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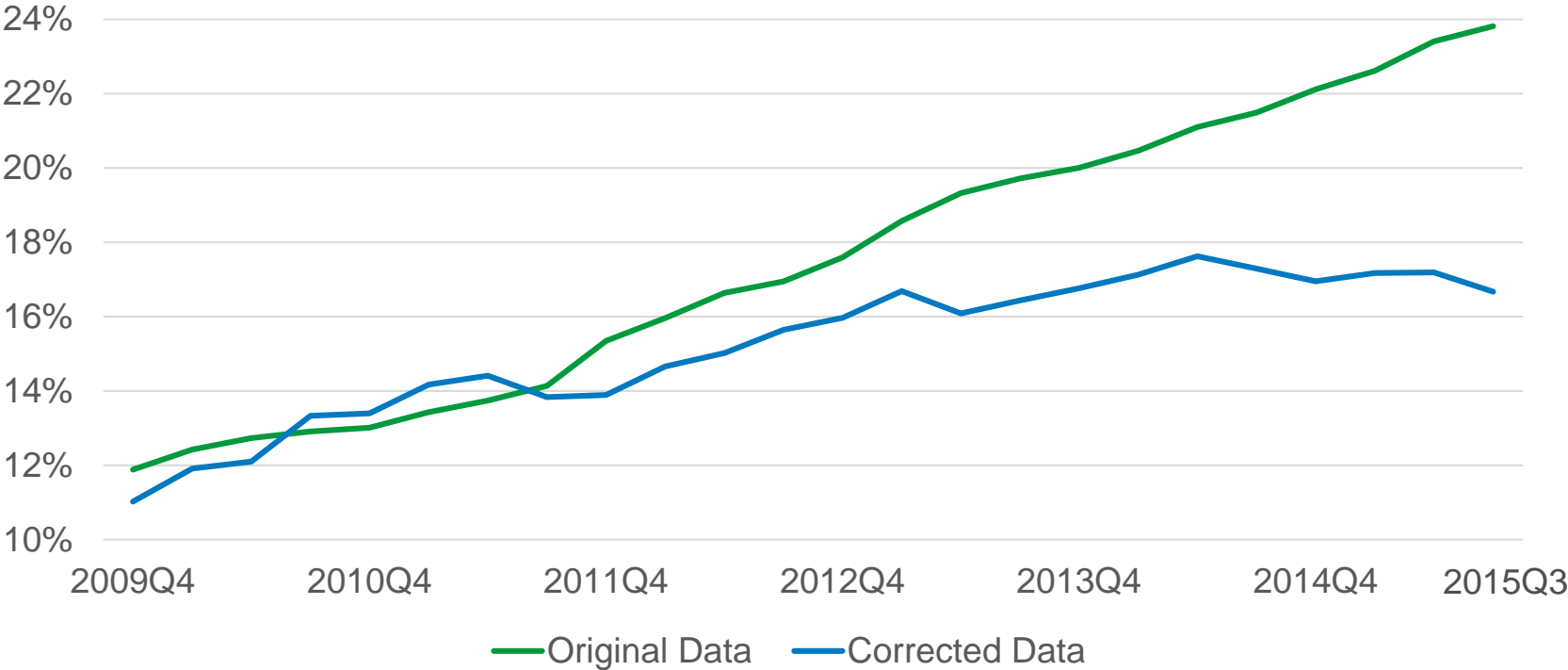
The Brookings Institution Liquidity in Financial Markets

Barbara Novick, Vice Chairman

November 15, 2016

Ownership of Bonds by Mutual Funds

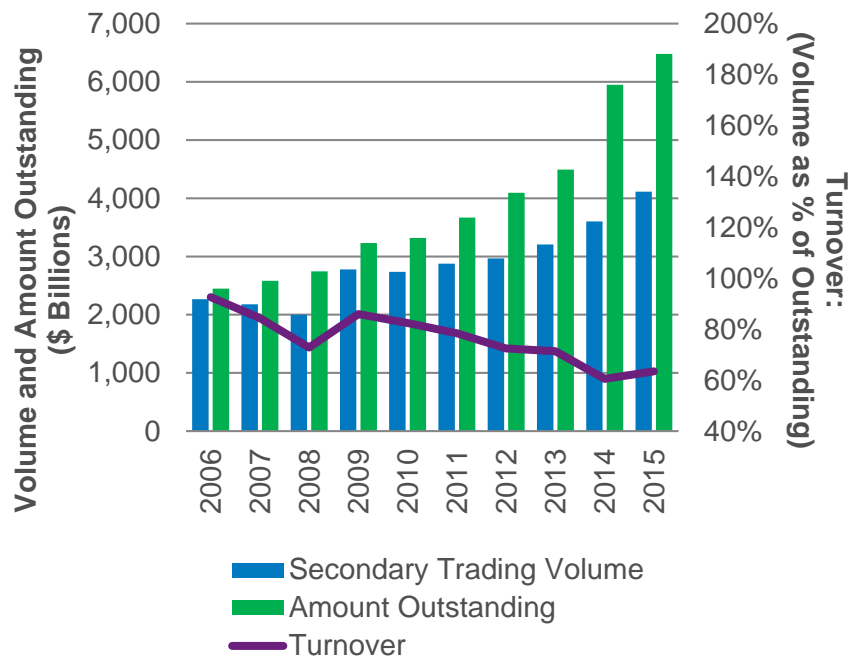
% of Corporate and Foreign Bonds Held by Open-End Mutual Funds



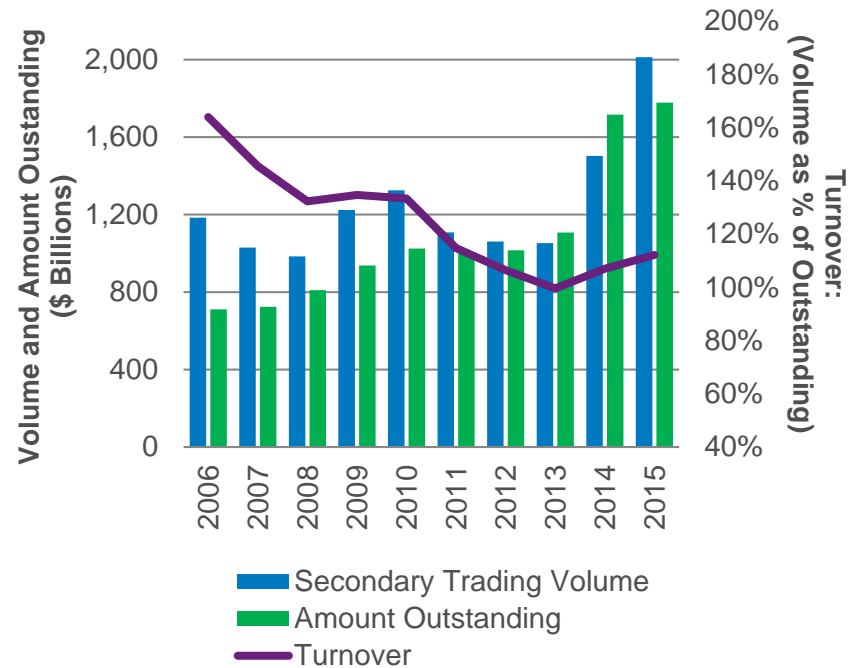
Source: Federal Reserve's Z.1 "Financial Accounts of the United States" Statistical Release. Original data from Dec. 2015 release. Corrected data from Sep. 2016 release. Chart includes quarterly data from fourth quarter 2009 through third quarter 2015 to illustrate corporate and foreign bond ownership by mutual funds following the 2008 Financial Crisis. Graphs represent total corporate and foreign bonds included in Fed Z.1 data.

Bond Turnover

US Investment Grade Volume, Outstanding, and Turnover



US High Yield Volume, Outstanding, and Turnover



Source: MarketAxess. As of Dec. 31, 2015.

Asset Owners in the Ecosystem

Asset Owners	
Asset Owner	Assets (\$ trillion)
Pension funds	\$33.9
Insurers	\$24.1
Sovereign wealth funds	\$5.2
Banks ^a	\$50.6
Foundations / Endowments ^b	\$1.4
Family Offices ^c	\$0.14 – \$0.42
High Net Worth Individuals (HNWI) ^d	\$52.4
Mass Affluent	\$59.5

Source (unless otherwise noted below): "Asset Management 2020: A Brave New World". PWC. Data as of 2012. PWC analysis based on data from various sources including Credit Suisse Global Wealth Data Book, SWF Institute, TheCityUK, OECD, and Insurance Europe. Available at <http://www.pwc.com/gx/en/asset-management/publications/pdfs/pwc-asset-management-2020-a-brave-new-world-final.pdf>. Some assets may be double counted.

a. Represents largest 25 Banks. Source: <http://www.relbanks.com/worlds-top-banks/assets>. As of 2013.

b. Source: McKinsey & Company. As of 2012.

c. Source: Cerulli estimates for US single-family offices. As of November 2011. Limited data available on family office assets.

d. HNWI's are defined as those having investable assets of US \$1 million or more, excluding primary residence, collectibles, consumables, and consumer durables.

Asset Owners Control Asset Allocation

FUNDfire

Pension Issues \$500M RFP in NEPC Emerging Mkts Rush

By Tim Sturrock July 29, 2014

The Wall Street Journal

As Yields Fall, Investors Turn to Alternative Assets

By Laurence Fletcher, Simon Clark, and Art Patnaude
October 23, 2016

Pensions & Investments

Illinois Teachers Trustees Approve \$1 billion in Asset Moves

By Christine Williamson October 31, 2014

Reuters

Calpers Dumps Hedge Funds Citing Cost, to pull \$4 billion Stake

By SVEA HERBST-BAYLISTT AND BARANI KRISHNAN Tue Sep 16, 2014

Financial Times

Insurers Move Towards Alternatives

By Chris Flood
May 5, 2014

Pensions & Investments

GPIF More than Doubles Equity Allocation, Slices Domestic Bonds

By Douglas Appell and Sophie Baker | October 31, 2014

Pensions & Investments

UTIMCO Ready to Invest \$1 Billion in Private Equity Real Estate

By Arleen Jacobs | October 1, 2014

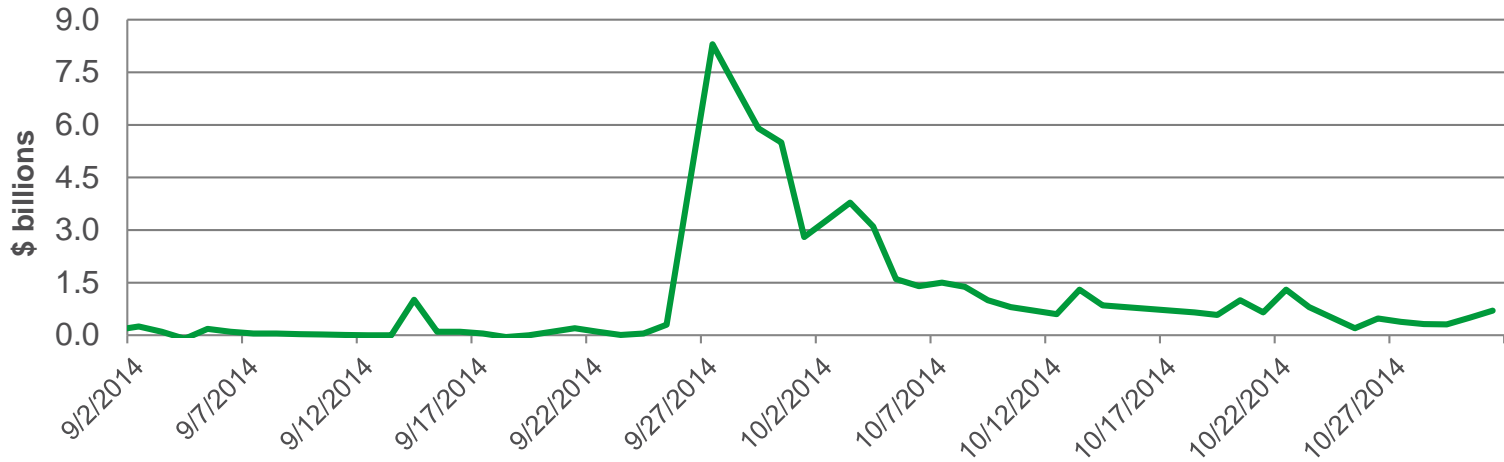
Bloomberg

Saudi Arabia Plans \$2 Trillion Megafund for Post-Oil Era: Deputy Crown Prince

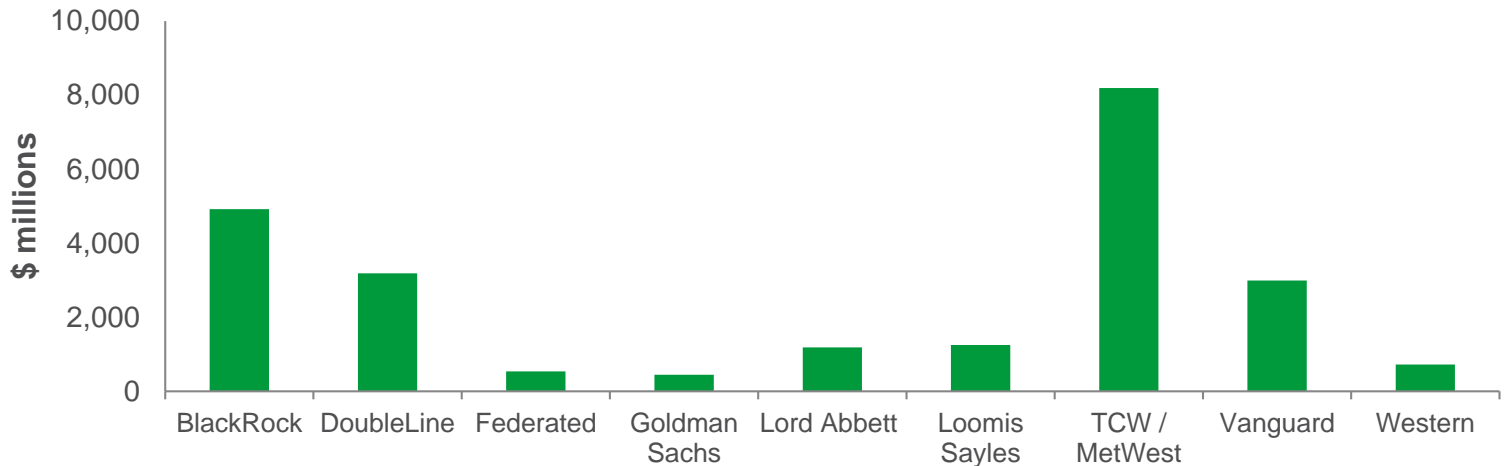
By John Micklethwait, Glen Carey, Alaa Shahine, and Matthew Martin | April 1, 2016

PIMCO Case Study: Asset Flows

PIMCO Total Return Fund Daily Outflows (Sep. 2 - Oct. 31, 2014)²

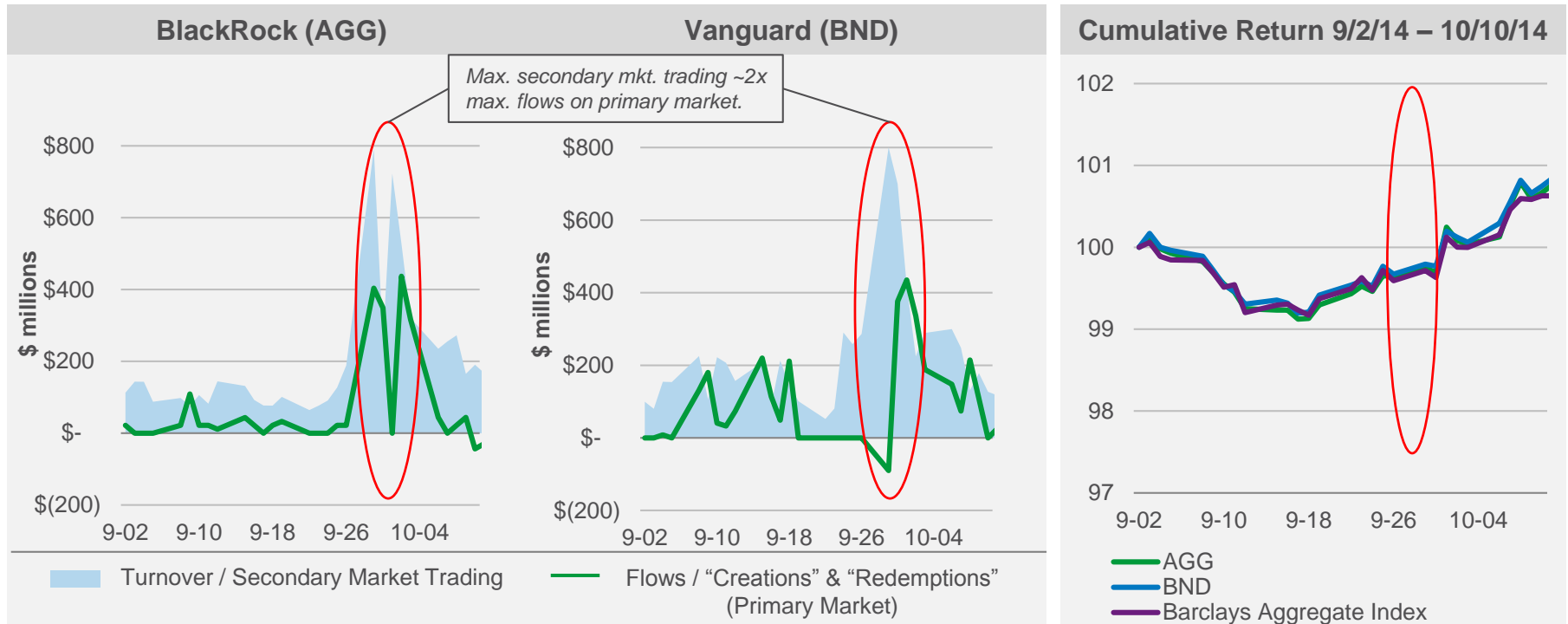


Flows for Selected '40 Act Mutual Funds (Sep. 26 - Oct. 31, 2014)¹



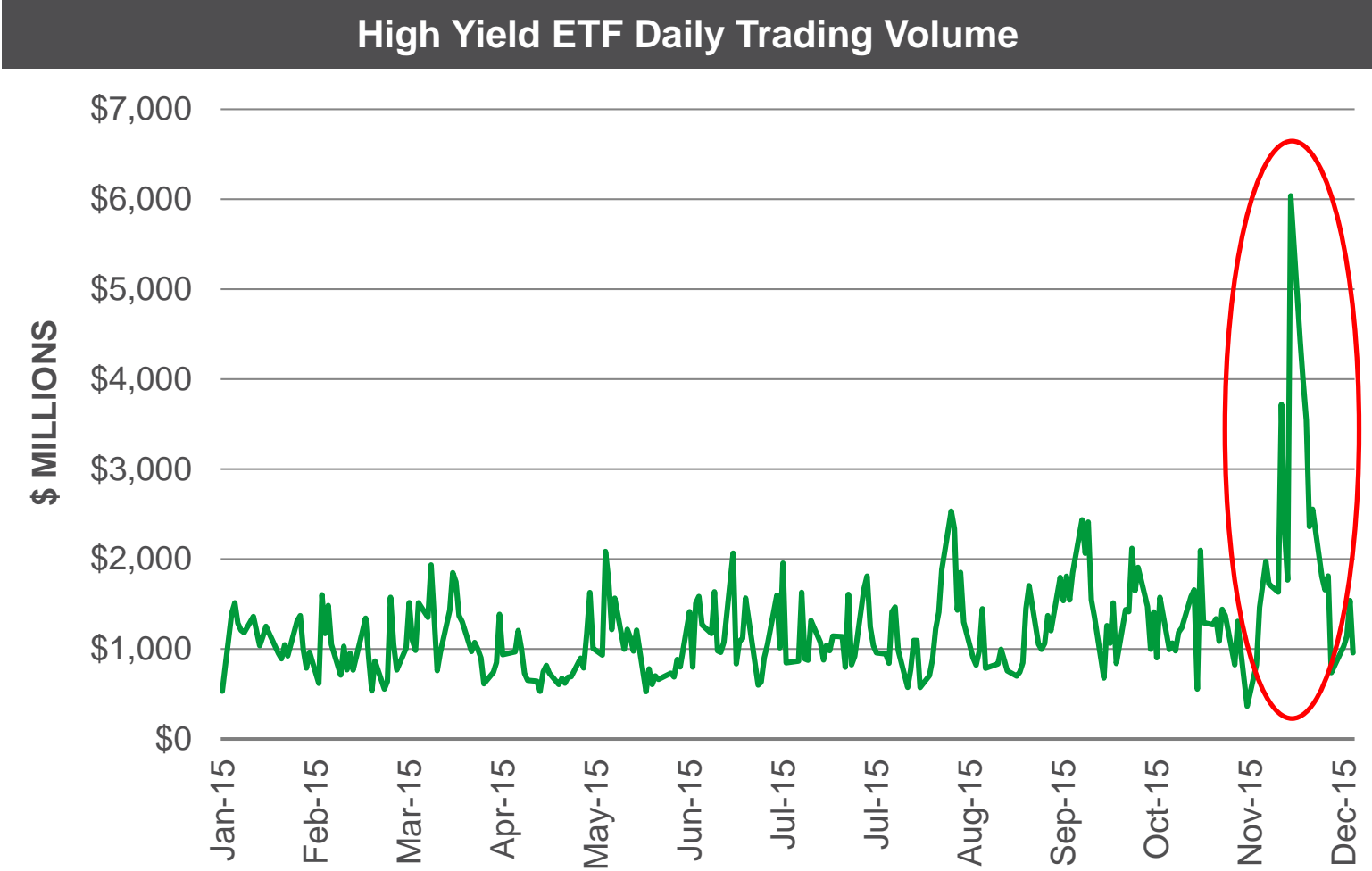
PIMCO Case Study: Bond ETFs

Index-Tracking ETFs Provide Liquidity and Price Discovery (Sep. – Oct. 2014)



Turnover is calculated as the aggregate notional value of each trade in a given day. Source: Bloomberg, iShares Global Business Intelligence. Past performance is no guarantee of future results. Case study shown for illustrative purposes only. This is not meant as a guarantee of any future result or experience. This information should not be relied upon as research, investment advice or a recommendation regarding the iShares Funds or any security in particular.

Third Avenue Case Study



Source: Bloomberg. As of Dec. 31, 2015. Represents average daily trading volume across all high yield fixed income ETFs.

Diversity of Bond Mutual Funds

Morningstar defines 49 different categories of dedicated open-end bond mutual funds in the US

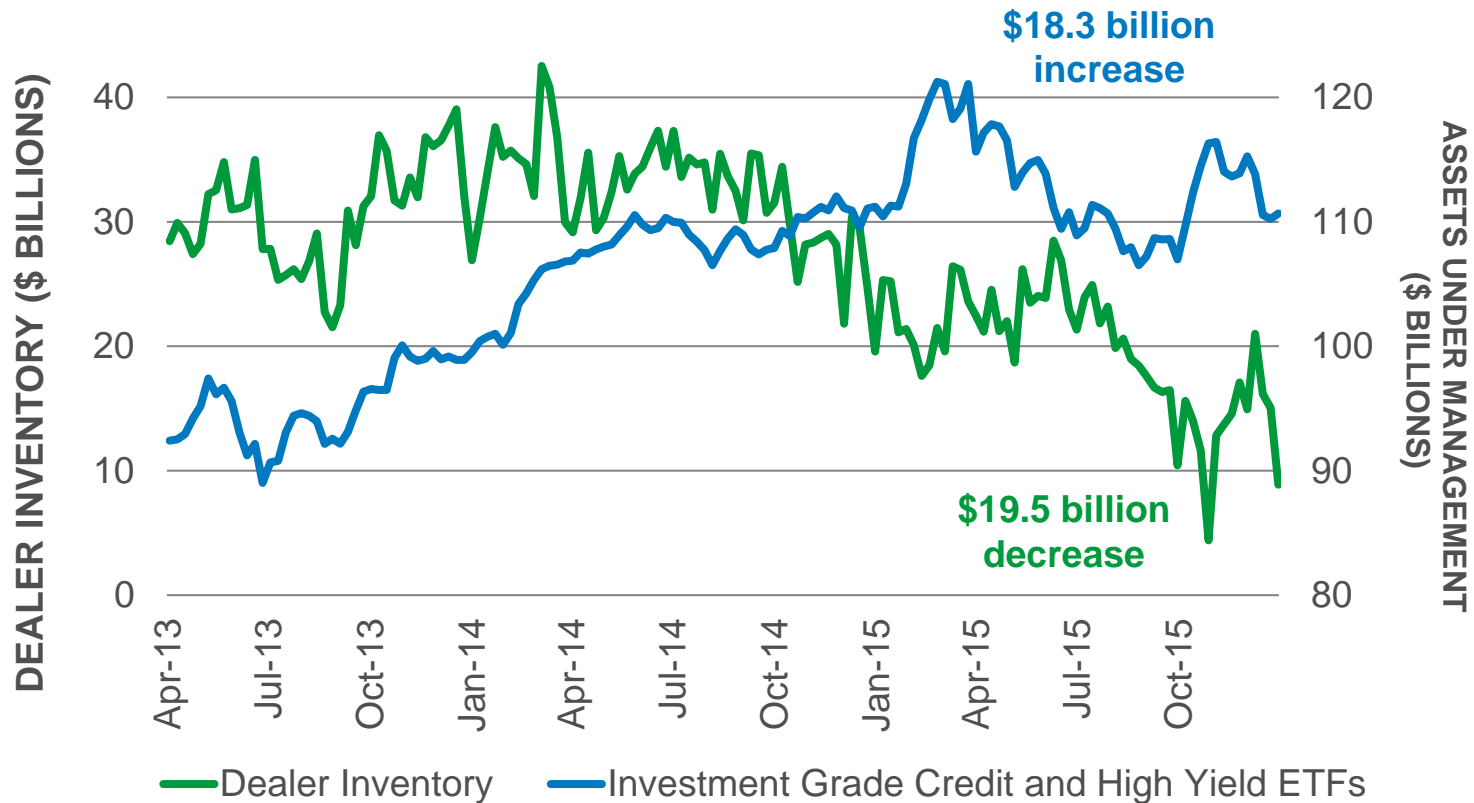
10 Largest US Open-End Bond Mutual Fund Categories

Morningstar Category	AUM (\$ millions)	% of total open-end bond fund AUM ¹
Intermediate-Term Bond	963,713	30.6%
Short-Term Bond	276,721	8.8%
High Yield Bond	232,229	7.4%
World Bond	197,838	6.3%
Multisector Bond	158,893	5.1%
Muni National Interterm	158,040	5.0%
Nontraditional Bond	132,134	4.2%
Muni National Short	114,925	3.7%
Intermediate Government	93,357	3.0%
Bank Loan	92,933	3.0%

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. 1) Total open-end bond fund AUM is the total AUM held in dedicated US open-end bond funds as defined by Morningstar. Total AUM is \$3.15 trillion as of Dec. 31, 2015.

Bond ETFs can be Additive to Liquidity

Corporate Bond Dealer Inventory and ETF AUM



Source: Dealer inventory data from the New York Federal Reserve as of Dec. 31, 2015. Includes Investment Grade and High Yield Corporate Bonds and Commercial Paper. Investment grade credit and high yield ETF AUM data from Bloomberg as of Dec. 31, 2015. Includes only US ETFs. There can be no assurance that an active trading market for shares of an ETF will develop or be maintained.

Market Liquidity ≠ Fund Redemption Risk

Strategies for Addressing Market Liquidity

- ▶ **Fixed income trading**
 - Smaller lot sizes
 - Increased use of electronic trading
- ▶ **Market structure modernization**
 - Encourage standardization
 - All-to-all venues
 - Expanded trading protocols
- ▶ **Evolution of new and existing products**
 - Transition management
 - ETFs as part of the solution

Strategies for Addressing Fund Redemption Risk

- ▶ **Portfolio construction**
- ▶ **Liquidity risk management**
- ▶ **Stress testing of individual funds**
- ▶ **Enhance fund “toolkits” globally**
- ▶ **Review investor disclosure**
- ▶ **Specify appropriate limits on illiquid securities and leverage**
- ▶ **Increased reporting requirements**
- ▶ **Enhanced supervision by securities regulators**

Market participants are adapting to changes in market liquidity

Important Notes

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