VIEWPOINT

BREAKING DOWN THE DATA:
A Closer Look at Bond Fund AUM

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Over the past few years, policy makers have focused on the growth of bond funds and raised concerns that systemic risk could arise if a bond fund were unable to meet redemptions due to a lapse in market liquidity. The hypothesis underlying these concerns states that such an event could incite heightened redemptions at other bond funds, which might force all bond funds to sell their holdings at the same time, resulting in fire sales.[1] Given the growth in assets under management (AUM) of bond funds, this has received significant attention causing some to suggest that a stress test across all bond funds – a "macro stress test" – is needed to determine the aggregate risks posed by bond funds.[2] While the headline figures around the growth of bond fund AUM are notable, a deeper look at the components of bond fund AUM demonstrates that bond funds are not homogenous. Rather, US bond funds represent over 2,200 distinct funds pursuing disparate investment strategies and in many cases, investing in different types of bonds.[3] Some areas of differentiation include index versus active, sector-specific (e.g., municipals, high yield, governments) versus multi-sector, duration-based strategies (e.g., short, intermediate, long duration), and market-specific versus global strategies. Adding to this diversity, end investors vary from fund to fund, with some funds heavily retail-oriented, others sold primarily to institutional investors, and still others utilized mainly by retirement plans. The different investment objectives and constraints of different types of end investors make it unlikely that all end investors will react to market events in the exact same way.[4] The diversity of bond funds impacts the value of attempting to quantify aggregate risks across funds, as the actions of both fund managers and shareholders will likely differ.

In this *ViewPoint*, we examine different categories of bond funds to demonstrate that bond funds are not homogeneous. We then review data on investor flows in the largest categories during four historical stress events: (i) 1994 Federal Reserve rate hikes, (ii) 2008 global financial crisis, (iii) 2013 "Taper Tantrum," and (iv) December 2015 high yield selloff. While the past is not necessarily a predictor of future behavior, the different patterns of net inflows and outflows in various categories of bond funds suggest that any macro stress test that does not account for the diversity of bond funds and incorporate performance of different fixed income asset classes is unlikely to produce results that are reflective of potential market dynamics, particularly if such models assume all shareholders in all types of bond funds react to market stress in the same way.

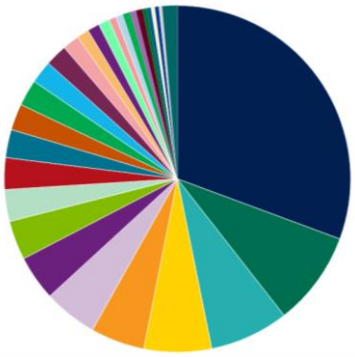
In this *ViewPoint*

KEY POINTS

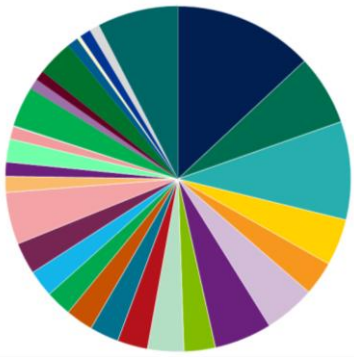
1. Bond funds are heterogeneous. Bond funds represent a diverse set of funds with distinct investment strategies.
2. During the stress events analyzed, some categories of bond funds experienced net outflows while others experienced net *inflows*. Investor flow patterns are consistent with expectations for the type of bonds in which the fund invests.
3. In our review of the largest bond fund categories, no category has experienced "massive aggregate outflows" during a quarterly period since 1988, even during stress events.
4. A macro stress test that assumes bond funds are homogeneous will not provide meaningful conclusions.
5. Stress testing of individual funds should be incorporated into mutual funds' liquidity risk management programs.

Exhibit 1: BREAKDOWN OF US OPEN-END BOND MUTUAL FUNDS

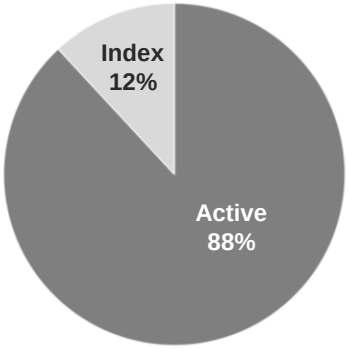
US Open-End Bond Funds
by AUM



US Open-End Bond Funds
by # of Funds



US Open-End Bond Funds
AUM in Active vs. Index



Bond Funds are NOT Homogeneous

MORNINGSTAR CATEGORY	AUM ($ BILLIONS)	# OF FUNDS
Intermediate-Term Bond	964	254
Short-Term Bond	277	128
High Yield Bond	232	179
World Bond	198	85
Multisector Bond	159	62
Muni National Intermediate	158	93
Nontraditional Bond	132	105
Muni National Short	115	57
Intermediate Government	93	66
Bank Loan	93	55
Muni National Long	82	53
High Yield Muni	78	50
Inflation-Protected Bond	77	47
Corporate Bond	67	49
Ultrashort Bond	65	58
Emerging Markets Bond	50	95
Muni California Long	35	29
Conservative Allocation	35	26
Short Government	33	42
Muni California Intermediate	22	23
Moderate Allocation	21	2
Muni Single State Long	21	73
Muni New York Long	19	19
Long-Term Bond	18	18
Muni Single State Intermediate	13	66
Long-Short Credit	12	20
Preferred Stock	12	7
Muni Single State Short	11	20
Muni New York Intermediate	10	19
Other*	44	147
TOTAL	**3,145**	**1,947**

Source: Simfund. As of Dec. 31, 2015. Accessed May 2016. Includes active and index open-end bond mutual funds. Excludes ETFs and fund of funds. Categories defined by Morningstar. Includes bond funds within each category. *Other includes bond funds within the following categories: Muni Pennsylvania, Muni Massachusetts, Muni New Jersey, Multicurrency, Muni Ohio, Muni Minnesota, Target Date 2011-2015, Retirement Income, Target Date 2000-2010, Tactical Allocation, Trading-Inverse Debt, Trading-Leveraged Debt, Market Neutral, Trading-Miscellaneous, Multialternative, World Allocation, Diversified Emerging Markets, Emerging Markets Local Currency Bond, Cautious Allocation, and funds that have not yet been classified with a Morningstar category in Simfund. May not sum to total due to rounding.

The Federal Reserve Z.1 data, which provides information on holders of assets, shows that bonds held by US open-end mutual funds and ETFs have grown from $1.8 trillion to $4.3 trillion between 2005 and 2015. The holdings of bonds by open-end mutual funds and ETFs represents less than 11% of the nearly $40 trillion in bond holdings represented in the Federal Reserve Z.1 data as of December 2015.[5] The remaining bonds are owned by other types of asset owners, including insurers, pension funds, and several other types of institutional investors, as well as individuals and households. Each of these different types of investors contribute to a diverse ecosystem, where participants have many different objectives and constraints that are unlikely to result in the exact same behavior by all participants at the same time. We explore the objectives and constraints of different types of bond holders in our February 2015 *ViewPoint*, entitled "Addressing Market Liquidity: A Broader Perspective on Today's Bond Markets."

Another interesting insight from reviewing the data is that the AUM of dedicated open-end fixed income mutual funds including ETFs has grown from just over $1 trillion in 2005 to almost $3.5 trillion as of December 2015.[6] This difference is likely attributable, at least in part, to the presence of multi-asset class funds that hold a portion of their assets in bonds, such as balanced or target date funds (TDFs).[7] Balanced funds are multi-asset class funds that have a fixed portion of assets invested in fixed income and a portion invested in equity. TDFs are asset allocation funds whose asset allocation shifts over time as the fund moves closer to its retirement date. TDFs tend to allocate a greater percentage of assets to fixed income over time. In the US, TDFs are often included as the default investment option in defined contribution plans. Both balanced funds and TDFs behave countercyclically, periodically rebalancing asset class allocations back to target allocations. This tends to cause these funds to buy an asset class when it declines in value and sell an asset class when it increases in value. For the remainder of this paper, we focus on the diversity of dedicated bond open-end funds; however, the presence of multi-asset class funds represents another example of the diversity among funds that hold bonds. We discuss multi-asset class funds in more detail in our May 2014 *ViewPoint* entitled "Who Owns the Assets? Developing a Better Understanding of the Flow of Assets and the Implications for Financial Regulation."

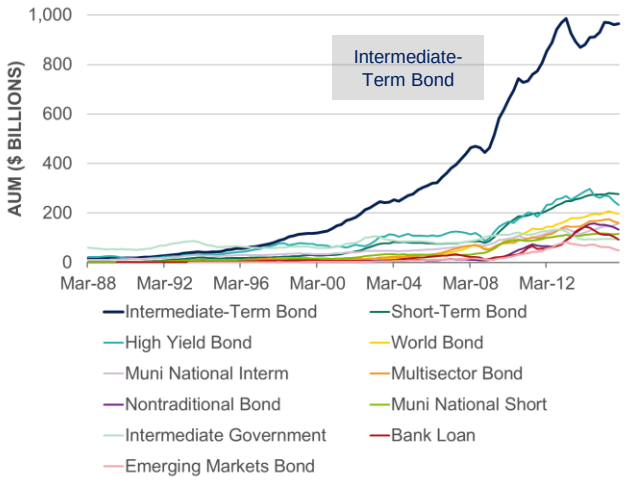
Breaking Down "Bond Fund AUM"

While the headline figures are notable, US open-end bond mutual fund AUM is comprised of over 1,900 individual funds pursuing an array of investment strategies, as shown in Exhibit 1 on page 2. Morningstar classifies funds into different categories based on the investments made by each fund. Currently, dedicated US open-end bond funds fall into nearly 50 distinct categories.[8] These categories range from broad market bond funds to sector-specific bond funds. The former include multi-sector bond funds that focus on a particular part of the yield curve (e.g., low, intermediate, or long duration). Multi-sector bond funds include government bond funds, high yield bond funds, municipal bond funds, and emerging market bond funds. There are numerous other combinations of fixed income sectors and sub-sectors. Exhibit 1 shows a breakdown of the AUM and number of funds in each category as of December 2015.

Even within each Morningstar category, there is significant diversity around the investment strategies pursued by individual funds. At the highest level, the first area of differentiation within a category is whether the fund is actively managed or passively managed to track the performance and risk characteristics of a given index. As shown in Exhibit 1, the majority of open-end bond funds are actively managed – approximately 88% of US bond mutual funds are actively managed, whereas only 12% are passively managed.[9] The majority of active strategies seek to have exposures that are similar to the benchmark against which their performance is measured and generate incremental returns through a top-down approach such as over- or under-weighting different sectors relative to the benchmark. Other types of active funds pursue an absolute return objective that is not driven by the composition of the performance benchmark. In other words, a fund can focus on underweighting sectors or securities in their benchmark, while other funds may invest opportunistically in bond sectors outside of their benchmark. Similarly, some funds may make extensive use of derivatives while others may not use derivatives at all. Finally, some bond funds take a view on the direction of interest rates while others maintain a duration similar to the fund's benchmark. These variations are the key reasons for performance differences across and within bond fund categories.

The differences in investment style and strategy between funds are often explored when asset owners perform due diligence and/or when individuals work with financial advisors to determine an appropriate asset allocation and then select the appropriate fund to meet the investor's objectives. The strategy pursued by a mutual fund is outlined in its prospectus. Further, applicable regulatory requirements may impact the composition of a given fund. For example, according to SEC guidance, any fund that uses a sector in the fund's name is required to hold at least 80% of its assets in the named sector. In other words, a fund that includes "high yield" in its name generally must invest at least 80% of its assets in high yield bonds.[10] Conversely, a fund with a more generic name can hold bonds across sectors, including bonds not represented in the performance benchmark. In the following section, we conduct a deeper dive on the five largest categories by AUM of open-end bond mutual funds as of December 2015.

Exhibit 2: HISTORICAL AUM OF BOND FUND CATEGORIES



Source: Simfund. Data as of Dec. 31, 2015.

Intermediate-Term Bond Funds

The largest individual Morningstar category is Intermediate-Term Bond with $964 billion in AUM across both active and index strategies, reflecting the aggregate AUM of 254 funds. Morningstar defines Intermediate-Term Bond funds as funds that "invest primarily in corporate and other investment-grade U.S. fixed-income issues and typically have durations of 3.5 to 6.0 years."[11] This type of fund is defined based on the duration and maturity of the assets rather than the specific type of bonds included. As shown in Exhibit 2, the AUM in the Intermediate-Term bond category has grown significantly in the past several years, relative to other categories.

The majority of the Intermediate-Term Bond funds are benchmarked against the Barclays US Aggregate Index or related indices.[12] The Barclays US Aggregate Index is comprised of investment grade, US-dollar denominated fixed rate taxable bonds across Treasuries, government-related, corporate, and securitized sectors. Exhibit 3 shows the breakdown of the Barclays US Aggregate Index by sector. As of November 2015, nearly 45% of the Barclays US Aggregate Index is comprised of Treasuries or government-related securities, with 24% allocated to corporate bonds and 31% allocated to securitized assets. While these percentages change over time to reflect outstanding bonds that fit the index inclusion rules, this index (and its predecessors) has included a significant weight in Treasuries and government securities for the past 30 years.[13]

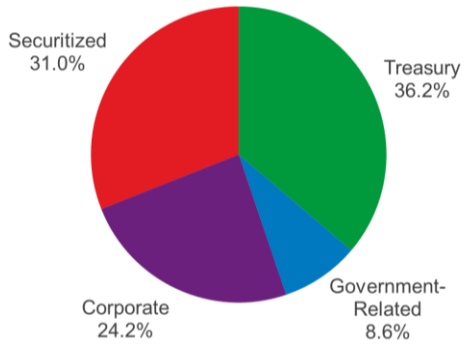
In addition to broad market funds, this category contains funds managed against a subset of more narrowly defined benchmarks. About 30 funds in this category are bench-marked against government/credit indices, which are comprised of investment grade corporate bonds and Treasuries as well as other government-related bonds.[14]

Twelve funds in the category are benchmarked against mortgage-backed securities (MBS) indices such as the Barclays US MBS Index. The Barclays US MBS Index is comprised of agency mortgage-backed pass-throughs.

Only 16 of the 254 Intermediate-Term Bond funds are index funds; though the largest fund in the category is passively managed to track the performance of the Barclays US Aggregate Float Adjusted Index.[15] The remainder of funds in the category are actively managed. Some funds in this category have the ability to invest in asset classes outside their benchmark, such as high yield bonds. While these allocations to bond sectors outside the benchmark vary from fund to fund, they are generally well under 20%.

Looking at historical quarterly net flows from January 1988 through March 2016, we find that the largest quarterly outflows across the Intermediate-Term Bond category occurred in the third quarter of 2013, totaling $40.7 billion. This coincides with the "taper tantrum." As a percentage of aggregate category AUM, the most extreme outflows occurred in the third quarter of 1988, when Intermediate-Term Bond funds experienced 5.6% of net outflows, equal to approximately $1 billion, over the quarter.

Exhibit 3: BREAKDOWN OF BARCLAYS AGGREGATE INDEX BY SECTOR



Source: Barclays US Aggregate Index Factsheet. As of Nov. 17, 2015.

Short-Term Bond Funds

The second largest category by AUM is the Short-Term Bond category. Like Intermediate-Term Bond funds, the Short-Term Bond category is defined based on duration and permits investment in multiple bond sectors. Morningstar defines this category as funds that "invest primarily in corporate and other investment-grade U.S. fixed-income issues and typically have durations of 1.0 to 3.5 years."[16] As shown in Exhibit 1, AUM in the Short-Term Bond category totals $277 billion across 128 distinct funds as of December 2015. Within the Short-Term Bond category, there are a number of different benchmarks used. Nearly three-quarters of Short Term Bond funds are benchmarked against government/credit indices,

such as the Barclays US Government/Credit Index and the Bank of America Merrill Lynch 1-5 Year US Corporate/ Government Bond Index. Several Short-Term Bond funds also use Treasury indices as their benchmarks, such as the Bank of America Merrill Lynch US Treasuries 1-3 Year Index. Of the total $277 billion in Short-Term Bond funds, approximately $28 billion is held in index funds.

The largest quarterly net outflows in dollars occurred during the fourth quarter of 2008, when the category experienced $3.7 billion in net outflows. As a percentage of AUM, the largest outflows occurred in the fourth quarter of 1994, when Short-Term Bond funds as a category experienced outflows of 8.2% of aggregate AUM, equal to $1.5 billion. We analyze the experiences of bond funds, including Short-Term Bond funds, during 1994 and 2008 on pages 7-11 of this paper.

High Yield Bond Funds

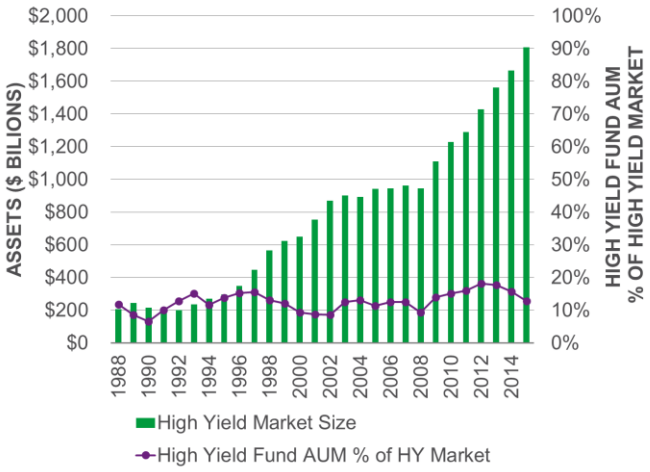
The High Yield Bond category includes funds that "primarily invest in U.S. high-income debt securities where at least 65% or more of bond assets are not rated or are rated by a major agency such as Standard & Poor's or Moody's at the level of BB (considered speculative for taxable bonds) and below."[17] Note that this criterion is less stringent than the SEC guidance that generally requires funds that use a sector-specific reference in their name to invest at least 80% of the fund in the asset class referenced in the fund's name. About 40% of the funds in the Morningstar High Yield Bond category do not use "high yield" in the name of the fund.[18]

The aggregate AUM in High Yield Bond funds is $232 billion held across 179 funds. The High Yield Bond category includes a variety of different high yield funds, such as those focused solely on US high yield bonds and others that invest in high yield bonds globally. About three-quarters of High Yield Bond funds use US high yield benchmarks, while approximately one-quarter use global benchmarks.[19]

In recent years, many have pointed to the growth of High Yield Bond fund AUM as a cause for concern. While it is true that High Yield Bond fund AUM has grown from approximately $88 billion in the fourth quarter of 2008 to $242 billion as of the first quarter of 2016, the growth of High Yield Bond funds is relatively muted in comparison to the growth of the largest category, Intermediate-Term Bond funds, as shown in Exhibit 2. Further, as shown in Exhibit 4, the global high yield market has contemporaneously grown from $944 billion in 2008 to nearly $1.8 trillion as of December 2015, meaning that the AUM of the High Yield Bond category represent less than 15% of the size of the global high yield market as of December 2015.

In a review of historical quarterly net flows, we find that the largest quarterly outflows occurred in the third quarter of 2014, when the High Yield Bond category experienced net outflows of $19.6 billion. These outflows were a result of a number of factors including uncertainty surrounding the

Exhibit 4: DEDICATED HIGH YIELD BOND FUND AUM AND GLOBAL HIGH YIELD MARKET SIZE



Source: JP Morgan, Simfund, BlackRock Analysis. As of Dec. 31, 2015. Note that the high yield bond fund AUM only includes US 1940 Act open-end mutual funds categorized as high yield funds by Morningstar.

Federal Reserve's monetary policy, global growth concerns particularly in Europe, the spread of Ebola, a continued drop in oil prices, and geo-political risks including tensions between Russia and the Ukraine as well as heightened concern around terrorism.[20] As a percentage of aggregate AUM, the largest outflows from the High Yield Bond category occurred in the first quarter of 1990, which saw outflows of 8.6% of total high yield category AUM, equal to $1.8 billion.

World Bond Funds

World Bond portfolios invest "40% or more of their assets in foreign bonds."[21] These funds are sometimes referred to as global or international bond funds. There is diversity within this category as to the types of investments made by each fund as some funds in the World Bond category follow a conservative approach that favors high quality bonds in developed markets, while others may own lower credit quality bonds from developed and/or emerging markets. These funds can invest in both US and non-US bonds. Slightly less than half of World Bond funds track benchmarks that are "ex-US," meaning that they generally exclude US securities, while slightly over half of World Bond funds track global benchmarks (that may include US securities).[22] Some World Bond funds may use derivatives as a way to hedge currency exposures, while others may leave currency exposure unhedged.[23] Of the $198 billion in World Bond funds, about $48 billion is held in index funds.

Historically, the most extreme quarterly net outflows in terms of dollar value and percentage of category AUM occurred during the fourth quarter of 2008, when outflows from the World Bond category totaled $7.2 billion or 11.1% of category AUM. We analyze investor flows during the 2008 crisis on pages 8-9 of this paper.

Muni National Intermediate Funds

Muni National Intermediate funds "invest in bonds issued by various state and local governments to fund public projects."[24] Unlike taxable bond sectors, such as investment grade or high yield corporate bonds, municipal bonds are generally tax exempt. As such, the investor base for municipal bond funds may differ from that of other types of bond funds, given the tax advantages municipal bond investments afford to taxable investors. The Muni National Intermediate category is one of sixteen municipal bond categories tracked by Morningstar. Collectively, all 16 categories of municipal bond funds represent $596 billion in AUM or 19% of US open-end bond mutual fund AUM.[25]

The Muni National Intermediate category is the largest of the municipal bond categories tracked by Morningstar, totaling $158 billion in AUM across 93 funds. Muni National Intermediate bond funds invest in intermediate duration municipal bonds, and the portfolios generally have "durations of 4.5 to 7.0 years (or, if duration is unavailable, average maturities of five to 12 years)."[26] This category of municipal funds has the ability to diversify risk across municipalities in different states. Other municipal bond categories tracked by Morningstar are limited to investments in individual states.

The largest historical outflows from the Muni National Intermediate category occurred during the third quarter of 2013, when net outflows totaled $8 billion or 6.2% of aggregate AUM. In addition, we note that during the fourth quarter of 2010 and first quarter of 2011, significant outflows across all municipal bond categories were experienced. The net outflows totaled $37.5 billion during that period across municipal bond categories. These outflows followed a confluence of events including a spike in Treasury yields, a downgrade in tobacco (a component of certain muni funds), and predictions of widespread defaults by municipalities.[27]

Fixed Income ETFs

In addition to active and index open-end funds, we have seen a growing adoption of bond ETFs. US bond ETF AUM has increased from $15 billion in 2005 to approximately $343 billion as of December 2015. Today, bond ETF AUM is about 10% of all the AUM of all bond funds.[28] While assets in bond ETFs have grown substantially over the past decade, the AUM in bond ETFs remains small compared to open-end mutual funds. Like open-end mutual funds, there is significant diversity in the types of assets held by bond ETFs. Specifically, the $343 billion held in bond ETFs is spread across 30 different categories, as defined by Morningstar.[29] As shown in Exhibit 5, the three largest categories are Intermediate-Term Bond with $86 billion in ETF AUM, Short-Term Bond with $45 billion in ETF AUM, and Corporate Bond with $45 billion in ETF AUM. The vast majority of these ETFs hold physical securities using a long-only index strategy.

Unlike open-end mutual funds, investors in ETFs buy and sell shares on an exchange, meaning that when investors exit a position in a bond ETF, they exchange shares with another participant on the exchange, as opposed to requiring the fund to redeem shares for cash, as is the case for open-end mutual funds. The vast majority of ETFs redeem in-kind, eliminating the need to liquidate securities for cash to meet redemptions. This means that a redeemer will typically receive individual stocks or bonds that are representative of the ETF's portfolio rather than cash. Further, ETF shares can only be redeemed by Authorized Participants (APs).

We explore bond ETFs in greater detail in our July 2015 *ViewPoint* entitled "Bond ETFs: Benefits, Challenges, Opportunities."

Exhibit 5: US FIXED INCOME ETF BREAKDOWN

Morningstar Category	AUM ($ billions)	# of Funds
Intermediate-Term Bond	86	18
Short-Term Bond	45	14
Corporate Bond	45	37
High Yield Bond	33	21
Inflation-Protected Bond	22	12
Short Government	16	9
Long Government	16	8
Ultrashort Bond	13	11
Emerging Markets Bond	11	20
Intermediate Government	9	8
World Bond	9	22
Muni National Interm	8	9
Bank Loan	6	5
Preferred Stock	5	7
Muni National Short	5	10
Trading-Inverse Debt	4	14
Muni National Long	3	5
Long-Term Bond	3	4
High Yield Muni	2	3
Muni California Intermediate	0.5	1
Other*	2	39
Total	**343**	**277**

Source: Simfund. As of Dec. 31, 2015. Categories defined by Morningstar.
*Other is comprised of: Conservative Allocation, Multicurrency, Multisector Bond, Muni California Long, Muni New York Intermediate, Muni New York Long, Nontraditional Bond, Single Currency, Trading-Leveraged Debt, and Trading-Miscellaneous.

Net Flows During Stressed Markets

One of the main theories underlying the call for a macro stress test of all bond funds is a concern that a stress scenario will lead to mass redemptions across bond funds, which bond funds may become unable to meet. It is believed such a scenario might lead to contagion and result in fire sales of bonds to meet redemptions. We analyzed quarterly net flows from the ten largest bond fund categories during several well-known recent stress periods, namely: (i) Fed rate hike in 1994, (ii) 2008 Financial Crisis, (iii) 2013 "Taper Tantrum," and (iv) December 2015 high yield selloff.[30] In reviewing the data, we draw the following conclusions:

- Different bond fund categories experienced different investor flow activity in response to the stress events.
- Even during stress periods, some of the bond fund categories experienced net inflows, not outflows.
- None of the categories studied experienced "massive aggregate outflows" during a quarterly period since 1988. Quarterly net outflows from the fund categories reviewed never exceeded 15.1% of category AUM.
- The size of outflows in dollar-terms has increased over time, but outflows as a percentage of category AUM have not increased materially.

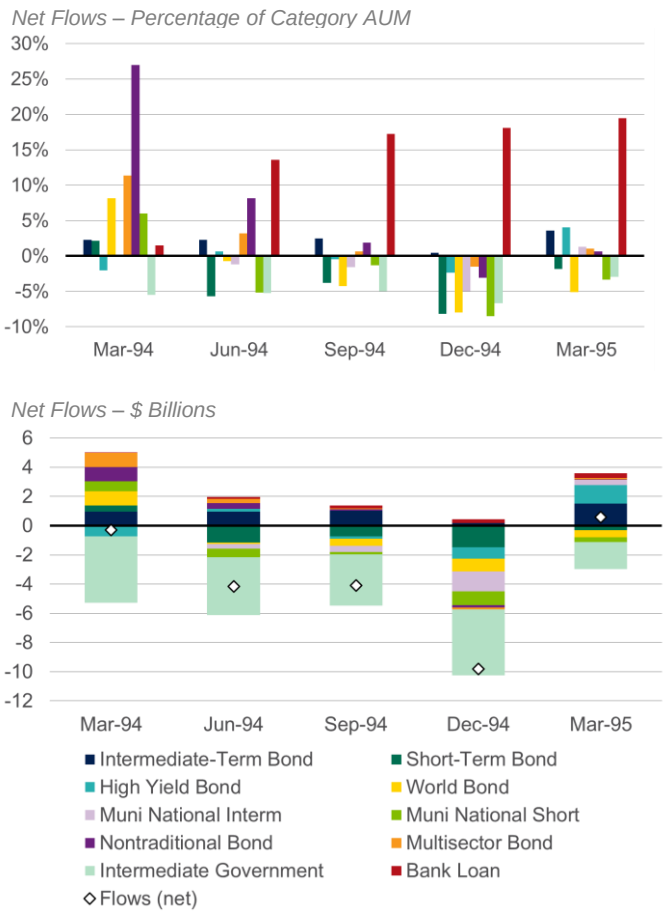
1994 Fed Rate Hike

In 1994, the bond market experienced a major selloff and increased volatility as a result of sharp and rapid interest rate hikes by the US Federal Reserve, which resulted in significant losses to many bond investors.[31] Some have even referred to this period as the "bond market massacre" due to the swift and severe losses that were experienced by many bond investors.[32] These events resulted in the largest quarterly net outflows ever experienced by bond funds on the whole when looking at outflows as a percent of total bond fund AUM. During the fourth quarter of 1994, aggregate quarterly net outflows from bond funds totaled 5% of bond fund AUM, which represented the largest aggregate quarterly net outflow from bond funds since 1988.[33] However, as shown in Exhibit 6, several categories of bond funds had net *inflows* during this time.

The categories with the largest net outflows during this time were intermediate duration and short duration categories, encompassing Intermediate Government, Muni National Intermediate, Short-Term Bond, and Muni National Short categories. Though, we note the Intermediate-Term Bond category actually experienced net inflows, not outflows. The Intermediate Government funds experienced the largest net outflows in dollar terms, with $16.5 billion in net outflows during the course of the year. The outflows were not concentrated in a single quarter, but rather, were spread out over the year, with the Intermediate Government category experiencing between $3.5 and $4.6 billion in net outflows each quarter of 1994. In the fourth quarter of 1993, the Intermediate Government category represented $83 billion in AUM, and had the greatest amount of AUM out of any bond fund category. Thus, it is not surprising that outflows in dollar-terms were the largest from this category during the 1994 events. Outflows from the Intermediate Government category were not limited to the 1994 period, however. The Intermediate Government category had actually experienced $2.6 billion in net outflows during the fourth quarter of 1993 before the rate hikes in 1994, and outflows in the category persisted for some time after 1994, with the category not experiencing net inflows until the third quarter of 1998.

Additionally, the Short-Term Bond and the Muni National Short categories experienced net outflows totaling $3.3 billion and $1.7 billion, respectively, over the second, third, and fourth quarters of 1994. We believe this reflects the more severe impact of the rate hikes on the front-end of the yield curve and the use of Short-Term Bond funds by relatively conservative investors with low tolerances for market value losses.[34] Outflows from any of the individual categories shown in Exhibit 6 did not exceed 10% of category AUM during any quarter of 1994.

Exhibit 6: 1994 RATE HIKE



Source: Simfund, BlackRock analysis. The categories shown above are the top ten largest bond fund categories by AUM as of December 2015.

While the majority of bond fund categories experienced outflows during this period, the Bank Loan category, which was relatively small at the time – only about $1 billion in the fourth quarter of 1993 – experienced over $600 million in net *inflows* over the course of 1994. Bank loans are floating rate instruments that generally receive increased payments as interest rates rise. Bank loans experienced favorable performance during the 1994 period, particularly in comparison to other fixed income asset classes, such as US Treasuries. As such, the inflows to Bank Loan funds are likely attributable to the floating rate nature of bank loans and investor expectations of future rate hikes. The Intermediate-Term Bond category also experienced net inflows totaling $3.1 billion during 1994. Finally, Nontraditional Bond and Multisector Bond funds also experienced net inflows during the first three quarters of 1994.

The outflows experienced by some categories and inflows experienced by others demonstrates that even during a period of sharply rising interest rates, bond fund investors were able to differentiate the performance of the fixed income assets held by individual bond funds and make investment decisions in line with expectations for individual fixed income asset classes during this period.

2008 Financial Crisis

The 2008 Global Financial Crisis (the Crisis) represents the most profound market stress event since the Great Depression. As is well-known by now, structural weaknesses in the global banking system, excessive leverage in the broader financial system, and problems in the subprime mortgage market resulted in significant losses to asset owners globally. While one might expect that bond funds would experience significant outflows given the liquidity "crunch" and flight to safety during the Crisis, it is interesting to note that while some categories of bond funds experienced significant outflows, this was not the case across all bond funds, with some categories actually experiencing *inflows* in 2008.

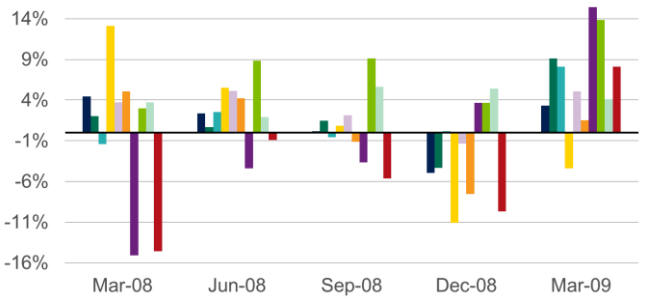
Two of the categories with the largest net outflows during the 1994 rate hikes had the largest *inflows* during the 2008 financial crisis. Likewise, the categories with large inflows during the 1994 period experienced some of the largest outflows during the fourth quarter of 2008. Specifically, the Intermediate Government and the Muni National Short bond categories experienced net inflows totaling $10.1 billion and $4.6 billion, respectively, during the second half of 2008. At the same time, investors pulled assets from categories such as Bank Loans, Intermediate-Term Bond, Multisector Bond, World Bond, and Short-Term Bond categories during the second half of 2008, with the majority of outflows occurring in the fourth quarter of 2008. The Intermediate-Term Bond category experienced the largest net outflows, totaling $23 billion in the fourth quarter of 2008. This was followed by $14.7 billion of net inflows during the first quarter of 2009. World Bond and Multisector Bond categories also experienced net outflows of $7.2 billion and $4.8 billion, respectively, during the fourth quarter of 2008.

Interestingly, outflows during the quarter-ended September 30, 2008 were relatively muted, despite the failure of Lehman Brothers on September 15, 2008, suggesting that investors who ultimately chose to redeem assets from bond funds in response to the global turmoil did not do so in the immediate aftermath of the Lehman failure. This is consistent with other periods of stress, where outflows that one might expect to occur quickly in response to a stimulus event, actually occur over a more prolonged period of time. This is generally because many investors have a governance model that incorporates consultation with an investment committee, a board, and/or an external consultant before making investment changes. This may reduce the proclivity for "knee-jerk" reactions to market stress events.

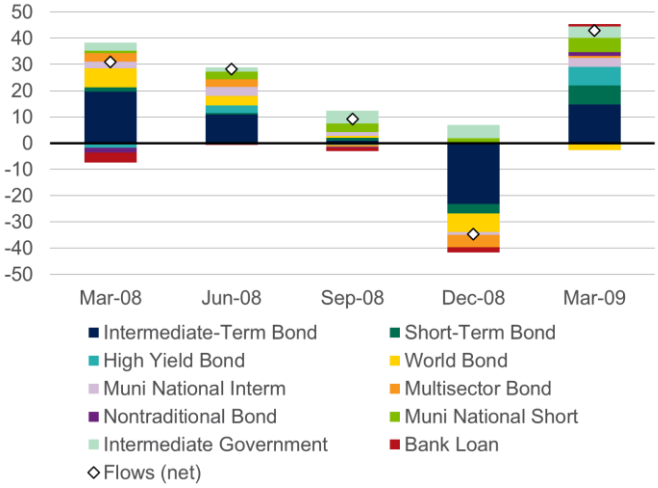
In reviewing this data, it appears that while investors were redeeming from what were perceived to be more risky bond sectors, they were simultaneously increasing exposure to funds that invest in what were perceived to be relatively safe havens, such as government bonds and municipals. As such, while we certainly observed significant net outflows from

Exhibit 7: 2008 FINANCIAL CRISIS

Net Flows – Percentage of Category AUM



Net Flows – $ Billions



Source: Simfund, BlackRock analysis. The categories shown above are the top ten largest bond fund categories by AUM as of December 2015.

several categories of bond funds during the 2008 crisis, we did not observe a wholesale loss of confidence in, or mass exodus from all bond funds. The data shows net inflows into certain types of bond funds during this period. One observation we see when looking at this data is that the magnitude of net outflows and inflows in dollar-terms were significantly larger during 2008 than they were during 1994.

This is largely a product of greater AUM in bond funds during 2008 than in 1994, which is consistent with the growth in the overall size of the bond market during the same period.[35] Net outflows as a percentage of AUM are only slightly higher during 2008, with the largest net outflows as a percentage of category AUM in the Nontraditional Bond category, which experienced 15% net outflows during the first quarter of 2008. Looking at the second half of 2008, the largest outflow as a percentage of category AUM was experienced by the World Bond category, which had net outflows totaling 11% of category AUM during the fourth quarter of 2008.

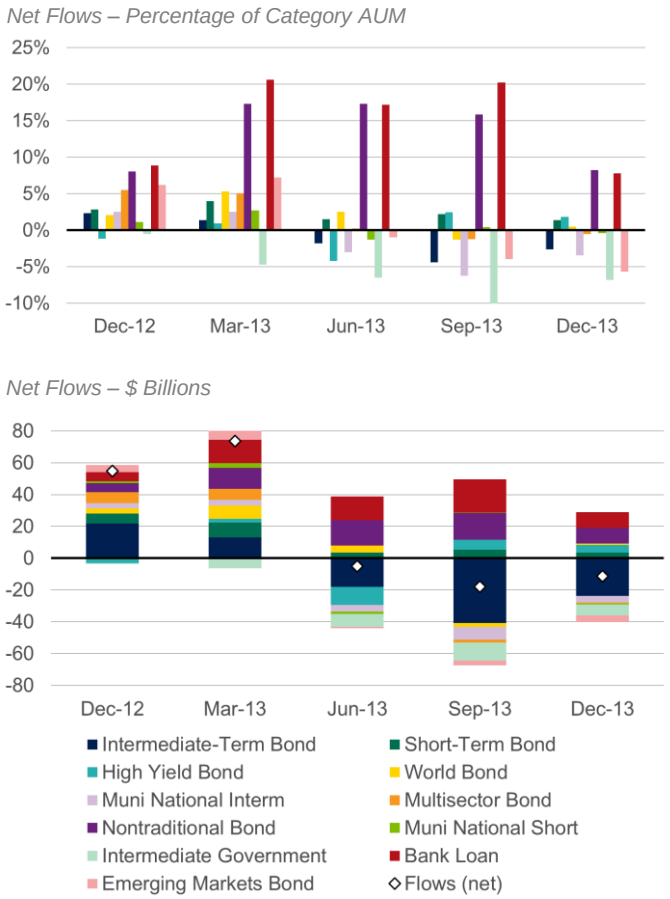
"Taper Tantrum" in 2013

In the Spring and Summer of 2013, Federal Reserve Chair Ben Bernanke made statements suggesting that the Federal Reserve might curtail and eventually end its monthly asset purchase program.[36] This was unanticipated by many market participants and caused US 10-year Treasury yields to rise sharply and the US dollar to appreciate significantly, which contributed to high levels of volatility in bond markets.[37] This event triggered a selloff in bond markets, and the impact on emerging markets has been highlighted in several publications.[38] There were nearly $8 billion in net outflows from Emerging Markets Bond funds from the second through fourth quarters of 2013. However, given their relatively small size in terms of category AUM compared to other bond fund categories, Emerging Markets Bond funds did not experience the largest net redemptions during the Taper Tantrum. Rather, the Intermediate-Term Bond and Intermediate Government categories experienced the largest net outflows totaling $82 billion and $27 billion, respectively, during the second through fourth quarters of 2013. The International Government category had also experienced $6.3 billion in net outflows during the first quarter of 2013. The Muni National Intermediate category also experienced over $16 billion in net outflows during the last three quarters of 2013.

While many have cited the Taper Tantrum as the type of event that might trigger a selloff across all bond funds, we observed simultaneous net *inflows* into the Bank Loan and Nontraditional Bond categories totaling $46 billion and $42 billion, respectively, during the last three quarters of 2013. Further, Short-Term Bond funds experienced $12.5 billion in net inflows during the same time period. Given greater concerns about rising interest rates in the wake of the Fed's statements, it is not surprising that investors may have decided to increase allocations to Nontraditional Bond funds, which are considered funds that have a greater ability to hedge interest rate risk, as well as bank loans, which tend to perform well (all else equal) in rising rate environments, given their floating rate nature. Likewise, investors increasing allocations to Short-Term Bond funds, which have less interest rate sensitivity than intermediate and long duration funds, makes intuitive sense in this context.

Lastly, it is interesting to note some similar patterns with the 1994 events, where the market experienced surprises with respect to rising interest rates. In particular, we observe significant inflows into Bank Loan funds, with significant outflows from Intermediate Government funds during both periods, as well as both inflows and outflows in several other categories of bond funds. These patterns suggest that investors differentiate between different categories of bond funds based on the different types of bonds held by each category of funds, and do not mechanistically sell all holdings across all types of bond funds during market stress events, particularly those during periods of rising interest rates.

Exhibit 8: 2013 TAPER TANTRUM

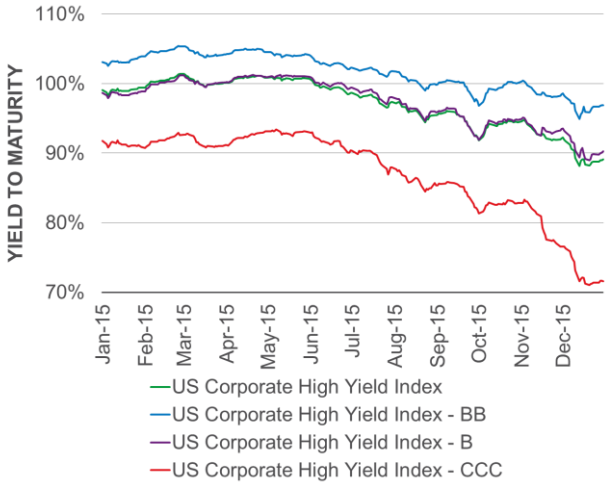


Source: Simfund, BlackRock analysis. The categories shown above are the top ten largest bond fund categories by AUM as of December 2015. The Emerging Markets Bond category has also been included given the focus on emerging markets during the Taper Tantrum.

December 2015 Volatility and Oil Price Decline

In the fourth quarter of 2015, a number of factors created a volatile economic environment. In particular, oil prices dropped approximately 40% from their peak in June 2015 of $61.43 a barrel to $37.04 a barrel by year-end 2015. Likewise, other commodities saw significant price declines. Further, uncertainty around the Federal Open Market Committee (FOMC) rate decisions and associated rhetoric, weak earnings growth, and concerns about the implications of record-low oil prices on energy and commodity-related businesses put significant downward pressure on risk assets. This phenomenon was particularly noticeable in the high yield space, which has significant exposure to the energy sector. Specifically, as of December 31, 2015, energy and metals & mining companies made up over 15% of the Barclays US High Yield 2% Issuer Capped Index. Given the performance of energy prices and energy stocks during this period, it is, therefore, not surprising that high yield bonds performed poorly, as shown in Exhibit 9.

Exhibit 9: AVERAGE HIGH YIELD BOND PRICES IN 2015



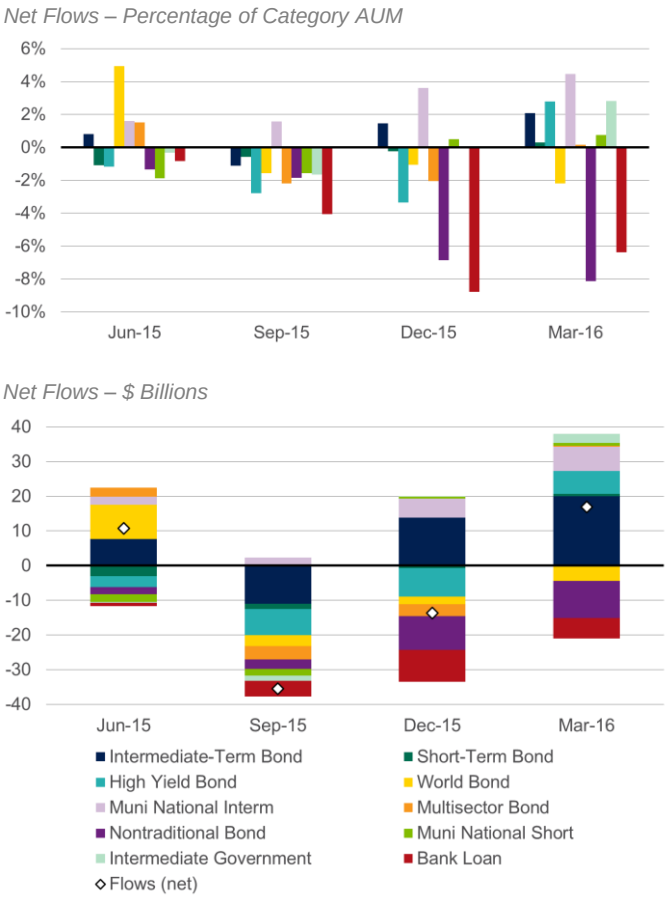
Source: Barclays Live. As of Dec. 31, 2015. Average Bond Price shown for the Barclays US Corporate High Yield Index.

This period was also notable in that the Third Avenue Focused Credit Fund – a daily open-end mutual fund that was classified as a high yield fund but had significant investments in distressed credits – announced that it would cease redemptions on December 16, 2015.

As a result of this environment, during the fourth quarter of 2015, we observed over $8 billion in net outflows from High Yield Bond funds. The High Yield Bond category did not experience the largest outflows in dollar-terms or as a percentage of category AUM, however, suggesting that investors did not view the Third Avenue situation as cause for fire sales of high yield fund shares. The largest outflows were actually experi-enced by the Bank Loan and the Nontraditional Bond categories, with $9.2 billion and $9.8 billion in net outflows, respectively, during the fourth quarter of 2015. Like the high yield market, the bank loan market has significant exposure to the energy sector, which likely contributed to outflows from Bank Loan funds.

At the same time, Intermediate-Term Bond funds experienced nearly $14 billion in net *inflows*, which provides another example of how investors differentiated between different types of bond funds. Likewise, the following quarter-ended March 2016 saw net inflows into several bond fund categories that had experienced outflows in the previous quarter, including inflows into the High Yield Bond category. The data we observe during this period are particularly important because they provide the only historical example of a scenario where an open-end mutual fund was unable to meet redemptions coupled with stressed market conditions. What we observe is that investors were able to distinguish the idiosyncratic event experienced by one open-end mutual fund from the risks associated with other mutual funds, given that mass aggregate outflows from high yield bond funds or any other bond fund category did not occur during this period. It also demonstrates that investors differentiated the different market risks associated with different investment strategies

Exhibit 10: DECEMBER 2015 HIGH YIELD SELLOFF



Source: Simfund, BlackRock analysis.

and did not treat all mutual funds as a single asset class when deciding if or how they should react to this market event.

Conclusion

When the components of bond fund AUM are broken down, it becomes clear that bond funds do not represent a homogeneous group of market participants, and the investors in different types of bond funds do not react in the same way to market stress events. Rather, bond funds reflect a wide range of funds pursuing a diverse range of investment objectives and investment styles. In addition to the diversity of bond funds and bond ETFs, there is diversity across the various asset owners that invest in bond funds. These asset owners have different investment objectives and constraints, which incentivize them to behave in different ways in response to market changes based on their respective return objectives, risk tolerance, tax status, regulatory regime, time horizon, liquidity needs, and liability structure.

While our analysis of fund flows during recent stress events demonstrates that the case for massive aggregate outflows from bond funds is not present in the data nor is it likely given the diversity of bond funds, we also recognize that the limitation of this analysis is that it reviews only relatively recent stress events, which have occurred within the context of a long-term downward trend in US interest rates that has been ongoing since the early 1980s.[39] A sharper and more substantial increase in interest rates than has been experienced in the last 35 years could certainly have implications for the bond markets as a whole, and mutual fund managers should be diligent in ensuring that the appropriate risk management policies and procedures are in place to address potential risks that have not been experienced during previous stress market events. **We view this as a reason to pursue the development of regulatory standards for the stress testing of *individual* open-end mutual funds' abilities to meet their redemption obligations.**

We further view this as underscoring the importance of collecting more data on asset owners across the bond market ecosystem before attempting to draw broad-based, macro conclusions about potential market dynamics during hypothetical stress market events. Focusing solely on US mutual funds because the data is easily accessible may yield misleading conclusions given the diverse range of market participants in the bond markets. Recall that open-end mutual funds and ETFs represent only a small portion of the nearly $40 trillion of debt owned by various entities that are included in the Federal Reserve Z.1 Data. Many of these asset owners have investment objectives and constraints that differ materially from those of open-end bond funds, suggesting that conclusions drawn only from looking at US mutual fund data are unlikely to be reflective of the behavior of the bond market as a whole.[40]

Although the analysis performed in this paper has some limitations, it does demonstrate that investor flows to and from bond funds during recent market stress events do not support the hypothesis that bond fund investors treat their bond fund investments as a single asset class, retreating from all bond funds at the same time during periods of stress. The combination of diversity at multiple levels calls into question the potential insights that could be gleaned from a "macro stress test" across all bond funds.[41] Further, the data shown throughout this *ViewPoint* highlight the conceptual challenges associated with such an exercise. Specifically, in thinking about a "macro stress test across bond funds," two questions highlight the challenges of defining such a test: (i) which bond funds would be included?; and (ii) how would the stress test account for different types of bonds held by different bond funds? In other words, the heterogeneity of bond funds reduces the value of looking at funds in the aggregate if the assumption is that bond funds should be treated as a homogeneous group or single asset class.

Further, the redemption "liabilities" of one bond fund are unrelated (from a legal or any other perspective) to the redemption liabilities of other funds – even those pursuing a similar investment strategy or managed by the same asset manager. In other words, the assets from one fund cannot be used to meet the redemption obligations of another bond fund because each fund is a separate legal entity. This further calls into question the value of attempting to test the aggregate ability of multiple bond funds to meet redemptions.

Instead of attempting to develop a macro stress test of all bond funds, **we recommend that policy makers focus on ensuring that all funds have robust liquidity risk management practices in place and consider incorporating stress testing of individual funds' abilities to meet redemption requests across a wide range of market scenarios.** This would contribute to high standards of liquidity risk management across the mutual fund industry and promote the resiliency of the mutual fund structure.

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3. The data referenced in this paper is specific to US 1940 Act open-end mutual funds that are included in a bond fund category per Morningstar classifications. We encourage regulators to review data on mutual funds in other countries, to the extent this data is available. The 2,200 figure includes both open-end funds and ETFs but excludes closed-end funds. Source: Simfund. As of Dec. 31, 2015. All Simfund data accessed in May 2016.
4. For more information on the different asset owners of open-end mutual funds and ETFs, see BlackRock, *ViewPoint*, Addressing Market Liquidity: A Broader Perspective on Today's Bond Markets (Feb. 2016), available at http://www.blackrock.com/corporate/en-us/literature/whitepaper/viewpoint-liquidity-bond-markets-broader-perspective-february-2016.pdf (Addressing Market Liquidity II); BlackRock, *ViewPoint*, Who Owns the Assets? Developing a Better Understanding of the Flow of Assets and the Implications for Financial Regulation (May 2014), available at http://www.blackrock.com/corporate/en-us/literature/whitepaper/viewpoint-who-owns-the-assets-may-2014.pdf.
5. Addressing Market Liquidity II; Federal Reserve Z.1, Financial Accounts of the United States (Dec. 31, 2015); available at http://www.federalreserve.gov/releases/z1/Current/z1.pdf (Federal Reserve Z.1 Data). See tables L.122 and L.124. Does not include closed-end funds and money market funds. Note that Addressing Market Liquidity II uses Federal Reserve Z.1 data as of Sep. 30, 2015; we reference Dec. 31, 2015 data in this paper. Updated to reflect revised Federal Reserve methodology as of June 2016.
6. Simfund. As of Dec. 31, 2015. Includes active and index open-end bond mutual funds. Categories defined by Morningstar.
7. Federal Reserve Z.1 data does not provide details on the individual funds holding bonds. Bond fund AUM measures the size of the entire bond fund, which oftentimes will be holding some cash or other assets, so bond fund AUM and bond holdings by mutual funds is not exactly the same. Data on insurance funds, such as variable insurance trusts, is not available in the same format as data on non-insurance open-end mutual funds, though insurance funds may also invest in bonds. Insurance funds have not been included in the bond fund AUM figures referenced in this paper; however, the holdings of such funds may be captured in Federal Reserve Z.1 data.
8. Source: Simfund. As of Dec. 31, 2015. This universe is comprised of dedicated fixed income US open-end bond mutual funds. It does not capture multi-asset funds that may invest a portion of their assets in bonds. In addition to these categories, there are some funds captured in Simfund that are not classified by Morningstar.
9. The figures referenced exclude ETFs. When ETFs are included, the percentage of passively managed funds is higher.
10. SEC, Final Rule, Investment Company Names (Jan. 17, 2001), available at https://www.sec.gov/rules/final/ic-24828.htm. This rule contains a carve-out for funds that use the term "high-yield" in conjunction with terms such as "municipal" or "tax-exempt" that suggest that the fund invests in tax-exempt bonds.
11. Morningstar, The Morningstar Category Classifications (Apr. 2016), available at http://morningstardirect.morningstar.com/clientcomm/Morningstar_Categories_US_April_2016.pdf (Morningstar Category Classifications).
12. Source: Simfund, BlackRock analysis. Related indices include Barclays US Aggregate Float Adjusted TR USD Index, Barclays US Aggregate Intermediate TR USD, Barclays Intermediate Aggregate Ex Baa TR US.
13. The relative weighting of asset classes in the index changes as market security values and bond issuance fluctuates and as new asset classes are added to the index. Most Barclays benchmark indices are rebalanced monthly, offering intra-month stability in index composition. Securities that meet all published index inclusion rules and eligibility criteria at the beginning of a given month will remain in the index for purposes of return calculations until the following month-end, when index composition is next reset. Security-level weights are reset at each index rebalancing and are available with a variety of weighting options. *See* Barclays, Barclays Index Methodology (Jul. 17, 2014), available at https://index.barcap.com/Home/Guides_and_Factsheets.
14. Barclays, Factsheet, US Government/Credit Index (Apr. 8, 2015), available at https://index.barcap.com/Home/Guides_and_Factsheets.
15. Source: Simfund.
16. Morningstar Category Classifications.
17. Morningstar Category Classifications.
18. Source: Simfund. As of Dec. 31, 2015. Includes US bond funds categorized as High Yield Bond funds by Morningstar. Some funds captured do not have a benchmark listed in Simfund.
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22. Source: Simfund. As of Dec. 31, 2015. For example, ex US indices include the Citigroup Non-US Dollar World Government Bond Index and the Barclays Global Aggregate Ex USD index. For more information on benchmark definitions, see Barclays, Benchmark Definitions, available at https://wealth.barclays.com/content/dam/bwpublic/americas/documents/shared/benchmark-definitions-americas.pdf.
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24. Morningstar Category Classifications.
25. Percentage of total bond fund AUM excludes ETFs. The sixteen categories of municipal bond funds, as defined by Morningstar are: Muni National Intermediate, Muni National Short, Muni National Long, High Yield Muni, Muni California Long, Muni California Intermediate, Muni Single State Long, Muni New York Long, Muni Single State Intermediate, Muni Single State Short, Muni New York Intermediate, Muni Pennsylvania, Muni Massachusetts, Muni New Jersey, Muni Ohio, and Muni Minnesota.

Notes *(cont'd)*

26. Morningstar Category Classifications.
27. Eric Jacobson, Morningstar, Lessons from the Muni-Bond Sell-Off (Mar. 3, 2011), available at http://ibd.morningstar.com/article/article.asp?id=372497&CN=brf295,http://ibd.morningstar.com/archive/archive.asp?inputs=days=14;frmtId=12,%20brf295.
28. This data was derived from SimFund as of Dec. 31, 2015 and includes open-end taxable and tax-free bond ETFs.
29. Simfund. As of Dec. 31, 2015. Categories defined by Morningstar. This universe is comprised of bond ETFs as defined by Simfund. In addition to these categories, there are some funds captured in Simfund that are not classified by Morningstar.
30. In addition to the type of broad market event explored in this paper, there could be narrower market events that could impact specific bond fund categories (e.g., a change in the tax-exempt status of municipals).
31. In addition to the Fed rate hike, the Mexican Financial Crisis created further turbulence in markets. For more information, see Joseph A. Witt Jr., Federal Reserve Bank of Atlanta, The Mexican Peso Crisis (Jan./Feb. 1996), available at https://www.frbatlanta.org/-/media/Documents/filelegacydocs/Jwhi811.pdf.
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38. See e.g., Jimmy Shek, Ilhyock Shim and Hyun Song Shin, Bank for International Settlements, Investor redemptions and fund manager sales of emerging market bonds: how are they related? (Aug. 2015), available at http://www.bis.org/publ/work509.pdf (BIS 2015 Report).
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40. Federal Reserve Z.1 Data, Addressing Market Liquidity II.
41. BIS 2015 Report; IMF FSAP Report.

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