

## An Analysis of the Growth in the Fixed Income ETF Market

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### Abstract

Since the financial crisis, demand for fixed income ETFs has increased dramatically. An analysis of this market shows that most of the growth has occurred in ETFs covering U.S. Corporate Bonds, Global Bonds and Emerging Market Bonds. This rapid growth suggests that institutional investors have begun to use fixed income ETFs to achieve both strategic and tactical asset allocation goals. Changes in fixed income ETF volume are positively related to changes in the VIX, which suggests that investors are using fixed income ETFs to tactically shift into fixed income when the stock market becomes more volatile.

**Keywords:** ETF; Emerging Market bonds; Financial crisis; Stock market

### Introduction

Demand for bond ETFs has grown dramatically since the beginning of the financial crisis. This has continued despite growing concerns over rising interest rates. On the surface this seems to be a curious result; however it appears to be driven by post-financial crisis changes in the market microstructure. Increased regulation on bond dealers designed to lower risk and increase transparency has led bond dealers to decrease their inventories in the individual bond market. According to a study by Greenwich Associates, bond issuance is near record highs, but liquidity for individual bonds has declined despite portfolio managers maintaining steady asset allocations in bonds. It may be that the fixed income ETF market has picked up the slack to help clear the market.

In general ETFs have become popular with institutional investors due to ease of use, instant diversification, low trading costs, easy access, and superior liquidity [1-3]. As fixed income ETFs have become more popular these traits are becoming more predominant in this market as well. In this paper we seek to explain the rapid growth in fixed income ETF volume over the last five years.

Our results indicate that the number of fixed income ETFs has been increasing over period of July 2002 to July 2014. Further, most of the observed increase appears to have been sparked by the U.S. financial crisis beginning in 2007. Many of the ETFs created focus on U.S. markets, which is consistent with institutional investors beginning to use fixed income ETFs strategically as part of the fixed income core in a core-satellite strategy. There is also considerable interest in foreign fixed income as well. This should not be surprising since it is not unreasonable to expect institutional investors to begin chasing more attractive yields in other markets given the relatively low yields available in the U.S. market. As tactical tools, both global and emerging market ETFs provide diversified access to higher yield markets without requiring tremendous expertise in security selection. This becomes valuable as investors venture into new markets in search of higher yields and superior diversification.

The analysis of fixed income ETF volume indicates that volume has been increasing over the sample. In fact, fixed income ETF volume roughly doubled over the one year period between July 2008 and July 2009, which corresponds to the U.S. financial crisis. The trend of increasing interest continues throughout the period. Finally, our regression result indicates a positive link between VIX changes and volume changes. This suggests that uncertainty helps to drive interest in fixed income ETFs.

### Background

Historically, fixed income ETFs have not been popular with institutional investors due to perceptions of low liquidity, non-traditional fee structures, and lack of inclusion in investment policy statements. The portfolio management applications are expected to be similar to equity ETFs. ETFs have been useful tools for supporting portfolio rebalancing, manager transitions, cash equitizations, low-cost core exposure in strategic asset allocations, and tactical adjustments such as seeking broad exposure to certain sectors, markets or countries. The ability to make quick portfolio adjustments and gain broad exposures at relatively low transactions costs has been a big driver in the equity ETF market. In the fixed income environment, ETFs allow for index-based exposure to global markets, emerging markets, U.S. corporate bond markets, and U.S. Treasury bond markets at low transaction costs and minimal bid-ask spreads. As transaction costs continue to fall due to competition and liquidity continues to rise due to increased demand, fixed income ETFs will likely grow in popularity for institutional investors. According to data from Morningstar, the average expense ratio for fixed income ETFs was 0.40% at the end of 2013.

As a result of the financial crisis, fixed income dealers have faced new regulations designed to decrease risk and increase transparency. This has made market making in fixed income more expensive and has led to dealers decreasing positions in individual bond inventory [4]. As a result the individual bond market has become less liquid since the financial crisis. Agrawal et al. [5] demonstrate that the liquidity of fixed income ETFs has increased dramatically over the last 5 years. In fact, they show that 5 of the 10 most liquid ETFs are fixed income based. This is consistent with a hypothesis that the ETF market is providing liquidity in the secondary market for fixed income securities.

### Data and Methodology

We gather fixed income ETF data from Morningstar Direct. Morningstar identifies a total of 220 fixed income ETFs. For each of the

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220 funds, we collect data on the year of inception, the ETF category, the ETF firm name, the objective of the ETF as given in the prospectus, and the daily volume of each ETF since its inception. The first fixed income ETF in our sample is July of 2002 and our sample ends in July of 2014. Our sample includes all fixed income ETFs that trade on a U.S. exchange, regardless of the focus of the ETF<sup>1</sup>. This results in 5,330 daily volume observations.

We aggregate the daily volume of all ETFs in the sample at the calendar month level. Thus, in our analysis, we have one observation per month over the sample period. Monthly aggregation helps to avoid the noise inherent in daily data. Monthly fixed income ETF volume data is then merged with monthly average VIX levels from CBOE. The VIX index is referred to as the “fear index” by Whaley [6,7] and is used to measure uncertainty in Nikkinen et al. [8] and Bialkowski et al. [9], among others. Nikkinen and Sahlstrom [10], Chen and Clements [11], Vahamaa and Aijo [12], Krieger et al. [13] and Krieger et al. [14] examine FOMC and ECB rate decisions and document VIX declines on FOMC meeting days in the U.S. market. VIX declines following rate decisions are associated with lower uncertainty, further establishing VIX as an uncertainty proxy.

In order to identify trends in the popularity of fixed income ETFs and to better understand such trends, we focus on three areas of analysis. First, we identify the number of fixed income ETFs which are created per year over our sample. This allows us to determine if the number of funds has significantly changed over time and if so what time periods are most associated with such changes. Second, we examine fixed income ETF volume over our sample period. Similar to our analysis on the number of ETFs, this allows us to determine if there are any trends in the relatively popularity of fixed income ETFs over the period examined. Third, we conduct a regression in which change in (log) fixed income ETF volume is the dependent variable and change in VIX is the independent variable. This allows us to establish the relation between equity market uncertainty and participation in fixed income ETFs. Changes in volume and VIX are preferable to levels as the levels are non-stationary<sup>2</sup>. In addition to changes in the level of VIX, we also examine changes in risk aversion and uncertainty which are decomposed from VIX following Bekaert et al. [15] and Bekaert and Hoerova [16]. Specifically, we run a regression in which realized volatility is the dependent variable and lagged squared VIX and lagged realized volatility are the independent variables. The fitted values from this regression are then used as the measure of uncertainty while the difference between squared VIX and uncertainty is the measure of risk aversion. This decomposition is potentially important as increased fixed income ETF volume may have been in part driven by a flight to safety during the financial crisis<sup>3</sup>. Finally, in addition to examining the changes in ETF volume we also examine the unexpected volume as in Bessembinder and Seguin [17] and Andersen [18] where the measure is derived following Bessembinder and Seguin [17]. Robust standard errors or Newey-West [19] standard errors are used in all regressions.

Our regressions take the form:

$$\% \text{ Change in Volume}_t = \alpha + \beta \% \text{ Change in VIX}_t + e_t \quad (1)$$

Where % Change in Volume (% Change in VIX) is the first difference of monthly ETF volume (VIX) scaled by volume (VIX) in period t-1. In additional specifications, we add % Change in UN and % Change in RA which is the monthly percent change for uncertainty and

<sup>1</sup> Our results are robust to only including U.S. fixed income focused firms.

<sup>2</sup> The Dickey-Fuller test is able (unable) to reject the null of a stationary time series for VIX (ETF Volume). Nonetheless, both series are persistent and the use of levels may induce spurious correlation.

<sup>3</sup> We thank an anonymous referee for this suggestion.

risk aversion, respectively, following the methodology discussed above. Finally, in Table 6, the dependent variable is Unexpected Volume which is derived following the methodology discussed above.

## Results

In Table 1 we report the number of ETFs created in each year of the sample. The first fixed income ETF identified in the Morningstar database is in 2002 which is associated with six new fixed income ETFs. From 2003 to 2006, only three more fixed income ETFs were created. Thus, such ETFs remained very rare until 2007. In 2007, which corresponds with the first year of the U.S. recession, 27 fixed income ETFs were created. This suggests that the crisis may have spurred investor interest in such ETFs. In 2008, only eight fixed income ETFs were created, however, from 2009 to 2013 more than 20 fixed income ETFs per year were created<sup>4</sup>. Overall, Table 1 indicates that fixed income ETFs have become relatively more popular over time and the financial crisis may be related to the spike in this interest.

Table 2 presents a breakdown of ETFs by category as determined by Morningstar. Perhaps not surprisingly, U.S. fixed income is the most popular category with 125 ETFs (roughly 57% of the sample). Global fixed income is the second most common category with 30 ETFs (roughly 14% of the sample) with Emerging Markets fixed income and High Yield fixed income each comprising roughly 10% of the sample. Thus, while demand for exposure to U.S. fixed income appears to be higher over the sample period, there is evidence of considerable interest in foreign fixed income as well. This is consistent with the suggested pattern that institutional investors are beginning to use bond ETFs to satisfy core elements of a strategic asset allocation by using U.S. corporate bond ETFs to satisfy the core portion of a domestic fixed income portfolio. This is consistent with Agrawal and Borgman [20].

<sup>4</sup> We note that 2014 data is only for roughly one half of the year.

Year	# of New Fixed Income ETFs
2002	6
2003	2
2004	0
2005	0
2006	1
2007	27
2008	8
2009	26
2010	22
2011	34
2012	36
2013	39
2014	19
Total	220

**Table 1:** New Fixed Income ETFs by Year. This table presents the number of new fixed income ETFs by year. The reported value includes all ETFs traded on US exchanges.

ETF Category	N	%
Emerging Markets Fixed Income	22	10
Global Fixed Income	30	13.64
High Yield Fixed Income	21	9.55
Inflation Linked	12	5.45
Other Fixed Income	10	4.55
US Fixed Income	125	56.82
Total	220	100

**Table 2:** ETF Categories. This table presents the number of ETFs by category as well as the percent of the sample represented by each category.

It also demonstrates that as portfolio managers begin to seek yield in global and emerging markets, bond ETFs are being used as tactical vehicles to gain exposure in higher yielding asset classes. ETFs allow managers to gain this exposure with little expertise in asset selection in these asset classes.

In Table 3 we present the number of ETFs by firm name. iShares is the most common ETF firm with 62 funds (roughly 28% of the sample). State Street's SPDR, Guggenheim Investments and PIMCO are the next most common firms each ranging from roughly 13% of the sample to roughly 9% of the sample.

Morningstar provides data on the objective of each ETF as stated in the prospectus. We present the summary statistics of this data in Table 4. We find that corporate bond ETFs (general, high quality, and high yield) collectively comprise roughly 22% of the sample. Government bond ETFs (general, mortgage, and treasury) also collectively make up roughly 22% of the sample – where the vast majority of ETFs focus on treasuries. There are 52 ETFs which list Income as the objective in our sample which is roughly 24% of the sample.

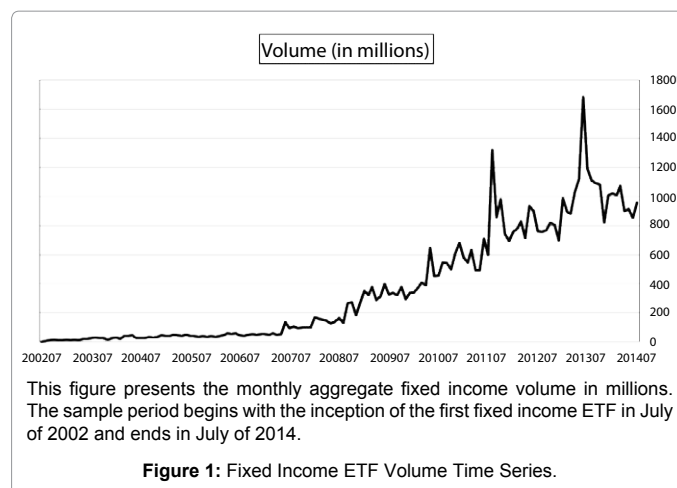
While Tables 1 through 4 documents the relative popularity of fixed income ETFs and their characteristics, we now turn to evidence on fixed income ETF volume. Figure 1 presents monthly aggregate fixed income ETF volume over the period July 2002 to July 2014. Consistent with the lack of such ETFs documented in Table 1, Figure 1 shows very low volume through 2007. Volume does pick up in 2007 with the introduction of many new ETFs, but remains very low. However, from July of 2008 to July of 2009 fixed income ETF volume nearly doubles from just under 200 million shares to roughly 400 million shares per month. This one year period corresponds with an increase in fixed income ETFs and the U.S. financial crisis which may have well spurred the popularity of such funds. The pattern of increasing volume continues over the remainder of the period with the last observation in

Firm Name	N	%
ALPS	1	0.45
AdvisorShares	5	2.27
Columbia	1	0.45
Deutsche Bank	1	0.45
Direxion Funds	1	0.45
ETF Advisors Trust	2	0.91
Egshares	3	1.36
First Trust	3	1.36
Flexshares Trust	3	1.36
Franklin Templeton Investments	1	0.45
Global X Funds	2	0.91
Guggenheim Investments	24	10.91
Highland Funds	1	0.45
Market Vectors	9	4.09
PIMCO	19	8.64
PowerShares	14	6.36
PowerShares DB	3	1.36
ProShares	5	2.27
State Street's SPDR	28	12.73
Schwab ETFs	4	1.82
Vanguard	15	6.82
WisdomTree	13	5.91
iShares	62	28.18
Total	220	100

**Table 3:** ETF Firms. This table presents the number of ETFs for each firm in the sample as well as the percent of the sample represented by each firm.

Objective	N	%
Corporate Bond - General	21	9.55
Corporate Bond - High Quality	6	2.73
Corporate Bond - High Yield	22	10
Diversified Emerging Markets	1	0.45
Equity-Income	2	0.91
Government Bond - General	8	3.64
Government Bond - Mortgage	4	1.82
Government Bond - Treasury	38	17.27
Growth	5	2.27
Growth and Income	14	6.36
Income	52	23.64
Multi-sector Bond	3	1.36
Municipal Bond - National	4	1.82
Specialty - Financial	2	0.91
Specialty - Unaligned	1	0.45
Specialty - Utility	1	0.45
Worldwide Bond	36	16.36
Total	220	100

**Table 4:** ETFs by Objective. This table presents the number of ETFs by objective as listed in the prospectus as well as the percent of the sample represented by each objective.



**Figure 1:** Fixed Income ETF Volume Time Series.

July of 2014 indicating volume of roughly 1,000 million shares. Overall, Figure 1 demonstrates the increase in popularity of fixed income ETFs in the sample period.

While Figure 1 presents evidence consistent with an explanation of the U.S. financial crisis driving interest in fixed income ETFs, the evidence remains circumstantial. Our proxy for the relative uncertainty in the market is the VIX index. In particular, Table 5 present results for a regression in which the dependent variable is the percent change in monthly (log) fixed income ETF volume and the independent variable is the percent change in VIX. If the crisis, and in general uncertainty, drive fixed income ETF volume we would expect a positive relation between changes in VIX and changes in ETF volume. Consistent with this explanation, the percent change in VIX is positively related to changes in ETF volume (significant at the 1% level) in our sample of 141 months for which ETF volume and VIX data is available. Thus, the popularity of fixed income ETFs and uncertainty are positively related. In the third specification, we decompose VIX into uncertainty and risk aversion following Bekaert, Hoerova and Lo Duca [15] and Bekaert and Hoerova [16]. This allows us to determine if uncertainty is indeed driving the observed relation or if there is a flight to safety

	% Change in Volume	% Change in Volume	% Change in Volume
% Change in VIX	0.021***, (0.006)	0.021***, (0.007)	
% Change in UN			-0.015***, (0.003)
% Change in RA			0.011***, (0.002)
Constant	0.002*, (0.001)	0.002*, (0.001)	0.002*, (.001)
Newey-West	No	Yes	Yes
N	141	141	141
R^2	0.08	0.08	0.21
F	11.51	11.51	18.65

**Table 5:** Change in Volume Regression. This table presents regression results for a specification in which the percentage change in aggregate fixed income ETF volume is the dependent variable and lagged VIX change is the independent variable in the first and second specifications. The third specification decomposes changes in VIX into changes in UN (uncertainty) and RA (risk aversion), respectively following the methodology of Bekaert, Hoerova and Lo Duca [15] and Bekaert and Hoerova [16]. Robust standard errors are reported in parentheses in the first specification and Newey-West standard errors are reported in the third specification. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

	Unexpected Volume	Unexpected Volume	Unexpected Volume
% Change in VIX	0.424***, (0.108)	0.424***, (0.135)	
% Change in UN			-0.280***, (0.058)
% Change in RA			0.223***, (0.040)
Constant	-0.003, (0.020)	-0.003, (0.017)	-0.006, (.018)
Newey-West	No	No	Yes
N	141	141	141
R^2	0.10	0.10	0.24
F	15.29	15.29	21.07

**Table 6:** Excess Volume Regression. This table presents regression results for a specification in which the unexpected aggregate fixed income ETF volume is the dependent variable and lagged VIX change is the independent variable in the first and second specifications. The third specification decomposes changes in VIX into changes in UN (uncertainty) and RA (risk aversion), respectively following the methodology of Bekaert, Hoerova and Lo Duca [15] and Bekaert and Hoerova [16]. Robust standard errors are reported in parentheses in the first specification and Newey-West standard errors are reported in the third specification. \*\*\*, \*\*, and \* denote significance at the 1%, 5%, and 10% levels, respectively.

during the financial crisis where the latter would be consistent with a positive relation between risk aversion and ETF volume. We find that uncertainty (risk aversion) is negatively (positively) related to ETF volume indicating that a flight to safety is driving the observed relation.

Table 6 replicates Table 5 except that the dependent variable is unexpected volume. As mentioned previously, ETF volume is highly persistent and using levels is therefore not preferable. Thus, in Table 6 we follow the literature [17,18] in constructing a measure of unexpected volume which is then used as the dependent variable in our regression. The results in Table 6 are qualitatively identical to those in Table 5 which indicates that our results are driven by the measurement of ETF volume.

## Conclusion

Overall, our results document the increasing popularity of fixed income ETFs over the period of July 2002 to July of 2014. The number of such funds increases dramatically following the start of the U.S. financial crisis in 2007. Similarly, fixed income ETF volume is increasing over the period and is positively related to VIX. Collectively our results support the notion that increasing uncertainty in the market has helped to spur interest in fixed income ETFs.

In addition there appears to be anecdotal evidence that the dramatic increase in liquidity in fixed income ETFs in the last five years is driven by an increase in demand by institutional investors. Based on the growth in the ETF market, it appears this demand is specifically targeting U.S. Corporate Bonds for core portfolio exposure and Global Bonds, Emerging Market Bonds and High Yield Bonds for tactical shifts in the portfolio.

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