonds, as shown in Figure 2.

During summer 2013, as the US Federal Reserve Board prepared to end its bond buying programme, the broad bond market returned -10% while stocks rallied. As bond prices declined, the fund and its target-date counterparts stepped in to buy what others were selling. The fund directed all new cash flow into bonds. In fact, it sold stocks and bought bonds to keep its bond allocation near its target (see Figure 3).

Figure 2. Example cash flow of Vanguard target retirement fund for retirees in 2020



Sources: Vanguard (fund flow data) and MSCI (market data from 31 January 2008 to 31 January 2009).

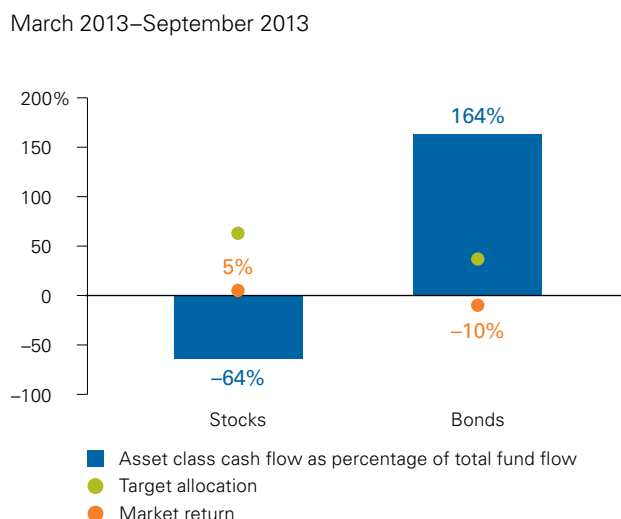
These examples aren’t intended to paint a comprehensive picture of the sources and depth of bond market liquidity. Such a task is impossible. Rather, they illustrate that liquidity is dynamic. It emerges when needed, summoned by buyers, sellers, and dealers seeking to capitalise on opportunity. At times, of course, liquidity can recede, returning when prices reach a level that brings buyers, sellers, and dealers to the market. Liquidity risk can’t be regulated away, however, and it can’t be captured in a simple metric.

Myth: The growth of bond mutual funds has concentrated risk in a potentially destabilising entity

Another widespread myth is that the significant growth in bond mutual funds has created a potentially destabilising source of risk.

The fear is that large pools of capital are now subject to the whims of unsophisticated investors prone to panic, chase returns, and herd into harder-to-trade assets such as high-yield bonds or bank loans. When these investors panic and redeem, according to this premise, bond funds will be forced to unload their portfolios into a market that can’t absorb them. The result will be a collapse in bond prices that could spark a systemic crisis.³

Figure 3. Example cash flow of Vanguard target retirement fund for retirees in 2020



Sources: Vanguard (fund flow data) and Barclays (market data from 31 May 2013 to 30 September 2013).

3 For an overview of these concerns, see *Navigating Monetary Policy Challenges and Managing Risks* (International Monetary Fund, 2015).

This frightening myth reflects a misunderstanding of the facts and misconceptions about mutual funds. It also ignores a relatively new development in the industry that has enhanced liquidity for all bond market participants: exchange-traded funds (ETFs).

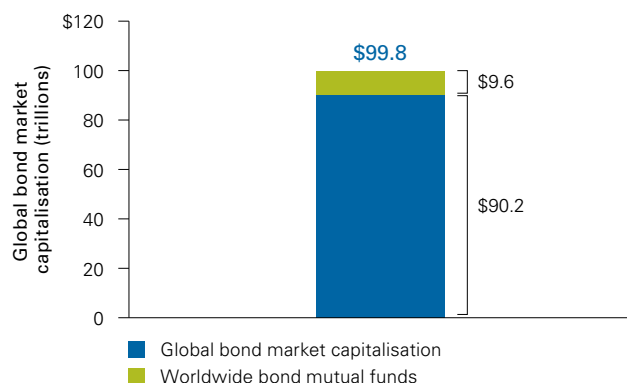
The facts

US bond mutual funds have grown significantly in recent years. From the end of 2004 through 2014, they took in \$1.9 trillion in net new cash flow. Their growth illustrates the benefits of a financial system with a balance between capital markets-based and bank-based funding. As banks have recapitalised, they've been less able to make loans to finance investment in the economy. Capital market participants such as mutual funds have filled the void.

Still, mutual funds remain a modest participant in global bond markets. At the end of 2013, US and non-US bond mutual funds accounted for roughly 10% of global bond market capitalisation. Most bonds are held by central banks, other banks, sovereign wealth funds, insurance companies, hedge funds, and a variety of institutional and individual investors (see **Figure 4**).

Bond funds invest, overwhelmingly, in the most liquid, highest-quality sectors of the market (see **Figure 5**). The market has demonstrated time and again its ability to find a clearing price for a high-quality security with a certain, well-defined income stream, whether it's issued by the US government or a highly rated corporation.

Figure 4. Mutual fund share of global bond market capitalisation



Sources: International Investment Funds Association and IMF.

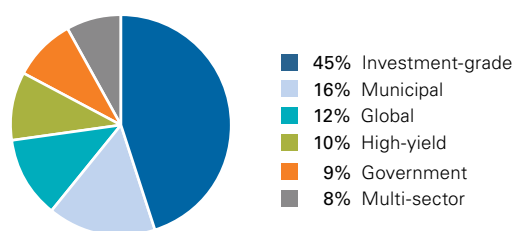
In smaller but generally high-quality sectors of the global bond market such as tax-exempt bonds, US mutual funds have faced no significant challenges in making purchases and sales. This has held true even amid headlines about Detroit's bankruptcy, Puerto Rico's debt crisis, and underfunded state pension plans from Rhode Island to Illinois to California.

The mutual fund is an agent

The mutual fund does not represent a single point of view. A large mutual fund is owned by millions of individual investors, all with their own time horizons, risk preferences, and investment goals. The most common goal is to save for retirement. As at 30 June 2015,, according to the Investment Company Institute, 53% of stock and bond mutual fund assets were held in individual retirement accounts, 401(k) plans, and other accounts designed to promote long-term investment for retirement security.

The mutual fund manager is an agent, charged with helping shareholders diversify their portfolios across hundreds or even thousands of individual securities or redeem their market exposures when their goals or circumstances change. The diversification benefits of mutual funds are of obvious value to fund shareholders. Perhaps less understood is their value to all bond market participants. Mutual funds pool the idiosyncratic risks of individual bonds to create lower-risk exposure to the broad bond market or its distinct segments.

Figure 5. US bond mutual fund and ETF AUM by market sector



Note: Data are as at 31 October 2015.
Source: Investment Company Institute.

The availability of this lower-risk exposure may bring new investors to the bond market, creating a new source of potential liquidity for all buyers and sellers.

And the historical record offers no evidence that these millions of investors tend to panic as a group or herd into hard-to-trade precincts of the bond market. Since 1993, none of the “less liquid” bond fund categories

has had a net outflow of more than –7.2% of assets in a single month (that figure represents emerging-market bonds in 2003). In the dark days of late 2008, investment-grade bond funds had a net outflow equal to –3.3% of assets, a modest response to the worst financial and economic crisis since the Great Depression.

Vanguard’s approach to liquidity management

Vanguard’s approach provides an example of the multifaceted nature of best practices in liquidity risk management. Vanguard tailors a specific method to each portfolio that considers a number of factors:

- **The construction of the portfolio.** We evaluate all of a fund’s holdings, calculating the portion of the portfolio that is likely to remain highly liquid even in times of market stress. This may include cash and cash equivalents, highly rated investment-grade sovereign bonds, and bonds from supranational issuers such as the World Bank.
- **The liquidity of the underlying market.** We consider market trading volume statistics and the quality and breadth of diversification in the market. We also rely on qualitative information provided by dealers. The result is an overall assessment of the liquidity of various market segments.
- **Historical levels of peak redemptions.** We review historical cash flow data for each Vanguard fund and comparable funds in the industry to evaluate redemption activity during times of stress such as the bond bear market of 1987, the global financial crisis, and the Taper Tantrum. We determine the potential impact of worst-case scenarios based on the construction of the portfolio, liquidity in the underlying market, and the composition of the investor base.
- **The composition of the investor base.** The shareholder base for most Vanguard funds is well-diversified, encompassing individuals of various ages and with various investment objectives, institutions, and financial advisers. If a large portion of a fund is held by a small number of big investors (as is sometimes the case in new funds), we consider that fund to be more vulnerable to liquidity risk and manage it appropriately. Vanguard funds that offer an ETF share class are assigned a lower liquidity risk. Because these shares are redeemed largely in-kind (the redeemer receives securities rather than cash), the need to transact in the bond market is reduced.

This approach yields a dashboard of measures that allow portfolio managers to gauge market liquidity as they put new cash to work or meet any net redemptions. If a fund can’t meet redemptions with new cash flows, the portfolio manager typically sells a cross-section of the fund’s holdings.

Our funds benefit from additional policies and resources designed to help us meet requests for redemptions and maintain the funds’ investment and liquidity profiles in all market environments. Examples include:

- **Frequent trading policies.** Where appropriate, clients are subject to frequent trading policies that discourage high levels of potentially disruptive and costly trading in fund shares.
- **Redemption fees.** Where appropriate, Vanguard assesses fees on redemptions to ensure that the redeeming investors bear the costs of these transactions.
- **In-kind redemptions.** We work with larger clients to redeem their shares in a way that minimises disruption to the portfolio. Many large clients prefer to redeem their investment “in kind” (as a cross-section of the fund’s securities) rather than in cash. This approach can minimise costs when moving assets to a new manager or implementing a new strategy. In-kind redemptions reduce or eliminate Vanguard’s need to transact, and incur trading costs, in the bond market.
- **Interfund lending and lines of credit.** In the event of significant net redemptions and unusually unsettled markets, Vanguard funds can rely on an exemptive order from the Securities and Exchange Commission that allows for loans from one fund to another. The funds also have access to a committed line of credit from a syndicated group of banks.

Vanguard’s approach to liquidity management is multi-dimensional: We do not calculate a single measure of portfolio liquidity because no such metric exists.

It would be unwise, of course, to rely blindly on historical data to shape expectations for the future. However, the data reflect a more compelling and enduring reason to expect limited redemption activity in any market environment: the diversity of mutual fund shareholders and their long-term perspectives.

Unleveraged, high-quality mutual funds acting as agents for a large, diversified group of investors do not present systemic liquidity or redemption risks to the financial markets.

ETFs

ETFs have emerged as a new source of bond market liquidity. ETFs are overwhelmingly similar to open-end mutual funds. Most are governed by the Investment Company Act of 1940, which, among its many provisions, sets standards for portfolio diversification and liquidity and imposes significant limitations on leverage.

Like open-end funds, ETFs allow investors to create low-cost, broadly diversified investment portfolios. But they differ in the way their shares are bought and sold. Rather than transact directly with the open-end fund once a

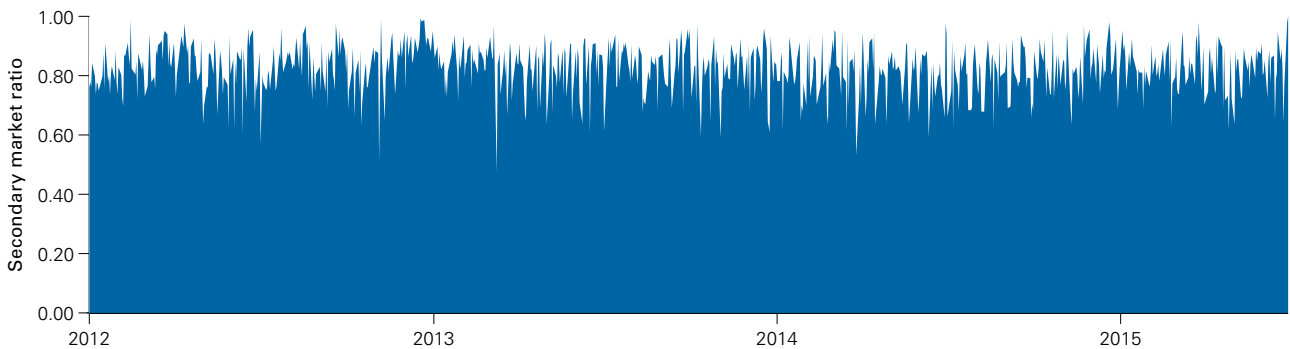
day at the fund’s end-of-day net asset value, investors can trade ETFs on the secondary market, creating an additional source of liquidity for bond fund investors.

The majority of ETF trading takes place in the secondary market, as illustrated in **Figure 6**. A limited amount is conducted in the underlying bond market between the funds that issue ETF shares and large institutions known as authorised participants.

Data on transaction costs in the secondary market suggest that ETFs have improved liquidity for bond investors. For example, as with any security, brokers quote a bid and an ask price for a bond ETF. The bid-ask spread is often tighter than those of the fund’s underlying bonds, partly because the ETF consolidates many different bonds in a standardised trading unit. That unit gives investors a more efficient way to manage their bond market exposure, and greater efficiency leads to more liquidity and narrower bid-ask spreads.

The bid-ask spread should not be confused with ETF premiums and discounts. Those largely reflect transaction costs in the underlying securities markets, time-zone differences across global markets, and intraday investor supply and demand for ETF shares.⁴

Figure 6. The majority of bond ETF trading volume is conducted on the secondary market



Notes: Figure shows the percentage of daily bond ETF trading volume that is conducted solely on the secondary market. The median ratio is 83%, suggesting that for every \$1 in trading volume, only 17 cents results in primary market trading. Put another way, 83% of the trading volume results in no portfolio management impact and no trading in underlying securities.

Sources: Vanguard calculations, based on daily data from Bloomberg.

⁴ For a comprehensive discussion of ETF premiums and discounts, see *Exchange-Traded Funds: Clarity Amid the Clutter* (Vanguard Investment Strategy Group, 2015).

Myth: Lower inventories and trading turnover are evidence of diminished liquidity

Those banks that have played a prominent role as market makers are retreating from the bond market. The value of corporate bonds held in dealers' inventories has declined from its 2008 peak. Turnover in corporate bonds (measured by trading volume as a percentage of market value outstanding) has also dropped, though both measures remain within historical ranges.

These changes are easy to quantify, but they may not say much about liquidity. As William Dudley, president and CEO of the Federal Reserve Bank of New York, has observed, "Liquidity is dynamic, unobservable and multidimensional in nature and, as such, can only be measured indirectly."⁵ In fact, there's no evidence that declines in inventory and turnover have had a negative impact on the liquidity metrics that matter most in bond fund management.

Economists at the Federal Reserve Bank of New York have found that bid-ask spreads on corporate bonds, an important measure of bond market liquidity, are narrower today than before the global financial crisis. The same analysis finds that a corporate bond trade of a specific size now has a smaller estimated impact on a bond's market price than in the years before the crisis.⁶

Although new regulation and low bond market volatility have altered the positioning and behaviour of traditional dealers, bond markets are perpetually changing. A decade ago, banks and investment banks dominated US Treasury bond market-making. Since then, these trades have increasingly migrated to electronic platforms. Today, high-speed, algorithmic traders facilitate more than half of Treasury trading in the interdealer cash market.⁷

Bond fund managers such as Vanguard have always treated liquidity as a risk to manage, continually adapting to the markets' evolution. (See Vanguard's approach to liquidity management on page 6.) Different asset managers have different approaches, of course, but many gravitate toward a similar set of "best practices" to manage liquidity risk.

Conclusion

⁵ Source: *Regulation and Liquidity Provision* (Dudley, 2015).

⁶ Source: *A Six-Part Series on Bond Market Liquidity* (Federal Reserve Bank of New York, October 2015).

⁷ Source: *Regulation and Liquidity Provision* (Dudley, 2015).

Since the global financial crisis, new regulations and low interest rates have led to changes in the bond market. This has raised concerns that in periods of market stress, bond fund investors will panic and redeem their shares. Mutual funds would then struggle to find the liquidity to convert their holdings into cash. The result would be fire-sale prices unrelated to a security's intrinsic value.

This frightening scenario is inconsistent with conceptual and empirical analyses of bond market liquidity and the behaviour of mutual fund investors. It also reflects a misunderstanding of the goal of market makers. Their aim has never been to support bond prices, but rather to match buyers and sellers — the actors who determine the value of an asset.

Our experience suggests reasons for optimism about the bond market's ability to match buyers and sellers as different needs arise. Liquidity is dynamic. It has a price that changes with market conditions. Participants in large, broadly diversified markets consistently manage to find a market-clearing price for high-quality securities. Experienced portfolio managers rely on a variety of gauges to ensure that they can buy and sell bonds in a cost-effective manner to meet client needs.

In addition, growth in countercyclical buyers such as target-date retirement plans and innovations such as ETFs have created new sources of liquidity. Nascent developments including electronic exchanges for investment-grade bonds may yet do the same.

Is bond market liquidity a concern? At Vanguard, it always has been. It always will be. Can that concern be managed with reference to, or regulation of, a simple metric? Our experience suggests that such a task is both impossible and a distraction from a more meaningful conversation with investors, analysts, and regulators about how bond fund managers can help clients meet their objectives in any market.

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