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**Leveraged Bank Loan versus High Yield Bond Mutual Funds**

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# Leveraged Bank Loan versus High Yield Bond Mutual Funds

*Ayelen Banegas and Jessica Goldenring<sup>1</sup>*

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## Abstract

Since the financial crisis, the markets for Bank Loan (BL) and High Yield Bond (HYB) mutual funds (MFs) have grown significantly, with assets under management increasing from \$19 billion and \$75 billion to close to \$117 billion and \$225 billion, respectively, as of December 2018. This short paper characterizes the universe of BL MFs and compare it against that of HYB MFs on several dimensions. We document that BL and HYB MFs' respective market share of leverage loans (LL) and high yield (HY) corporate bonds outstanding increased since the mid-2000s. We also show that in terms of portfolio allocations, HYB and BL MFs hold around 60 percent of B, BB and BBB-rated assets and that exposure to foreign fixed-income markets is relatively small for both types of MFs. Finally, we document that net flows as a share of assets were larger and more volatile for BL MFs than for their HYB counterparts and that HYB MFs significantly outperformed BL MFs since early 2000.

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<sup>1</sup> We are very grateful to Min Wei, Dan Li, Chuck Press and Zack Saravay for their insightful comments.

## 1. Introduction

The underlying assets of corporate debt mutual funds are often grouped into two broad categories that lie at different ends of the credit spectrum: investment grade and high yield. While mutual funds investing primarily in investment grade corporate bonds are considered less risky, higher returns are generally associated with high yield mutual funds. Two increasingly popular investment categories within the high yield MF universe are BL and HYB MFs.

BL MFs invest a large share of their portfolios in leveraged loans, defined as commercial loans lent to high yield companies. The issuing companies are usually below investment grade or unrated with a risk profile similar to speculative grade firms. Similarly, HYB MFs primarily invest in high yield bonds or “junk bonds”. Reportedly driven in part by investors reaching for yield in the sustained low interest rate environment, the demand for bank loans and high yield bonds increased substantially since the financial crisis: from 2008 to year-end 2018, institutional leveraged loan outstanding increased from around \$550 billion to \$1,150 billion and HY bonds outstanding increased from \$750 billion to \$1000 billion.<sup>2</sup> Moreover, since 2008, HYB MFs’ assets under management increased from around \$75 billion to \$225 billion and bank loan funds grew from \$19 billion to \$117 billion. These trends highlight changes in the HYB and BL market and are motivation for further insight into the high yield mutual fund universe. Before detailing the BL and HYB MFs universe, there are differences between BL and HYB that are important to note:

1. *Coupons*: BLs are floating rate investments, typically defined as Libor plus a fixed spread. As a result, as interest rates (i.e. Libor) rise, coupon rates also increase. On the other hand, HY bonds typically have fixed coupons. Interest rate increases tend to benefit floating rate investments such as BLs.
2. *Recovery rate*: BLs are collateralized, senior secured debt, at the top of a company’s corporate capital structure. In the case of a company’s default, BL investors are more likely to receive more principal back than HY bond investors. HY bonds are subordinate in the capital structure and are paid after BLs.

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<sup>2</sup> See Appendix B, figure B5 for a time series of both outstanding series.

3. *Callability*: BLs are callable at par at any time after the first few months of the issuance, and therefore can have limited upside potential during bull markets. In contrast, HY bonds tend to have better call protections, allowing investors to benefit further from price appreciation.
4. *Liquidity*: HYBs are generally more liquid than bank loans as loans tend to be less standardized, which can lead to more uncertainty and longer settlement time. As a result, during periods of market stress, in which investors are reducing their exposures to these assets, BLs can be expected to experience larger price declines than HY bonds.
5. *Investor Protection*: BLs contain covenants, or restrictions, that put limitations on borrowers and protect investors by requiring the borrower to do or refrain from doing certain activities. These clauses in the loan agreement can be particularly useful for lenders in the event of a default or loan restructuring. However, these covenants have been loosening over the past years, leading to more similarities between BL and HY bonds.
6. *Transparency*: Firms issuing bonds are subject to more stringent disclosure requirement than firms issuing loans. Bank Loans are not a security and are less regulated. Moreover, because of the limited public disclosure of their financial information, BLs are generally more difficult to monitor by a third-party.<sup>3</sup>

This analysis uses monthly share class data from Morningstar Direct (MD).<sup>4</sup> The sample contains U.S. domiciled mutual funds over the 2000-2018 period and includes both active and inactive funds in order to avoid survivorship bias.<sup>5</sup> Specifically, the sample considers the “Bank Loan” and “High Yield Bond” subsets of MD “Taxable Bond” (TB) U.S. Category Group. In order to create a robust and comprehensive universe, the data was checked against several data vendors including Investment Company Institute and Lipper.<sup>6</sup> The following subsections characterize and compare the universe of these two mutual fund investment categories.

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<sup>3</sup> In the case of BLs, financial information related to the loan arrangement is generally only fully disclosed to the lenders and or potential investors.

<sup>4</sup> Morningstar, Inc. Morningstar Direct, <http://corporate.morningstar.com/US/asp/subject.aspx?xmlfile=40.xml>.

<sup>5</sup> The sample also excludes fund of funds.

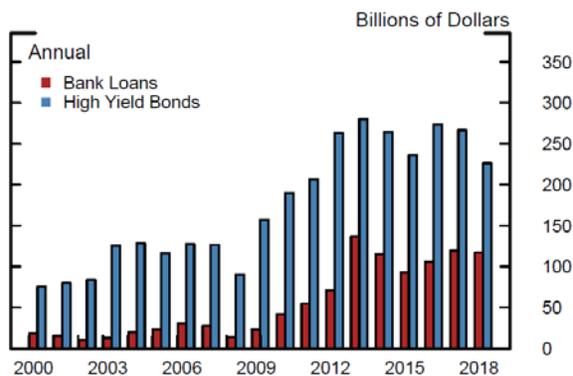
<sup>6</sup> See Appendix A for more detail on the definition of the mutual fund universe and the breakdown of MD categories.

## 2. Assets Under Management and Investor Base

### 2.1. BL and HYB assets under management have grown significantly since the financial crisis.

Total net assets of BL and HYB MFs, depicted in figure 1, rose at a strong pace during the post-crisis period, supported by large inflows and positive performance. BL MF assets under management (AUM) increased from roughly 19 to 117 billion dollars over the sample period, and similarly HYB MF assets grew from close to 75 to 225 billion dollars. The AUM of BL and HYB funds increased through the sample until September 2017 when fund assets for both investment categories edged down.

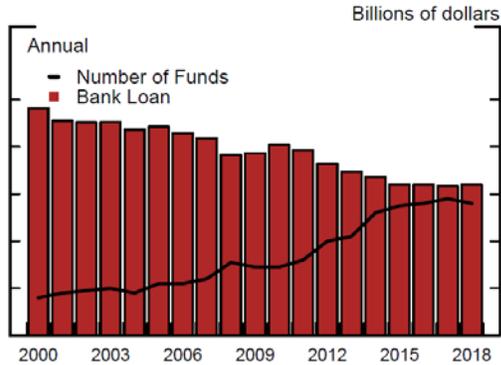
Figure 1:  
Total Net Assets



Source: Morningstar, Inc.

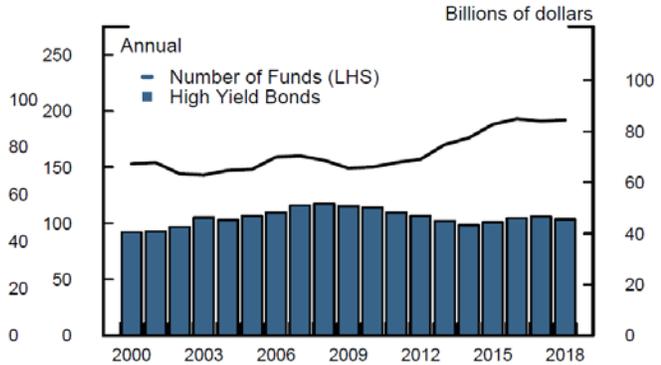
Notably, the growth in AUM accompanies the rise in the number of mutual funds investing in these asset classes. Figures 2 and 3 show the number of funds and the market share of the top 10 funds investing in BL and HYB MFs through the sample. The sample consists of 56 BL funds and 191 HYB funds as of December 2018, a significant increase relative to the 16 BL and 153 HYB MFs at the beginning of the sample in early 2000. While the number of mutual funds investing in BL MFs rose over time, the market concentration, measured as the market share of the top 10 largest MFs in terms of AUM, declined to 60 percent at the end of last year. Meanwhile, concentration of HYB MFs fluctuated around a narrow range, with the top 10 of HYB MFs managing close to 40 percent of total HYB MF assets.

Figure 2:  
Market Share of BL Top Ten Funds



Source: Morningstar, Inc.

Figure 3:  
Market Share of HYB Top Ten Funds



Source: Morningstar, Inc.

## 2.2. Institutional investors are increasingly seeking out BL and HYB MFs.

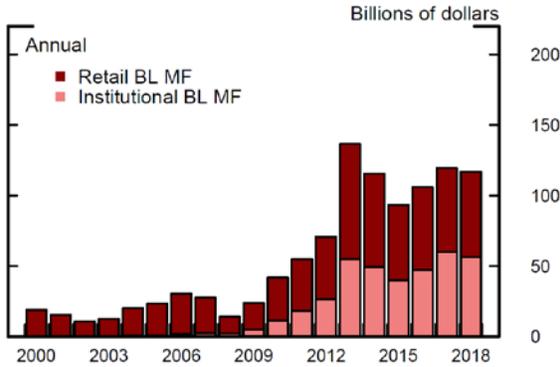
Figures 4 and 5 present BL and HYB MFs total AUM partitioned by investor type over time. As shown below, the share of institutional investors remained negligible for BL MFs until 2005, but increased substantially since the financial crisis.<sup>7</sup> Consistent with investors reaching for higher yields in the post-crisis sustained low interest rate environment, the share of total assets held by institutional investors jumped to 16 percent in 2009 and continued to grow at a solid pace through the end of 2018. By the end of the sample, institutional investors accounted for 50 percent of BL MF assets. Comparable to BL MFs, HYB MF institutional investors' participation increased through the sample period, starting around 10 percent in 2000 and reaching 40 percent at the end of 2018. Moreover, like BL MFs, the increase of institutional investors' participation in HYB MFs was particularly notable since the financial crisis.

<sup>7</sup> MD defines institutional investors as any fund that meets one of the following qualifications: has the word "institutional" in its name; has a minimum initial purchase of \$100,000 or more; or states in its prospectus that it is designed for institutional investors or those purchasing on a fiduciary basis. In the sample, a fund is classified as institutional if all share classes meet one of the classifications; otherwise the fund shows as non-institutional or retail. This means this classification does not account for cases in which one of the share classes of a fund is for institutional investors while others are for retail investors.

### 3. Portfolio Allocations

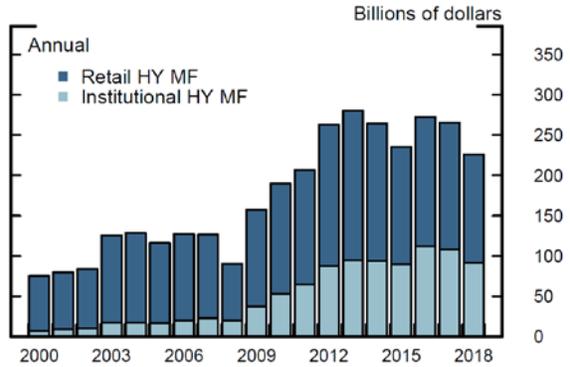
This section focuses on quarterly portfolio allocations that highlight the composition of BL and HYB MFs including exposure by asset class, fixed-income sector allocations, foreign versus domestic exposure and credit rating.

Figure 4:  
Institutional vs. Retail Assets Bank Loan MFs



Source: Morningstar, Inc.

Figure 5:  
Institutional vs. Retail Assets High Yield Bond MFs



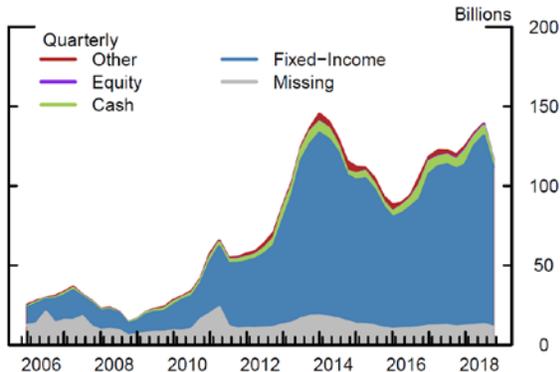
Source: Morningstar, Inc.

Figures 6 and 7 show BL and HYB MFs allocations to cash, fixed-income, equity and other securities.<sup>8</sup> Both BL and HYB funds held about 85% of their assets in fixed-income securities and about three percent in cash, at the end of 2018. Aside from fixed-income and cash, portfolio exposure to equities and to other remained minimal over time for both BL and HYB funds.<sup>9</sup>

<sup>8</sup> This portfolio allocation breakdown is performed using Morningstar’s asset allocation variables. The variables are defined as the percentage of a fund’s assets for each category. The categories are calculated separately for short, long and net positions. In this analysis only the net positions are considered. Missing represent the share of AUM that were not classified by MD. See Appendix for more details on these variables.

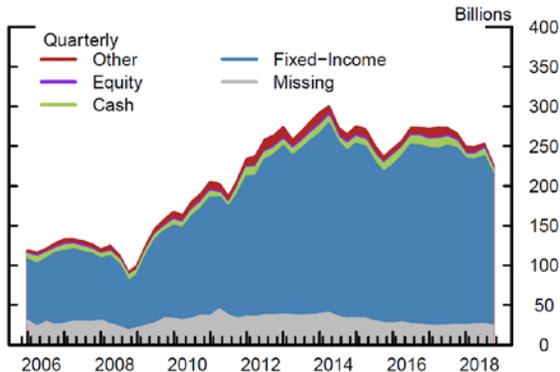
<sup>9</sup> Morningstar describes “other” to include futures or options on commodities, weather and volatility. Cash includes futures, forwards, or options on short-term interest rates and currencies. It also includes the cash offsets for most derivative contracts.

Figure 6:  
Bank Loan Mutual Funds Assets by Allocation



Source: Morningstar, Inc.

Figure 7:  
High Yield Bond Mutual Funds Assets by Allocation



Source: Morningstar, Inc.

**3.1 BL funds held about 74% of their assets in leveraged loans, while HYB funds held near 5% of total assets in such loans.**

Figures 8 and 9 confirm that BL and HYB funds primarily hold the securities defined by their categories.<sup>10</sup> Specifically, BL funds held about 74 percent of their assets in bank loans, which accounted for \$84 billion as of fourth quarter 2018, while HYB funds held only 5 percent of total assets in such loans, equivalent to around \$12 billion in AUM. Meanwhile, HYB funds held about 76 percent of total assets in corporate bond securities while BL funds held around 11 percent. In addition, figures 8 and 9 highlight net cash allocations, which in both MF categories are positive and less than 5 percent through the sample. These cash allocations can be particularly relevant for these fund categories since both BL and HYB MFs engage in liquidity transformation and therefore need cash buffers to meet large redemptions.<sup>11</sup>

<sup>10</sup> Morningstar fixed income sector allocation can be aggregated at different levels. Each category is assigned based on holdings. The broadest category, “Super Sectors” (shown in Appendix C) illustrate the predominate amount of corporate bonds assets in both BL and HY MFs. Disaggregating these allocations into their “Primary Sectors” shed light to the actual amount of bank loan holdings in both MF categories. The percentage of each asset class is the market value divided by the total market value of the portfolio at each point in time. For more details on the available categories see Appendix A.

<sup>11</sup> Funds may also manage liquidity through internal portfolio construction by holding a larger share of their portfolios on highly liquid assets, managing liquidity at the firm level, or expanding their credit lines, among other tools.

Figure 8:  
Bank Loan Mutual Funds Assets by Primary Sector

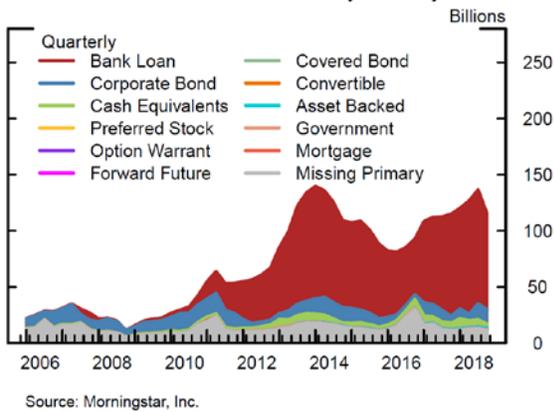
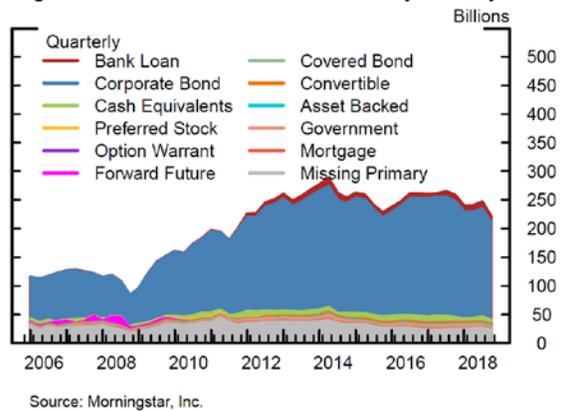


Figure 9:  
High Yield Bond Mutual Funds Assets by Primary Sector



**3.2 Foreign assets of BL and HYB MFs account for nearly one-fifth of their respective fixed-income allocations.**

The breakdown of foreign and domestic assets is particularly relevant when analyzing the sources of potential financial stability risks arising from U.S. MFs investing in BL and HYB debt. Depicted in figures 10 and 11, BL and HYB MFs held a relatively small share of their bond portfolios in foreign fixed income assets, with domestic debt comprising about 81 and 84 percent of BL and HYB allocations to the fixed income sector, respectively. On aggregate, these figures show that BL and HYB MFs’ foreign exposure is not substantial.

Figure 10:  
Bank Loan Mutual Funds Bond Allocation (Net)

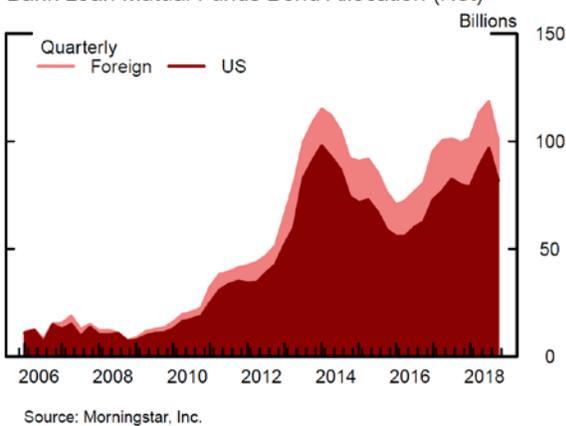
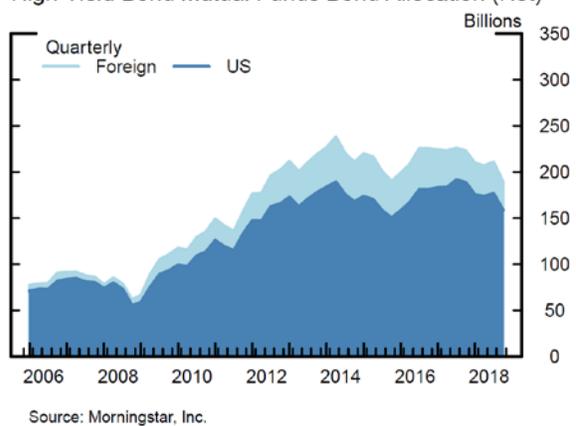


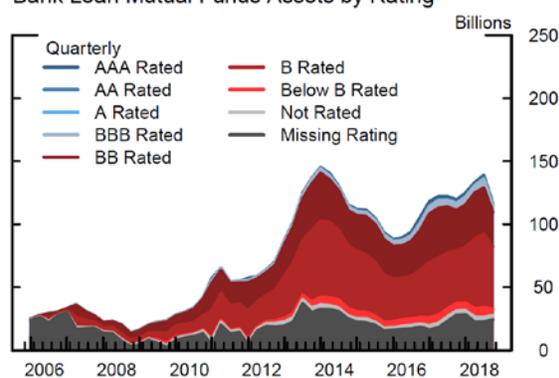
Figure 11:  
High Yield Bond Mutual Funds Bond Allocation (Net)



### 3.3 BL and HYB MFs held about 74% and 71% of their fixed-income allocation in B and below-B rated debt.

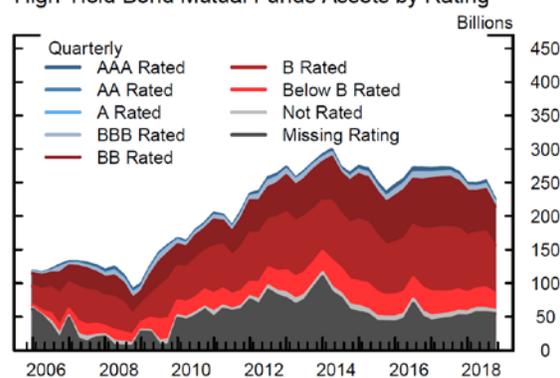
Although by definition BL and HYB MFs invest primarily in below investment grade debt, in this section we use MD credit rating variables to further decompose BL and HYB MF fixed income and cash allocations in terms of their credit quality.<sup>12</sup> Figures 12 and 13 display the breakdown of assets by specific credit ratings.<sup>13</sup> In both BL and HYB MFs the largest credit category correspond to B rated securities, representing about 42 and 32 percent, respectively. For BL MFs, these percentages account to about \$27 billion in assets at end-of-year 2018, while for HYB MFs B rated allocations are close to \$25 billion. Overall, at the end of 2018, BL and HY funds held 74% and 71%, respectively, of their rated assets in securities with a credit rating of B and below.

Figure 12:  
Bank Loan Mutual Funds Assets by Rating



Source: Morningstar, Inc.

Figure 13:  
High Yield Bond Mutual Funds Assets by Rating



Source: Morningstar, Inc.

Moreover, the specific credit ratings highlight the Investment Grade (IG) and High Yield (HY) composition as the shade of blue in figures 12 and 13 show the allocation to IG assets while the shades of red summarize the HY assets. This configuration highlights that both BL and HYB MFs hold the large majority of their portfolios in HY assets, although a small share close to 6%

<sup>12</sup> It is not possible to subset only fixed-income and cash instruments in the Morningstar feed; however the allocation variables shown in Appendix C confirm that there is not a significant amount of cash offsetting BL and HYB funds fixed-income allocations. These charts are based on available data, without any interpolation of missing observations. In appendix B, we present alternative scenarios which follow different backfilling schemas to reduce the share of missing rating assets.

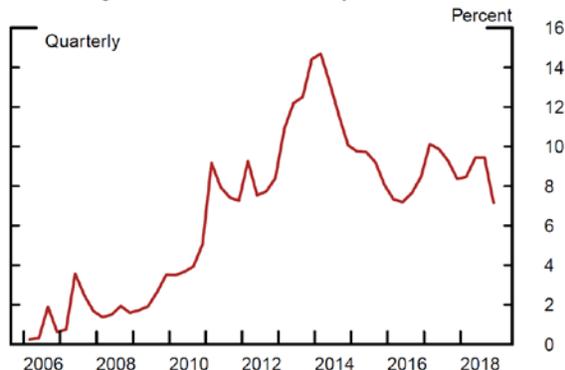
<sup>13</sup> This rating breakdown is performed using Morningstar's credit quality variables. Missing represent the share of AUM that were not classified by MD.

and 5% of their bond holdings are rated as IG at the end of 2018, respectively. The concatenation of ratings is used to construct market share estimates described in the next section.

**3.4 BL MFs held about 7% of LL outstanding while HYB MFs held roughly 16% of HY bond outstanding at the end of 2018.**

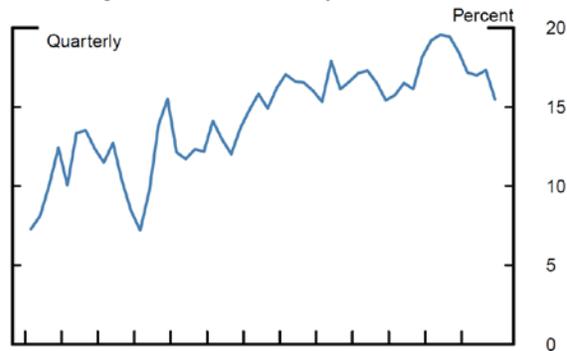
Key to the assessment of risks arising from BL and HYB MFs is understanding their market share in the underlying asset markets. Figures 14 and 15 show estimates of the share over time of BL and HYB outstanding held by the corresponding MF categories.<sup>14</sup> On balance, the percentage of BL and HYB MFs trends up through the sample. BL MFs, reached its peak in 2013 and since has fluctuated around 7 and 10 percent. Of note, in 2018 the BL percent was near 10 percent but dropped to 7 percent in the fourth quarter due to large redemptions in December.<sup>15</sup> Meanwhile, the share for HYB funds increased in the post-crisis period and is somewhat higher than the level observed for BL MFs, at 16 percent.<sup>16</sup>

Figure 14:  
Percentage of Bank Loans held by BL Mutual Funds



Note: Ratio is the assets of Bank Loans held by BL MFs to institutional leveraged loan outstanding.  
Source: Morningstar, Inc and Thomson Reuters LPC.

Figure 15:  
Percentage of HY Bonds held by HY MFs



Note: Ratio is the Assets of HY bonds held by HY MFs to HY bonds total outstanding. High yield CB outstanding includes unrated.  
Source: Morningstar, Inc and Mergent, Inc.

<sup>14</sup> For BL, these estimates are computed as the share of leveraged loans in BL MFs relative to the total assets of institutional leverage loans outstanding reported by S&P/LSTA by way of Thomson Reuters. A similar approach is applied to estimate the share of HY securities held by HYB MFs, where total HY corporate bond outstanding is from Mergent's FISD. Mergent, Inc. Fixed Investment Securities Database (FISD).  
Thomson Reuters LPC. Dealscan and LoanConnector, [http://www.loanconnector.com/loanconnector/LPC\\_LC2\\_SecurID.html](http://www.loanconnector.com/loanconnector/LPC_LC2_SecurID.html).

<sup>15</sup> CLOs have historically been the largest player in the institutional leveraged loan market.

<sup>16</sup> For more information see Appendix B, figures B.3 and B.4, where we create a range for these estimates.

## 4. Flow and Performance

The growth of BL and HYB MFs' AUM was driven by positive performance, strong inflows and new funds entering the sector in the post-crisis period. In particular, BL MFs experienced large net inflows, reaching a \$61.8 billion peak in 2013. Since then, net flows decreased substantially, with annual net outflows reaching almost 20 billion dollars in 2014 and in 2015. More recently, BL net flows have remained almost flat. Specifically, in 2018 annual net flows reached 0.2 billion dollars (figure 16). HY MFs show a similar pattern to BL MFs post-crisis and experienced large net inflows, with annual net flows reaching a 26.6 billion dollar peak in 2012, followed by strong outflows in the order of 18 and 13 billion dollars in 2014 and 2015, respectively. However, unlike BL MFs, in 2018 HY MFs experienced large net outflows close to 31 billion dollars.<sup>17</sup>

### *4.1. Flows as a share of assets have been larger and more volatile for BL than for HYB MFs.*

The monthly frequency data highlights that BL net flows as a share of total net assets (TNA) at times were substantial and volatile, with net outflows reaching between 5 to 11 percent of total AUM (figure 17). Though smaller in magnitude than BL flows, HYB fund net flows as a share of TNA were also volatile, with redemptions reaching their record high level of 4.4 percent of TNA around the Taper Tantrum in 2013.<sup>18</sup> Of note, BL and HYB MF flows tend to show different sensitivity to interest rate changes, as BLs generally benefit from interest rate hikes while HY bond performance is negatively affected by rising interest rates. The Taper Tantrum in May 2013 provides an illustration of the different effects of a monetary policy shock on the flows of these two investment categories. This event triggered notable outflows from HYB MFs, with monthly redemptions reaching 4.4 percent of TNA in June of 2013, equivalent to around \$11 billion in AUM. At the same time, as shown by figure 17, BL MFs experienced large net inflows in the order of 6% of TNA, totaling about 6 billion dollars. This event highlights the different effects of a change in the expected future benchmark interest rate on BL and HYB flows. Nevertheless, it is important to note that other types of shocks, such as credit shocks,

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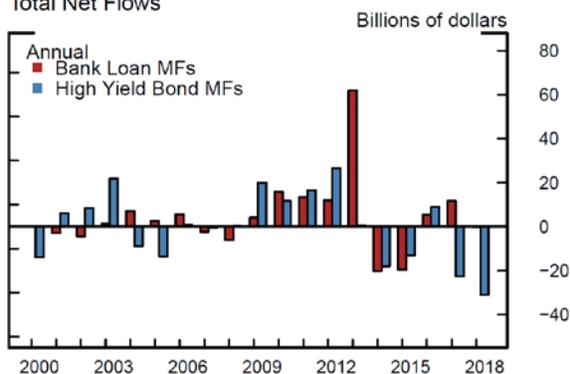
<sup>17</sup> Early 2019 data shows that these outflows rebound but remain negative on net.

<sup>18</sup> See appendix D, table 1, for the summary statistics of the underlying flow ratios depicted in figure 17.

could trigger different flow patterns and investor redemption behavior than the ones observed during the Taper Tantrum.

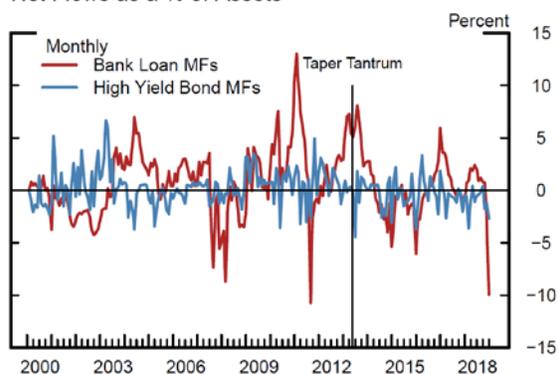
In addition, figure 17 shows some asymmetries between positive and negative net flows at times, with both BL and HYB positive net flows experiencing somewhat higher dispersion than net outflows over the sample period. Also, monthly data points to somewhat weak co-movements between BL and HYB MF flow ratios, with correlation close to 0.2 during the 2000-18 period.<sup>19</sup>

Figure 16:  
Total Net Flows



Source: Morningstar, Inc.

Figure 17:  
Net Flows as a % of Assets



Note: Values are calculated as the weighted sum of fund's flows for a given day divided by total assets of the share class universe (TNA) where the weight is the lag assets of the fund divided by the lag TNA.  
Source: Morningstar, Inc.

Figures 18 and 19 expand on figure 17 and provide further insights into the distribution of BL and HYB MF net flows. As shown by these figures, and based on fund level data, BL MFs generally experienced larger and more volatile flows than HYB MFs at the 25<sup>th</sup>, 50<sup>th</sup>, and 75<sup>th</sup> percentiles.

<sup>19</sup> Breaking the sample into the pre- and post-crisis period also suggests a low correlation between BL and HYB flows, at negative 0.04 and positive at 0.24 during the first and second half of the sample.<sup>20</sup> Appendix C presents BL and HYB MFs annual performance based on average returns.

Figure 18:  
Bank Loan Flows as a Percentage of Assets

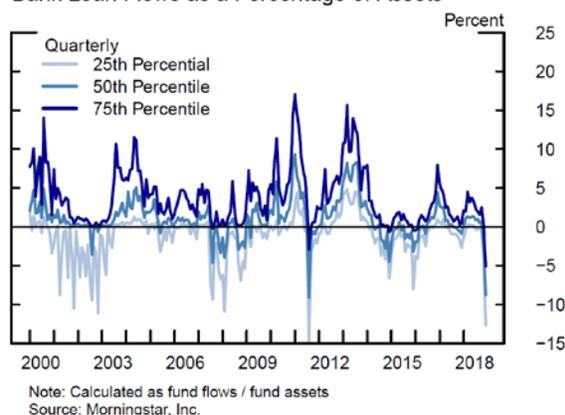
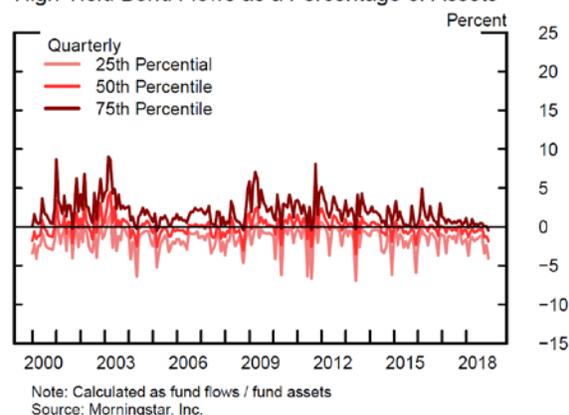


Figure 19:  
High Yield Bond Flows as a Percentage of Assets

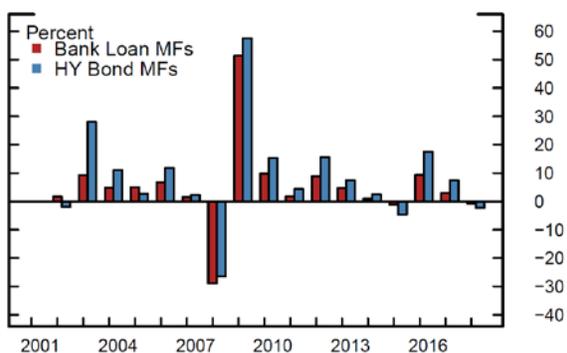


#### 4.2. HY MFs significantly outperformed bank loan MFs.

Figures 20 and 21 present BL and HY annual returns for widely used market benchmarks as well as returns for the MD universe of MFs. MF returns are net of fees and expenses and are weighted averages of the underlying fund level returns.<sup>20</sup> The benchmark returns considered are the Bank of America Merrill Lynch High-Yield Master II Total Return Index to track the performance of the HY market, and the S&P/LSTA US Leveraged Loan 100 B/BB Rating Index for BLs. In contrast with the MF returns, these benchmarks are in gross terms, without accounting for fees and expenses. As shown in figures 21, BL MFs have lagged HY MF performance for most of the calendar years covered in the analysis. Both investment strategies experienced their worst year in 2008, with BL MFs producing a negative 29 percent annual return, and with HY MFs delivering negative returns in the order of 27 percent. Following the burst of the crisis, performance rebounded strongly in 2009 with BL and HY MF returns reaching their highest levels at about 38 percent and 48 percent, respectively. In looking at the return correlation between BL and HYB MFs, monthly correlation increased notably in the post-crisis period (June 2009 to the end of year 2018) to 0.9, from 0.6 in the pre-crisis period (2000 to December 2007).

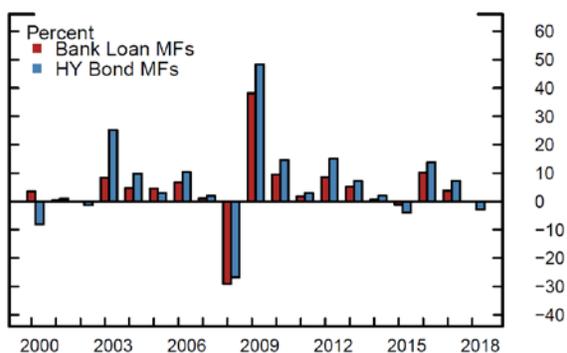
<sup>20</sup> Appendix C presents BL and HYB MFs annual performance based on average returns.

Figure 20:  
Annual Benchmark Returns



Note: Data starts in 2001.  
Source: Bloomberg Finance LP and FRED (ICE/BAML).

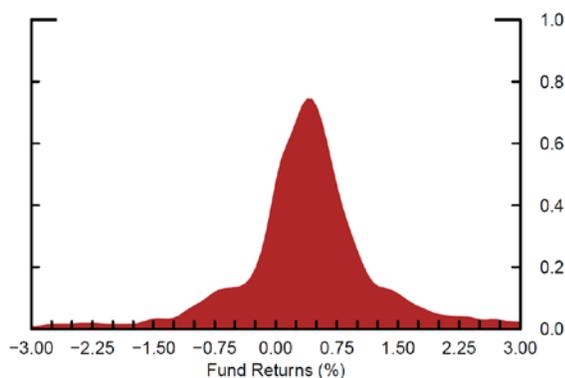
Figure 21:  
Annual Weighted Returns



Source: Morningstar, Inc.

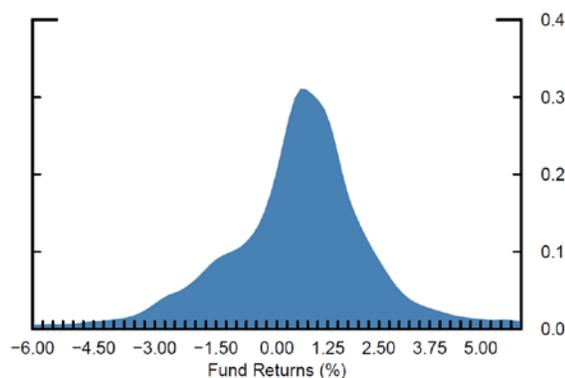
Moreover figures 22 and 23 illustrate the distribution of BL and HYB MF returns using fund level data, allowing us to also quantify tail risks. The figures suggest that the returns of HYB MFs are somewhat more negatively skewed than those of BL MFs.

Figure 22:  
Bank Loan Mutual Fund– Distribution of Returns



Source: Authors' calculations based on Morningstar Direct

Figure 23:  
High Yield Bond Mutual Fund– Distribution of Returns



Source: Authors' calculations based on Morningstar Direct

Summary statistics for monthly returns (shown in appendix D, table 2) also point to higher average returns from the HYB MF universe. This finding also holds when breaking the sample into the pre- and post-crisis periods. Also, results for the 5<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup> and 75<sup>th</sup> percentiles indicate that BL MF's monthly returns are smaller in magnitude than those experienced by HY funds across their distribution.

To further illustrate how BLs performed relative to HY bonds, figures 24 and 25 show the evolution of \$100 dollars invested in the BL and HY market portfolios, and on value-weighted

BL and HY MF portfolios that include all the funds in our MF universes. As depicted in figure 24, while \$100 invested in the BL benchmark at the end of 2001 delivered about \$200 at the end of 2018, \$100 invested in the HY benchmark returned close to \$350 over the same period. A similar pattern is observed when looking at the MF portfolios in figure 25, although in this case HYB MFs outperformance is somewhat dampened. This relative underperformance of BL funds is consistent with the lower volatility of BL MF returns.<sup>21</sup> Specifically, HYB MFs experienced higher return volatility on average than BL funds. Over the 2000-18 period, HYB fund monthly volatility stands at 2.2 percent on average, while that of BL is close to 1.3 percent.<sup>22</sup> In looking at the ability of both MF categories to beat their respective benchmarks, CAPM alphas are about flat for the universe of BL funds and slightly negative for HYB MFs, on average. CAPM betas also suggest that HYB MF performance is slightly more volatile than that of their respective market benchmark, on average. Conversely, BL CAPM betas indicate that, on average, BL MFs are somewhat less volatile than their market benchmark.

Figure 24:  
Market Benchmark Returns over time

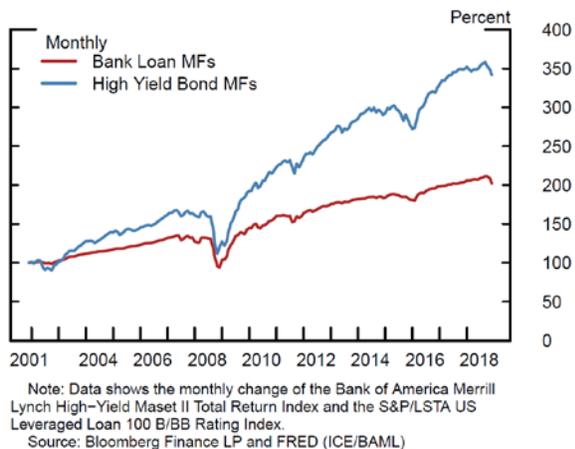
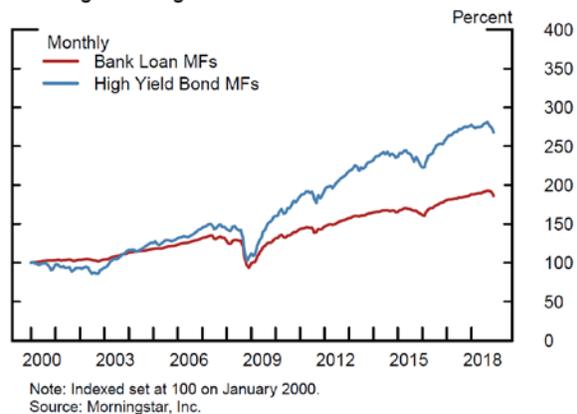


Figure 25:  
Morningstar Weighted Returns over time



Finally, a comparison of figures 24 and 25 also suggests that, especially in the case of HY MFs and after adjusting for fees, a passive approach to investment over our sample period, meaning

<sup>21</sup> Market commentary had also related BL MFs' lower returns relative to those of HYB funds to the negative convexity of bank loans, which can be callable at par at any time, and therefore their upside potential for price appreciation tends to be capped during bull markets.

<sup>22</sup> See appendix D, table 3, for details on these performance statistics.

investing in the market portfolio, generated more economic value than investing in a portfolio of funds that included our universe of BL and HY funds.

## **5. Concluding Remarks**

This note documents the characteristics and trends of mutual funds investing primarily in BL and HY bonds MFs over the 2000-18 period. We show that AUM of both BL and HY MFs grew at a strong pace during the post-crisis years, driven by positive performance, net inflows and new funds entering the high yield space. We also document that BL MFs have underperformed HY MFs over the period and that BL net flows as a share of assets have been larger and more volatile than those experienced by HY MFs.

Going forward, although HY MFs tend to be associated with lower liquidity risk and greater potential for price appreciation, BL MFs may continue to be an attractive alternative to investors seeking to minimize interest rate risk in the high yield space. This can be particularly relevant in the current context of monetary policy normalization by major central banks.

Future analysis could build on recent work on MF liquidity transformation and explore in detail the case of bank loan MFs, analyzing the potential price impact of large redemptions on investors' portfolios, as well as the financial stability implications at the aggregate level.

## Appendix A –Robustness of the Bank Loan and High Yield Mutual Fund Universe

Several checks validated the BL and HYB MF universe. First, in addition to the MD share class level data, MD provides aggregate numbers that summarize values for a specific investment category. In the first stage of testing the universe, the share class data was compared to MD’s monthly net asset aggregates. Next, the monthly total net BL and HYB fund assets were compared to Lipper and ICI assets to further ensure that share class data aggregated to a robust universe. Figures A.1 and A.2 present the total net asset comparison over time between MD, Lipper and ICI.<sup>23</sup> Note that Lipper asset aggregates are not available for the Bank Loan category. Overall, the universe of BL and HYB mutual funds tracks both ICI and Lipper data closely, validating and supporting our definition of BL and HY mutual fund universe.

Figure A.1:  
Morningstar and ICI and Bank Loan  
MFs Assets Comparison

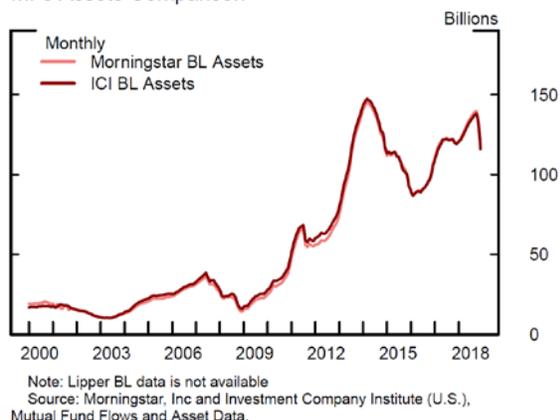
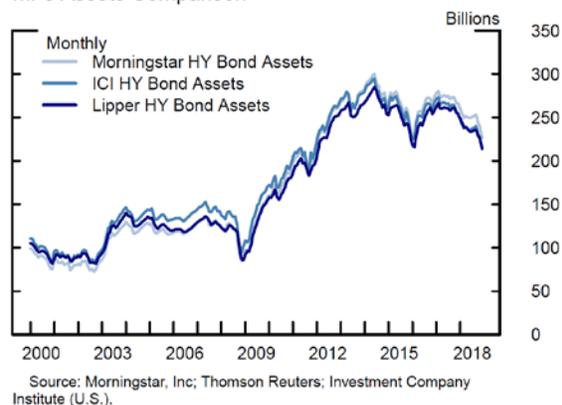


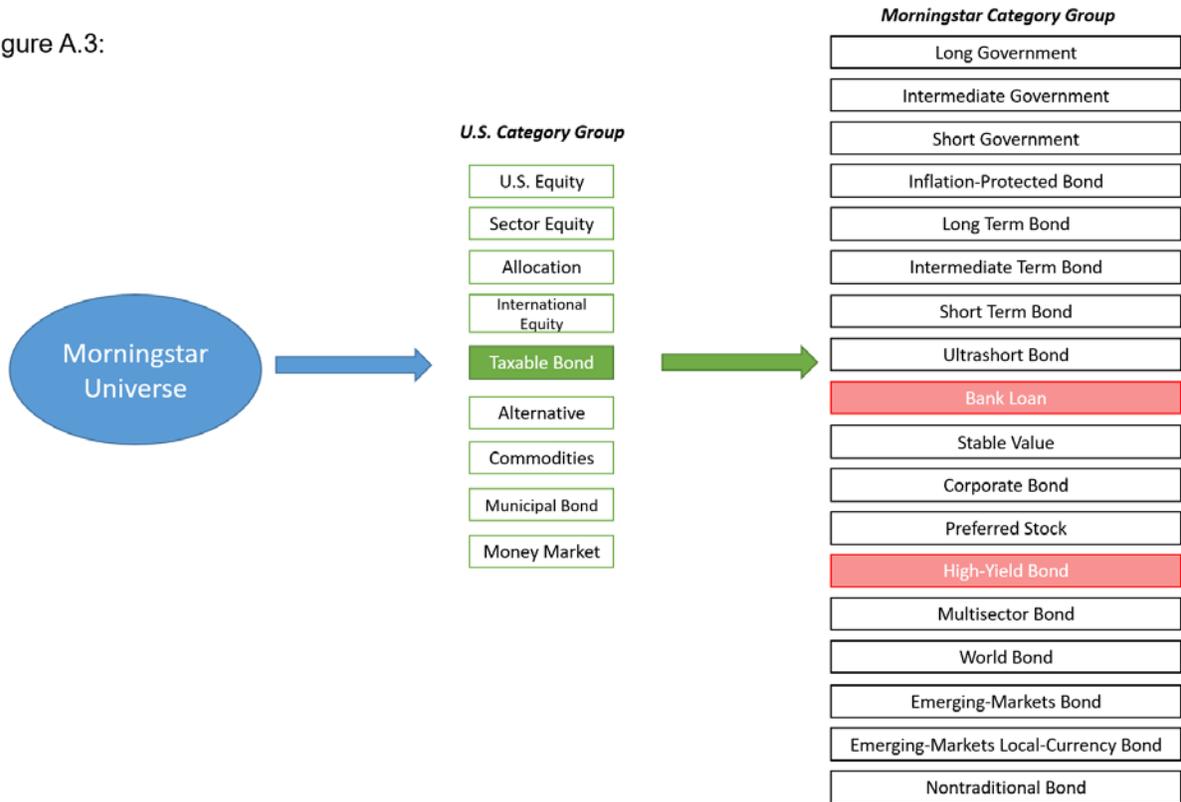
Figure A.2:  
Morningstar, ICI and Lipper High Yield Bond  
MFs Assets Comparison



Morningstar Direct reports MF data at several levels. The highest category used in this analysis is the “U.S. Category Group” that divides mutual funds into nine category groups. This analysis uses the “Taxable Bond” (TB) U.S. Category Group and specifically the “Bank Loan” (BL) and “High Yield Bond” (HYB) subsets of the TB category. These two categories are used to create the Bank Loan and High Yield Fund mutual fund universe. Figure A.3 shows the breakdown of the categories used in this sample.

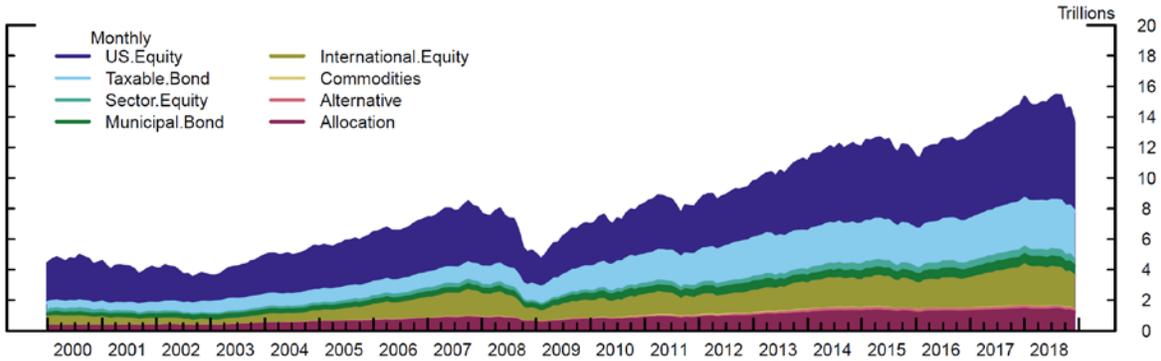
<sup>23</sup> Thomson Reuters. Lipper U.S. Fund Flows Data, <http://www.lipperusfundflows.com>.

Figure A.3:



The Morningstar Category, highlighted in Figure A.3, classifies funds based on their holdings. There are 123 Morningstar Categories that are mapped to nine U.S. Category Groups. To further understand how BL and HYB MFs fit in the universe, exhibits A.4-6 break down the Morningstar categories by assets. First, Figure A.4 shows the assets for each U.S. Category Group. On average, the taxable bond category comprises about 20 percent of the U.S. Category Group.

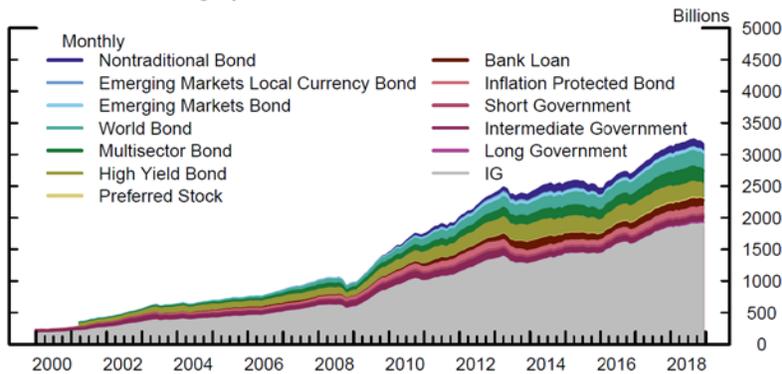
Figure A.4:  
U.S. Category Group Assets



Source: Morningstar, Inc.

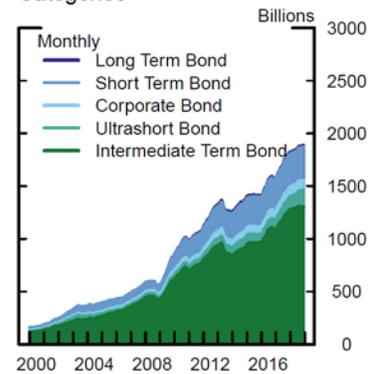
Within the TB category are 18 sub-categories including BL and HYB. Figures A.5 and A.6 show the breakdown of each of these categories. More specifically, figure A.6 shows the decomposition of the IG categories that are grouped as one category in figure A.5. On average, around 57 percent of the sample is IG bonds while BL and HYB make up 10 and 3 percent of the taxable bond category respectively.

Figure A.5:  
Taxable Bond Category Assets



Source: Morningstar, Inc.

Figure A.6:  
Investment Grade Bond Asset Categories



Source: Morningstar, Inc.

## Appendix B – Data Limitations

### *Addressing Missing Data*

For many of the holding and categorical variables, reported as percentages, MD only assigns these variables to fixed-income and cash instruments in a fund. It is not possible to subset only

fixed-income and cash instruments in the feed; however, the asset allocation breakdown (figures 6 and 7) show that there is not a significant amount of net cash offsetting the credit quality distributions.

In the main portion of the text only quarter values on March, June, September and December are considered. However, to the data was backfilled to test for missing data. Figures B.1-4 illustrate the credit quality breakdown using a lagged sample. In the lagged sample, the values for a quarter are backfilled by first carrying back from one month later and if this value is still incomplete, pulling the value of the month earlier. The goal of the lagging was to account for share classes that report their values on different quarter cycles than the traditional March, June, September and December.

Figure B.1:  
Bank Loan MFs Assets by Rating  
Lagged Sample

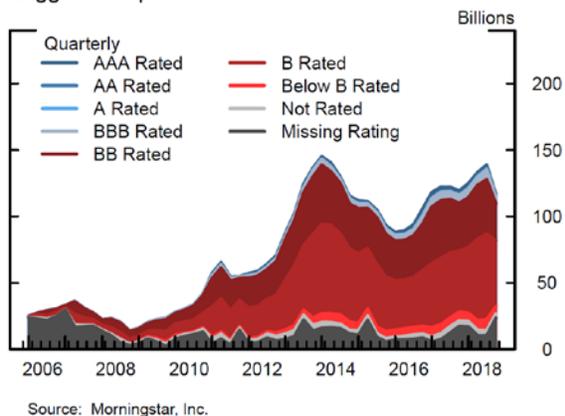
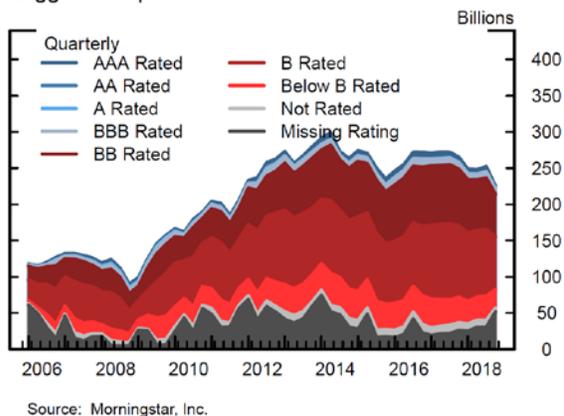


Figure B.2:  
High Yield Bond MFs Assets by Rating  
Lagged Sample



A similar methodology was then applied using a two-month lag but displayed minimal additions to the sample. Using the backfilled data, Figures B.3-4 shows an upper and lower bound of the share of LL and HY securities held by BL and HYB funds. The figures show the sample including a one-month and two-month backfill. Finally, Figure B.5 shows the corporate bond and leveraged loan outstanding series used in the calculation.

Figure B.3:  
Percentage of Bank Loans held by Leveraged Loans  
Lagged Sample

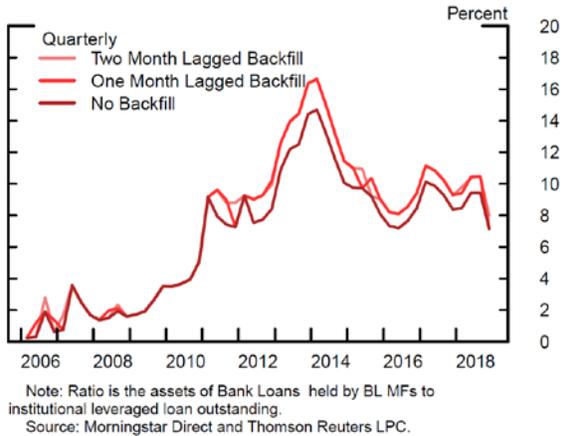


Figure B.4:  
Percentage of HY Bonds held by HY MFs  
Lagged Sample

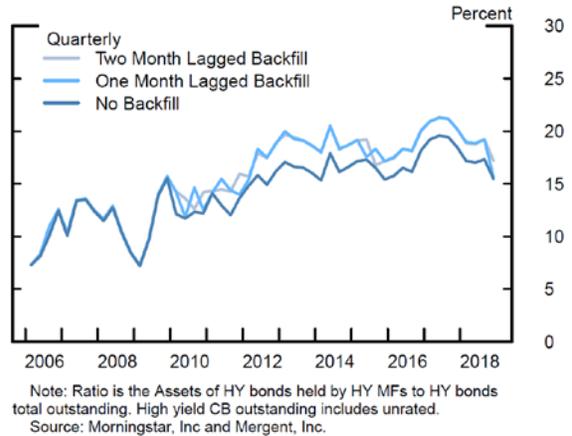
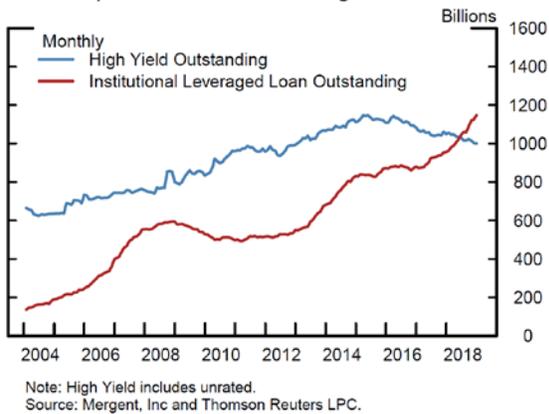


Figure B.5:  
Total Corporate Bonds Outstanding

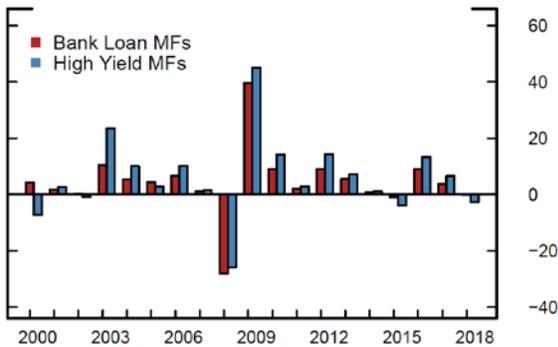


## Appendix C – Other Morningstar Variables and Analysis

### Returns

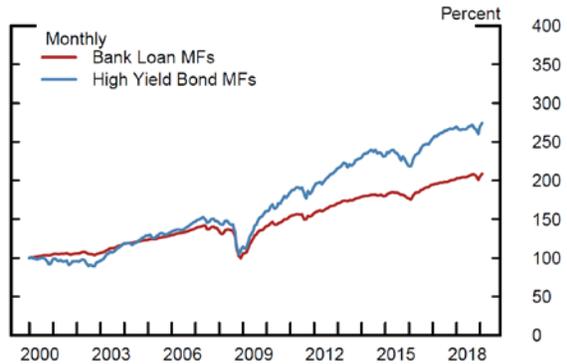
In addition to the weighted average returns present in the main text, the return series were constructed using a simple average at the investment category level that does not take into account the market share of each fund. Figures C.1 and C.2 depict annual average returns and performance indices for both BL and HYB MFs.

Figure C.1:  
Annual Average Returns



Source: Morningstar, Inc.

Figure C.2:  
Morningstar Average Returns over time

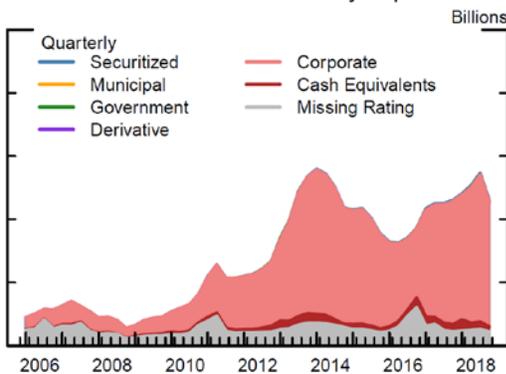


Note: Indexed set at 100 on January 2000.  
Source: Morningstar, Inc.

### Fixed-Income Categories

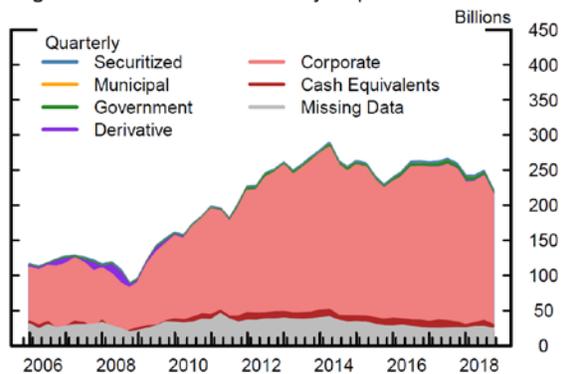
The main text of the analysis highlights the primary sector decomposition of BL and HYB MFs. However, there are several other fixed-income categories that further describe the BL and HYB mutual fund universe. Of note, each of these categories reports a net, long and short position. This analysis uses the net position in all position variables. In addition to the primary sectors, described in the main text of this analysis, the super-sector category consolidates the primary sectors into six categories. In these categories, the BL primary sector is mapped to the corporate super sector. The decomposition of these six fixed-income super sectors is displayed in figures C.3-4.

Figure C.3:  
Bank Loan Mutual Funds Assets by Super Sector



Source: Morningstar, Inc.

Figure C.4:  
High Yield Bond MFs Assets by Super Sector



Source: Morningstar, Inc.

## Appendix D – Summary Statistics

Table 1 presents asset class level summary statistics for BL and HYB MFs monthly net flows as a percentage of assets covering the period from 2000 to 2018. Columns 1 and 4 shows statistics for the entire time series. Columns 2 and 5 (inflows) are based on observations with positive net flows, while statistics in columns 3 and 6 are based on observations with negative net flows.

Table 1: Summary of Flows as a Percentage of Assets (Monthly)

	Bank Loan			High Yield Bond		
	Net	Inflows	Outflows	Net	Inflows	Outflows
Mean	0.72	2.70	-2.18	0.09	1.26	-1.26
Median.	0.56	2.30	-1.65	0.12	0.83	-1.11
Max	13.03	13.03	-10.75	6.67	6.67	-4.44
Min	-10.75	0.17	-0.01	-4.44	0.00	-0.01
Sd.	3.24	2.27	2.07	1.68	1.22	0.98

Source: Morningstar, Inc.

Table 2 shows monthly return summary statistics based on fund level data for the BL and HYB MF universes. The full sample period is from 2000 to 2018, pre-crisis from 2000 to December 2007, and post-crisis from June 2009 to the end of 2018.

Table 2: Summary of Returns (Monthly)

	Full Sample		Pre Crisis		Post Crisis	
	Bank Loan	High Yield Bond	Bank Loan	High Yield Bond	Bank Loan	High Yield Bond
Average Returns	0.32	0.46	0.34	0.44	0.40	0.60
5th Percentile	-1.6	-3.0	-1.2	-3.2	-1.1	-2.4
25th Percentile	0.0	-0.4	0.1	-0.5	0.0	-0.2
50th Percentile	0.4	0.6	0.5	0.8	0.4	0.6
75th Percentile	0.8	1.5	0.7	1.5	0.8	1.5

Source: Morningstar, Inc.

Table 3 depicts fund level CAPM alphas and betas, as well as the average standard deviation for BL and HYB MFs. Averaged statistics are first calculated at the fund level and then averaged across funds. Market benchmarks are the Bank of America Merrill Lynch High-Yield Master II

Total Return Index to track the performance of the HY market, and the S&P/LSTA US Leveraged Loan 100 B/BB Rating Index for BL MFs.

Table 3: Fund Level Performance (Monthly)

	Full Sample	
	Bank Loan	High Yield Bond
CAPM Alpha (average)	0.02	-0.04
25th Percentile	-0.02	-0.08
50th Percentile	0.02	-0.01
75th Percentile	0.07	0.05
CAPM Beta (average)	0.77	1.05
Stdv. (average)	1.30	2.15

*Source: Morningstar, Inc and Federal Reserve Bank of New York, Board staff calculations.*