

# Hedging Credit Bond Tail Risk with VIX Futures

Global Research & Design  
S&P Dow Jones Indices

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**S&P Dow Jones  
Indices**

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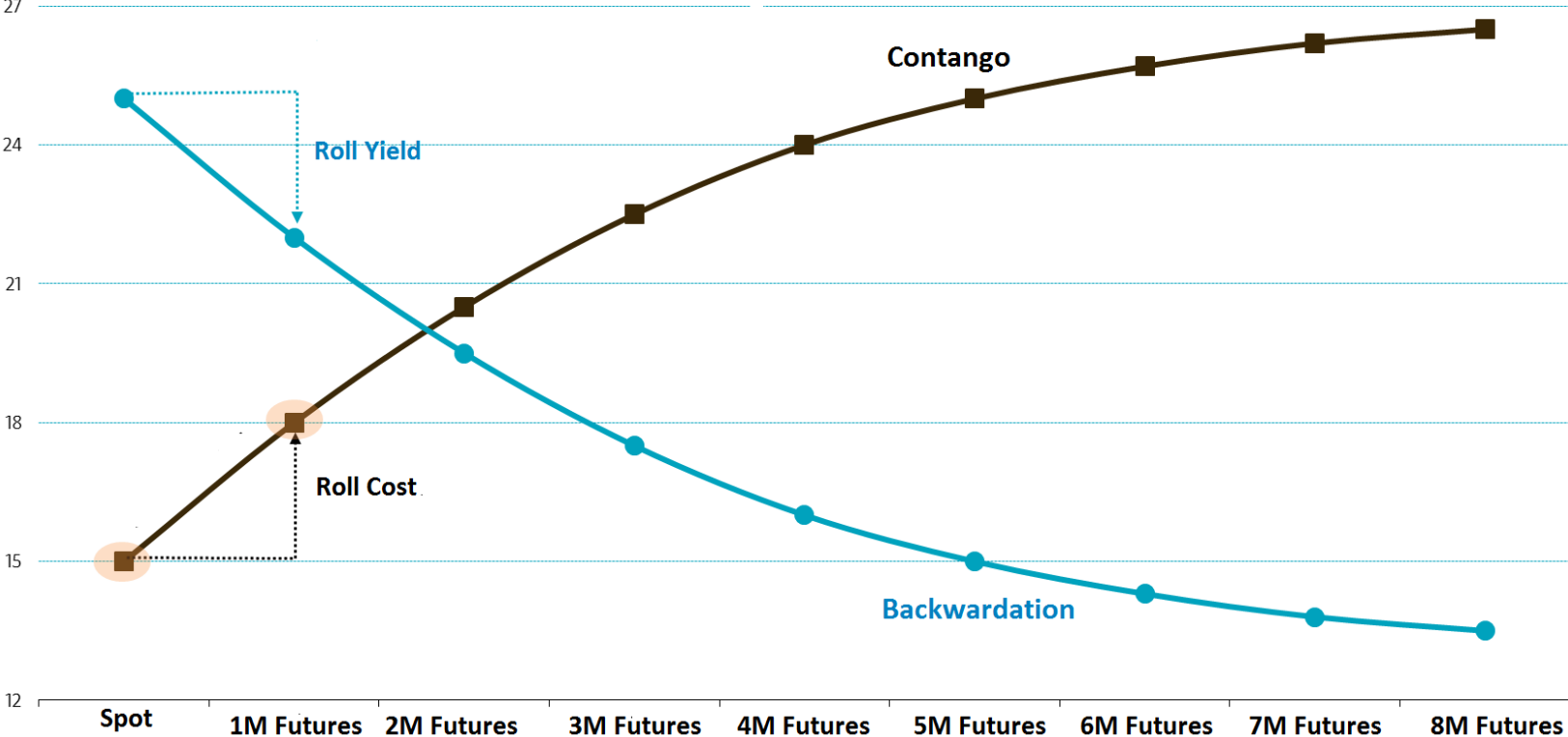
# Agenda

- Challenge of hedging tail risk of credit bond portfolios
- Correlation between returns of credit-focused bonds and VIX futures
- Roll cost of VIX futures
- Static hedge vs. Dynamic hedge

# Challenge of Hedging Tail Risk of High Yield and Emerging Market Bonds

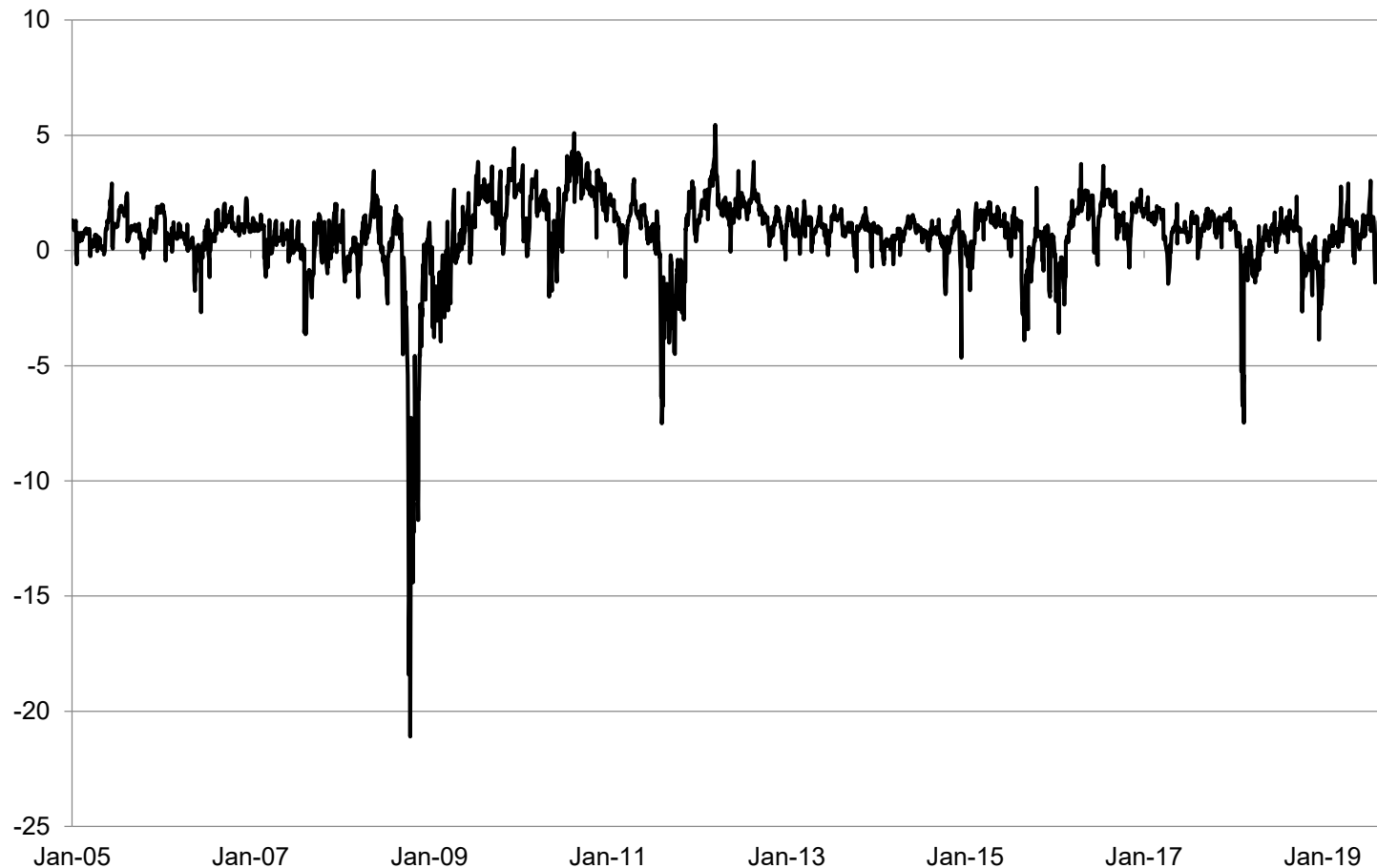
- Within fixed income, high yield (HY) and emerging market bonds (EMD) are among the least liquid sectors
- Hedging credit portfolios with equity instrument overlay against tail risk of significant widening of credit spreads
  - Basis risk between cash bonds and credit default swap
  - High yield or emerging market bond ETFs:
    - Size relative to the size of outstanding bonds
    - Liquidity and trading cost
  - Credit bonds can move with equities in a correlated way
  - VIX and VIX futures

# Contango and Backwardation



Source: S&P Dow Jones Indices LLC. Chart is provided for illustrative purposes.

# VIX Futures Curve is Usually in Contango



*Notes: Data from January 2006 to September 2019. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes  
Source: S&P Dow Jones Indices LLC.*

# Correlation Analysis

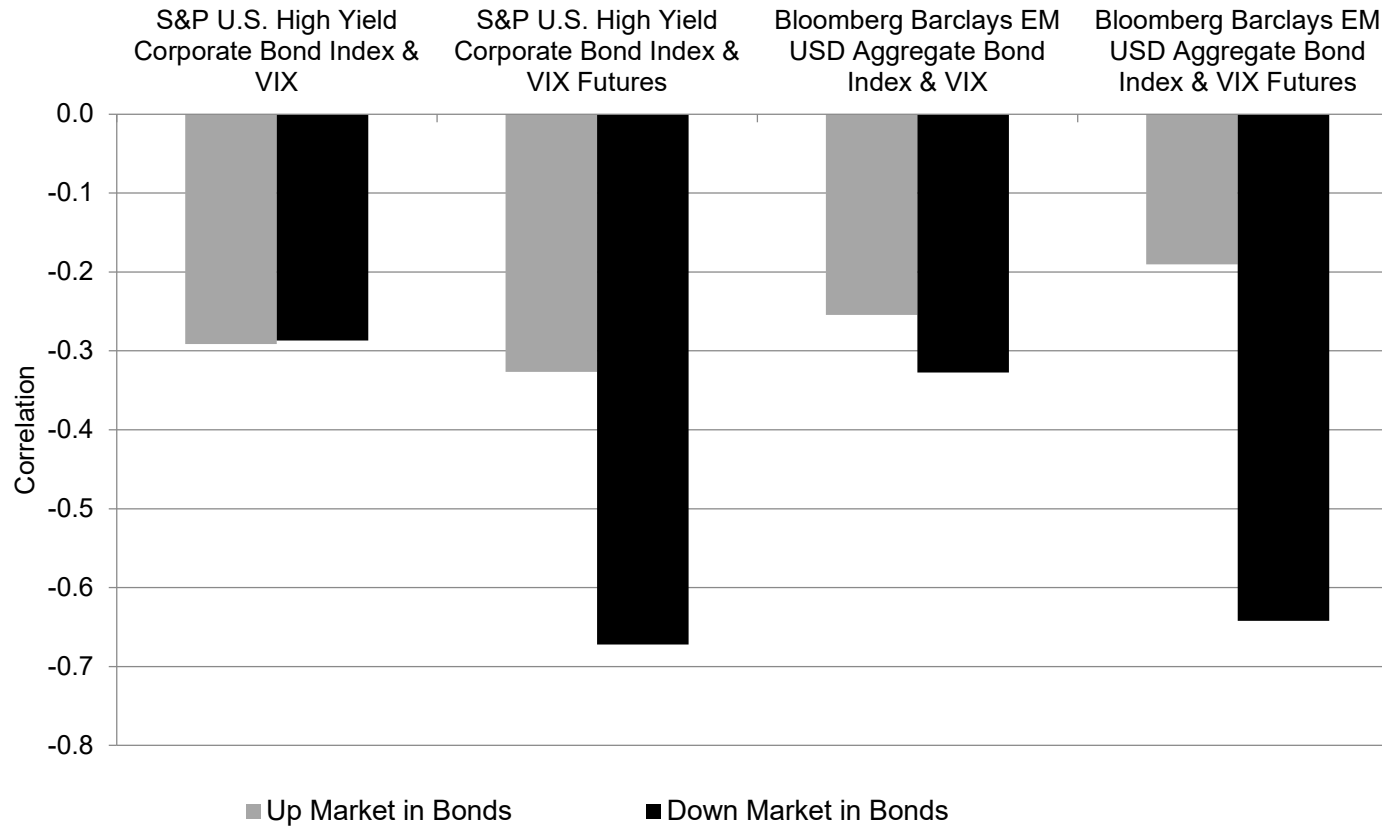
- High correlation between HY and EMD (0.79)
- High correlation between US equities and HY/EMD (0.71/0.57)
- High correlation between VIX and VIX Futures (0.81)
- Negative Correlation between VIX/VIX Futures and HY/EMD

	S&P 500	VIX	S&P 500 VIX Short-Term Futures Index	US HY	EMD USD
S&P 500	1				
VIX	-0.69	1			
S&P 500 VIX Short-Term Futures Index	-0.78	0.81	1		
US HY	0.71	-0.49	-0.68	1	
EMD USD	0.57	-0.47	-0.62	0.79	1

*Notes: Data from January 2006 to September 2019. US HY is represented with S&P U.S. High Yield Corporate Bond Index. EMD USD is represented with Bloomberg Barclays EM USD Aggregate Bond Index. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.*

*Source: S&P Dow Jones Indices LLC, Bloomberg.*

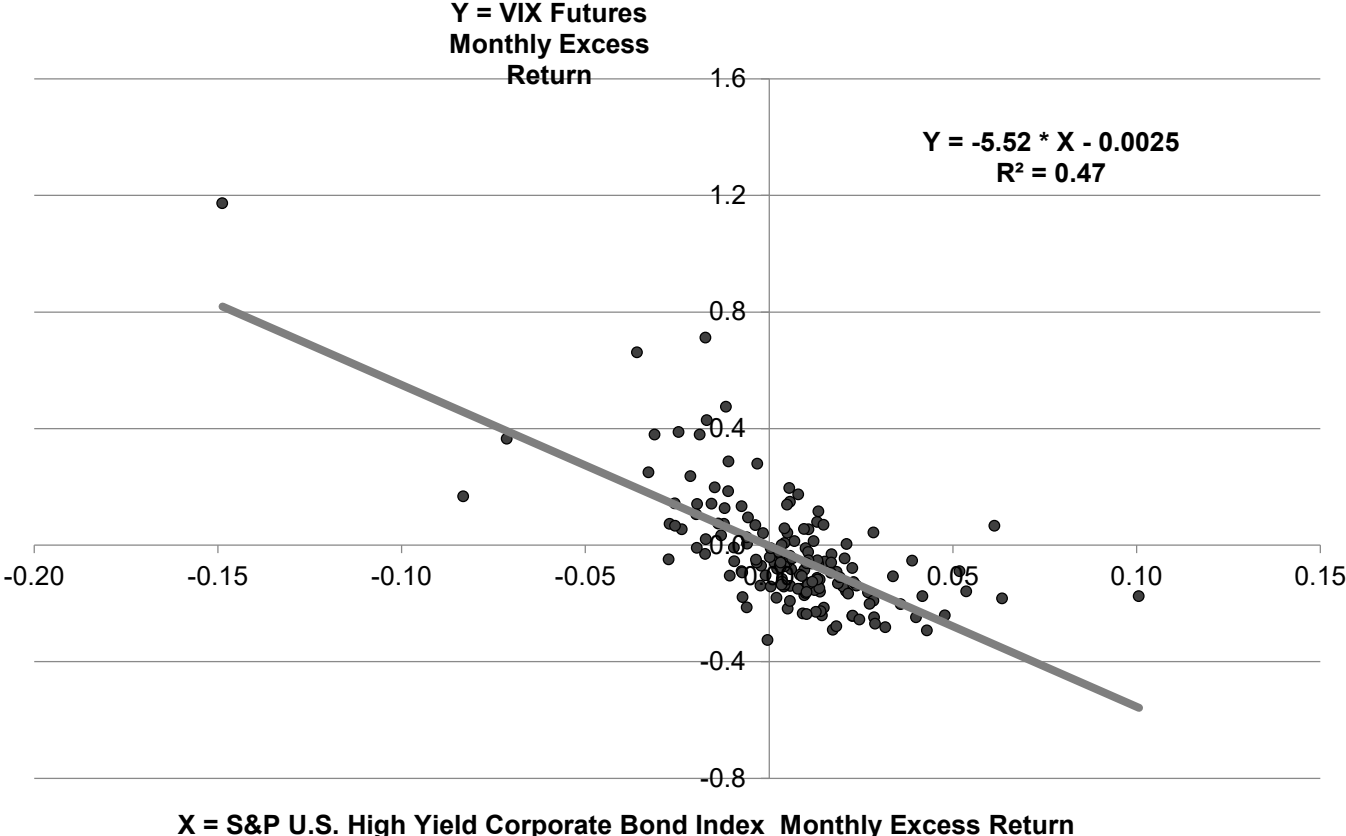
# Stronger Negative Correlation in Down Markets



Notes: Data from January 2006 to September 2019. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.

Source: S&P Dow Jones Indices LLC, Bloomberg.

# Negative Beta between VIX Futures and HY

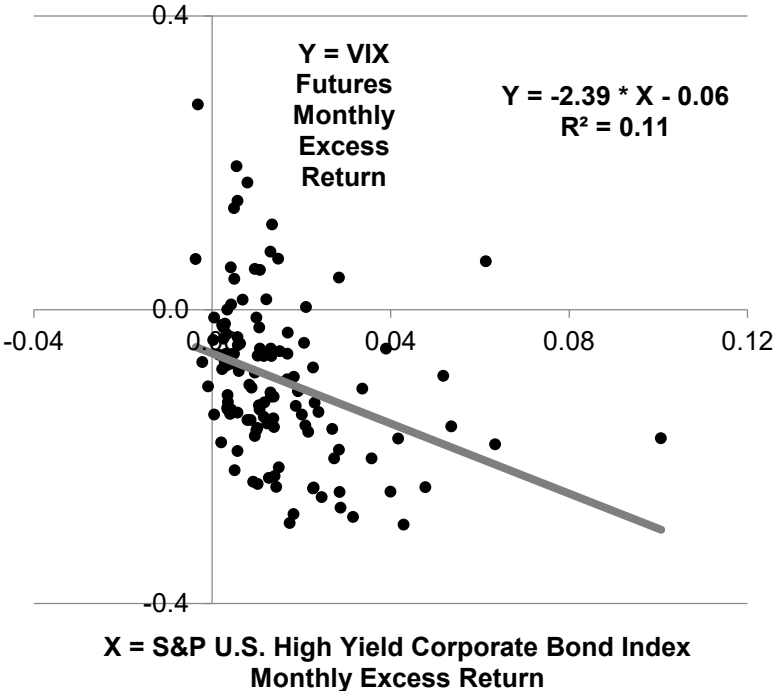


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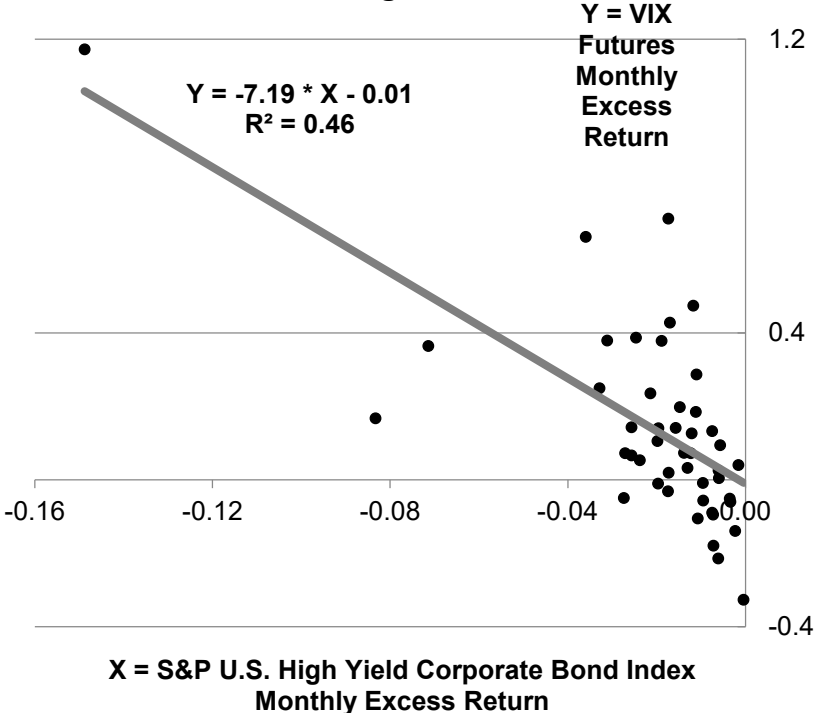


# Stronger Negative Beta in Bear Market of HY

VIX Futures vs High Yield Bonds in Bull Market of High Yield Bonds

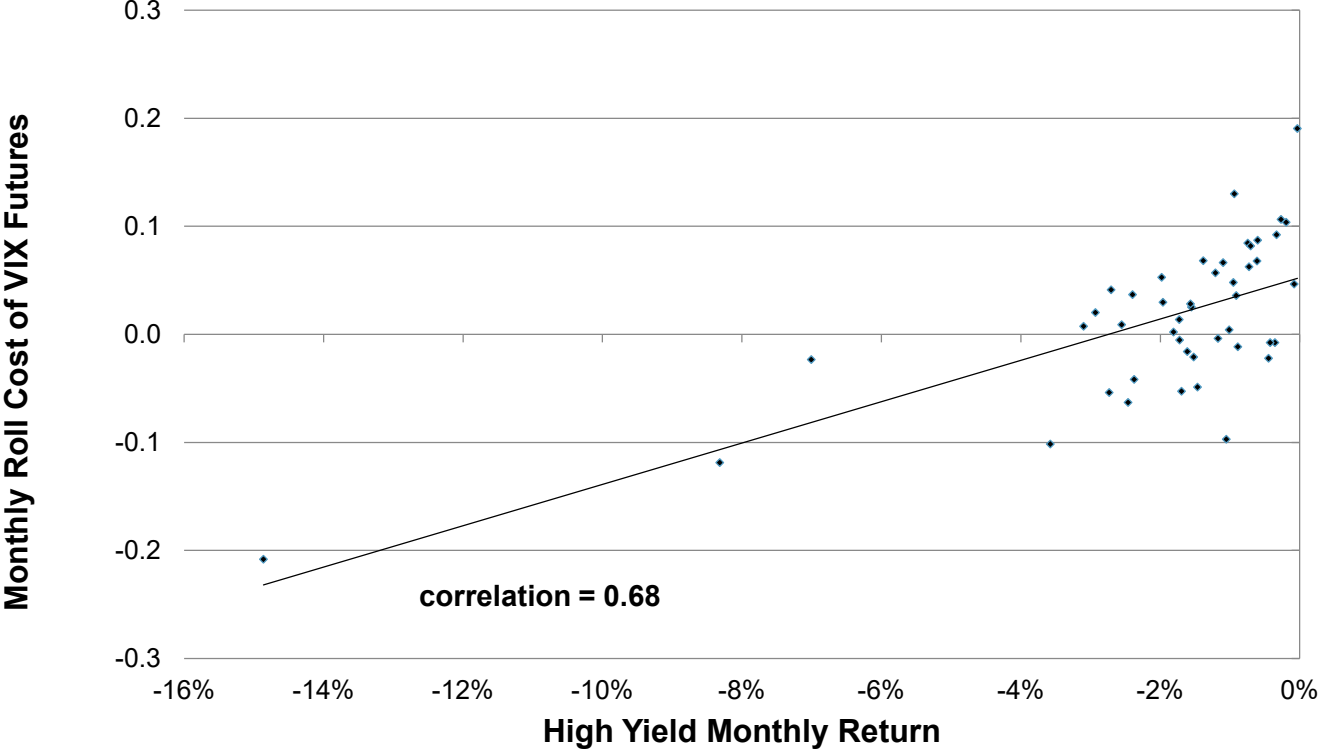


VIX Futures vs High Yield Bonds in Bear Market of High Yield Bonds



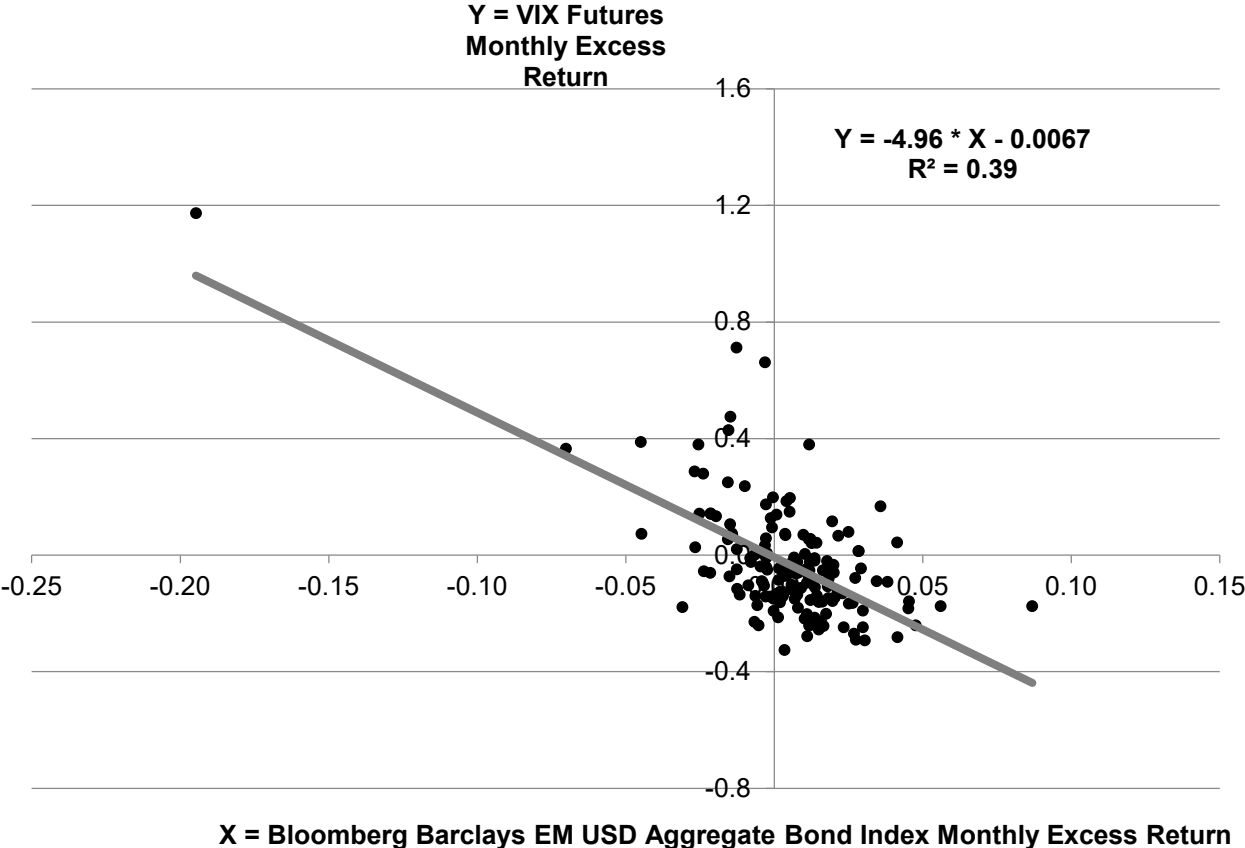
Notes: Data from January 2006 to September 2019. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.  
 Source: S&P Dow Jones Indices LLC.

# Negative VIX Futures Roll Cost when HY are Down



Notes: Data from January 2006 to September 2019. US HY is represented with S&P U.S. High Yield Corporate Bond Index. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.  
Source: S&P Dow Jones Indices LLC.

# Negative Beta between VIX Futures and EMD

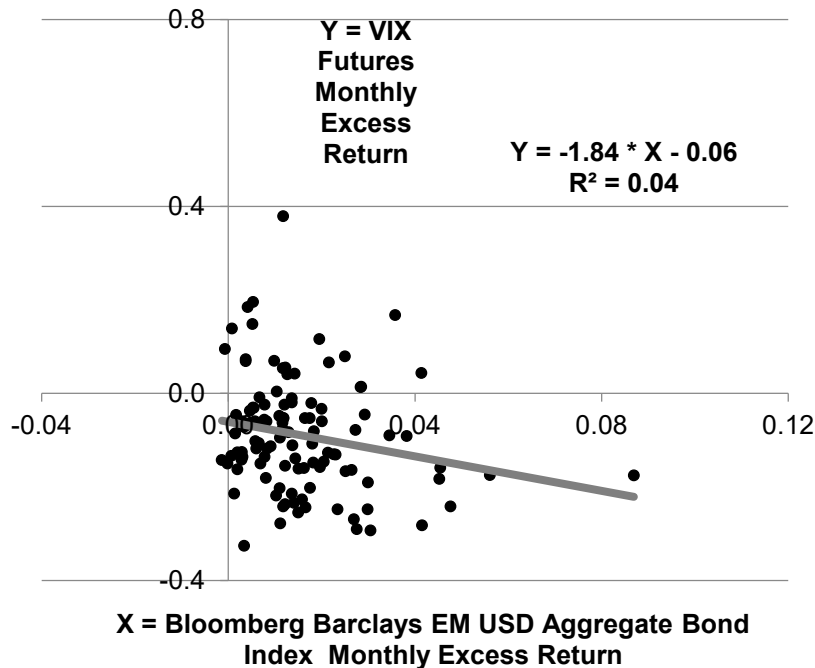


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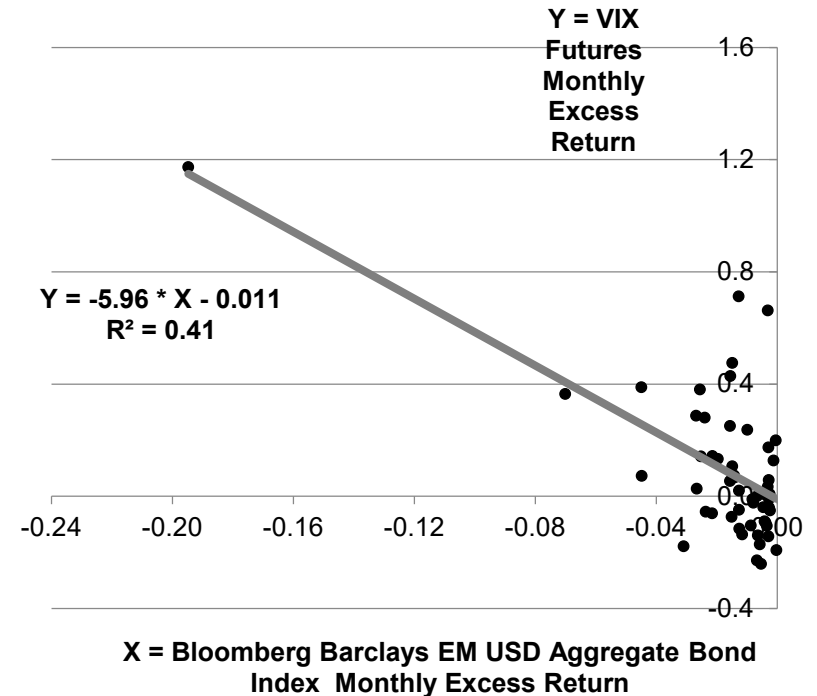
Source: S&P Dow Jones Indices LLC, Bloomberg.

# Stronger Negative Beta in Bear Market of EMD

**VIX Futures vs Emerging Market Dollar-Denominated Bonds in Bull Market of EM USD Bonds**



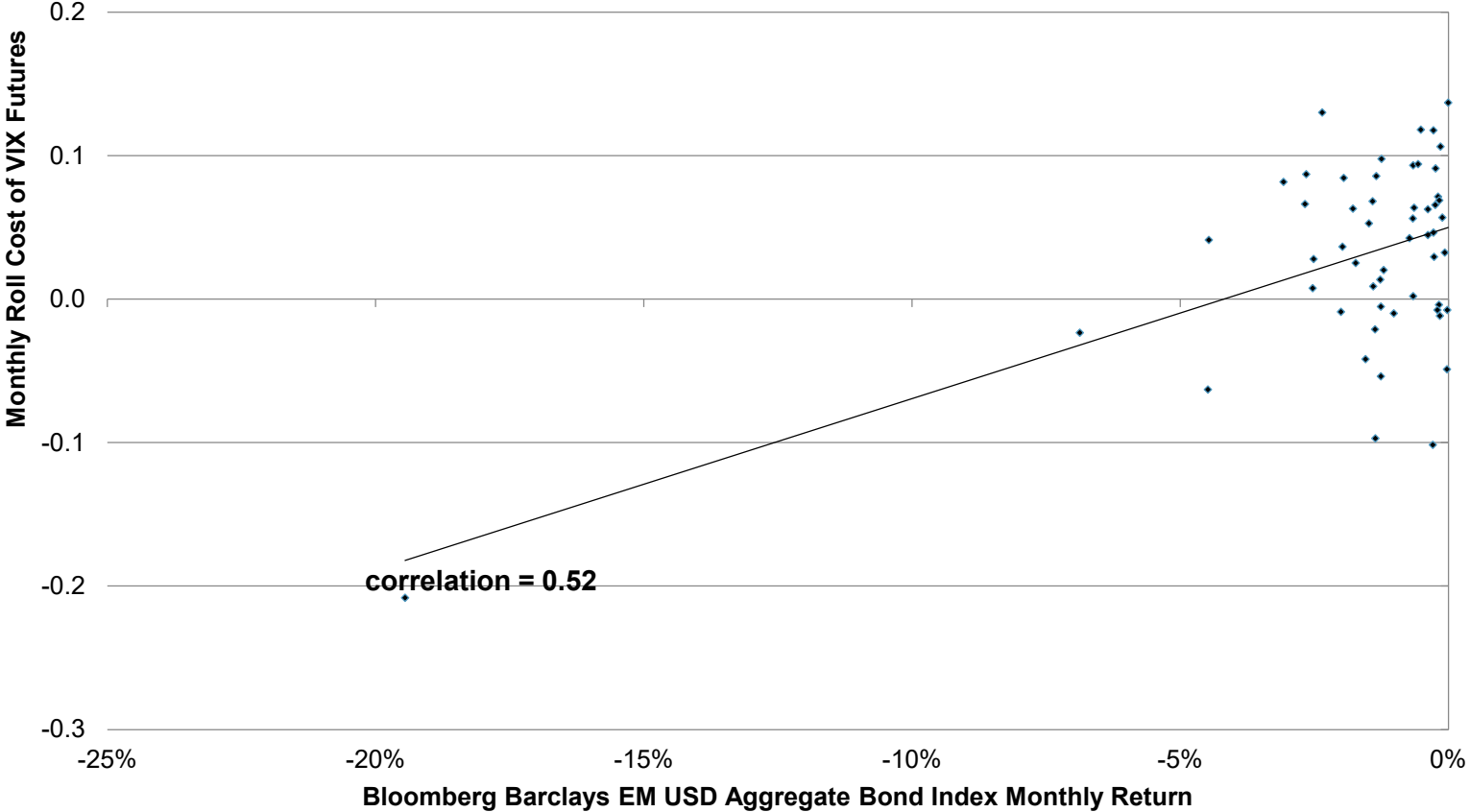
**VIX Futures vs Emerging Market Dollar-Denominated Bonds in Bear Market of EM USD Bonds**



Notes: Data from January 2006 to September 2019. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.

Source: S&P Dow Jones Indices LLC, Bloomberg.

# Negative VIX Futures Roll Cost when EMD are Down



Notes: Data from January 2006 to September 2019. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.  
Source: S&P Dow Jones Indices LLC, Bloomberg.

# Testing VIX Overlay in a HY Bond Portfolio

## *Approaches*

### Static allocation

- Allocating a static weight to x% to VIX futures in a high yield bond portfolio

### Dynamic allocation

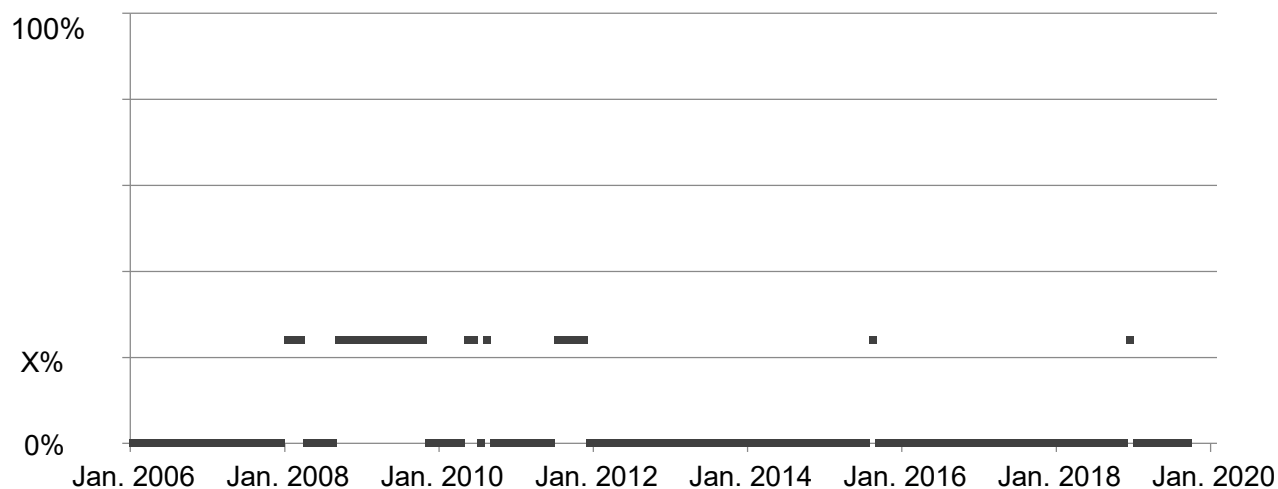
- Allocating a fixed percentage (x%) of the portfolio to VIX futures if VIX spot level  $\geq 25$
- VIX futures allocation is 0 if VIX  $< 25$
- Why 25?
  - VIX ranged [9.14, 80.86] from 1990 to 2017
  - 80% percentile of VIX = 24.26

# Testing VIX Overlay in a HY Bond Portfolio

## *Historical Dynamic Allocation*

### Periods ( $\geq 2$ months) with $>0$ VIX allocation

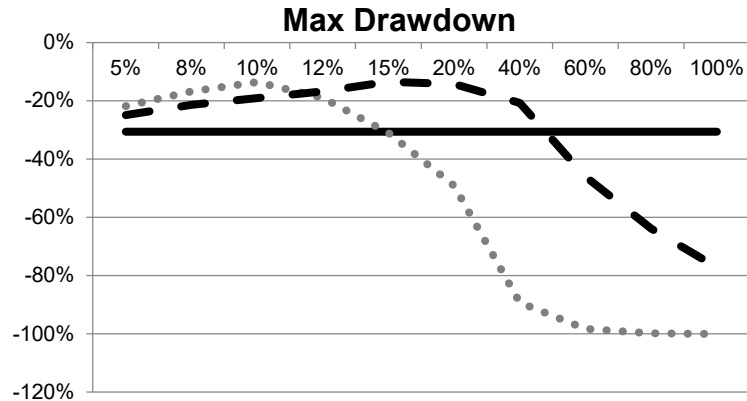
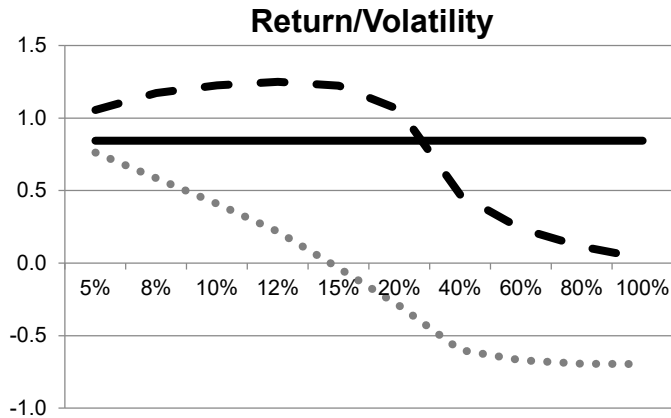
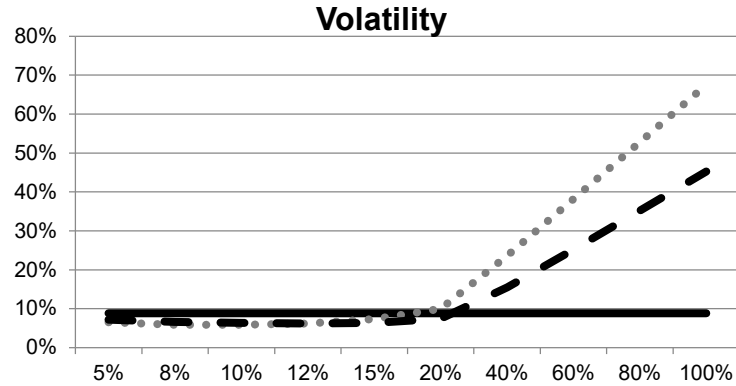
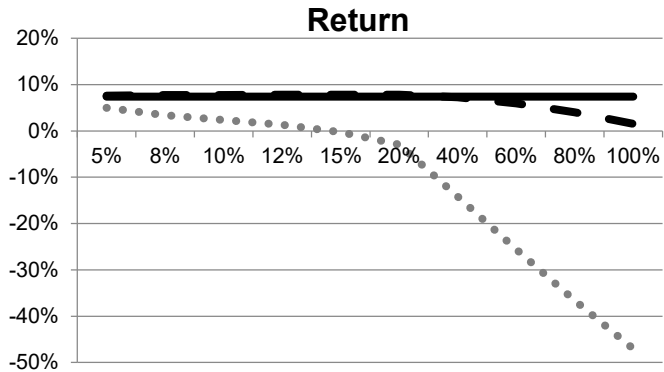
- 2008 Feb - Apr, Oct - Nov
- 2010 June - July
- 2011 Aug - Dec



Source: S&P Dow Jones Indices LLC

# Testing VIX Overlay in a HY Bond Portfolio

## Performance with Various VIX Allocation



— US High Yield Bonds    ..... Static Allocation    - - - Dynamic Allocation

Notes: Data from January 2006 to December 2017. US high yield bonds is represented with S&P U.S. High Yield Corporate Bond Index. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.

Source: S&P Dow Jones Indices LLC.



# Testing VIX Overlay in a HY Bond Portfolio

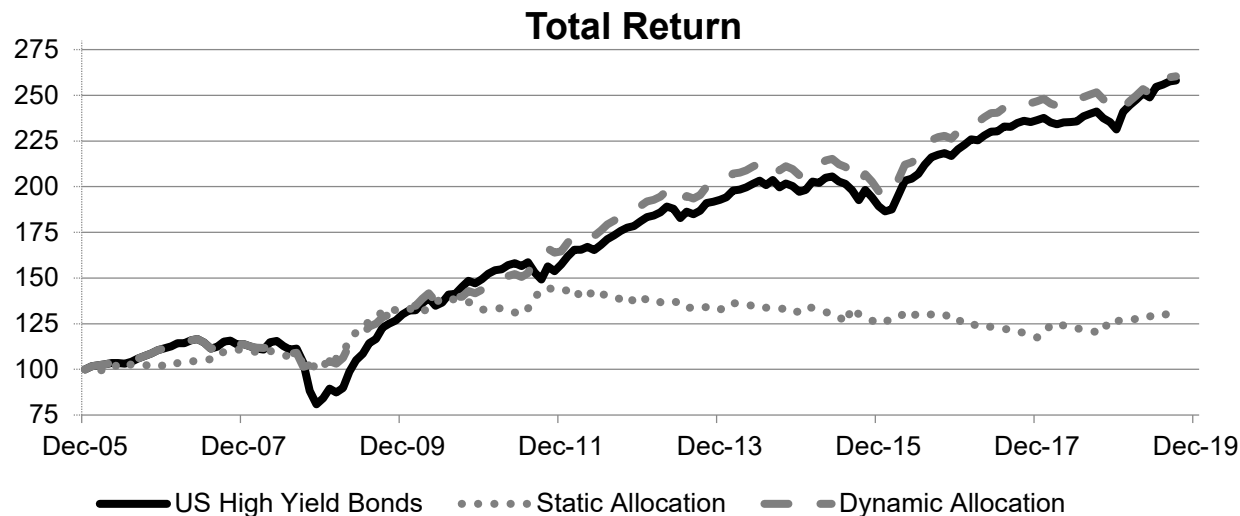
## *Performance with Various VIX Allocation*

### Observations:

- Both static and dynamic allocation of VIX futures can help reduce volatility, as long as VIX futures allocation is limited to 20%
- Dynamic allocation can improve return by limiting drawdown in volatile market if VIX futures allocation is kept under 20%. In comparison, static allocation significantly drags down portfolio return as rolling VIX futures tends to incur cost
- Risk adjusted return, as measured by the ratio of return over volatility, is optimized when VIX allocation is at 12%

# Testing VIX Overlay in a HY Bond Portfolio

## VIX futures Allocation at 12%



	US High Yield Bonds	Static Allocation	Dynamic Allocation
<b>Return</b>	7.14%	1.91%	7.21%
<b>Volatility</b>	8.4%	6.2%	6.0%
<b>Return/Volatility</b>	0.85	0.31	1.20
<b>Max Drawdown</b>	-31%	-19%	-17%

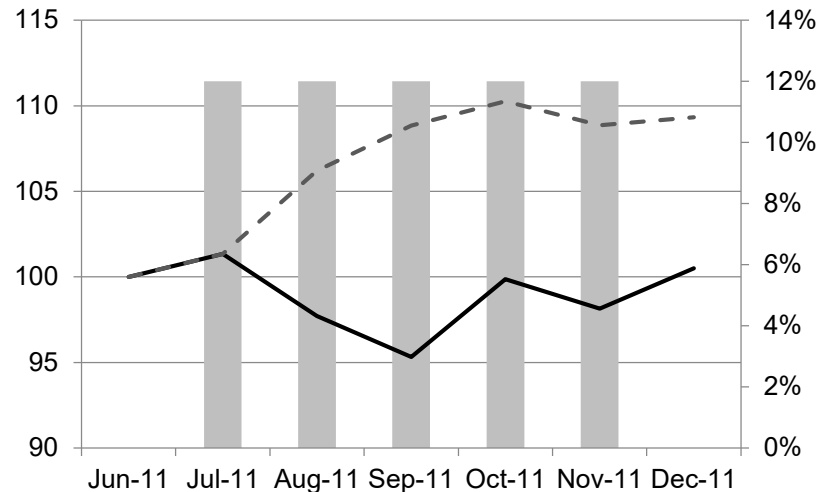
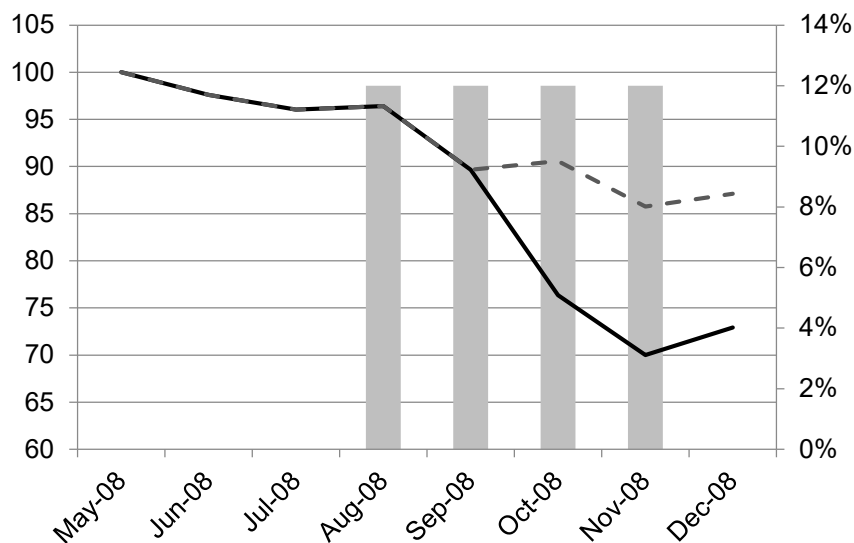
Notes: Data from January 2006 to September 2019. US high yield bonds is represented with S&P U.S. High Yield Corporate Bond Index. Past performance is no guarantee of future results. Chart and table are provided for illustrative purposes and reflects hypothetical historical performance.

Source: S&P Dow Jones Indices LLC.

# Testing VIX Overlay in a HY Bond Portfolio

## Drawdown in 2008 and 2011

- In Nov 2008, maximum drawdown for the dynamically hedged high yield strategy stood at 14%, compared to the 30% experienced by the broad high yield bond market
- In 2011, dynamic hedging helped return by avoiding drawdown completely



VIX Allocation (RHS)
  Bonds Only
  With 12% Dynamic Allocation of VIX Futures

Notes: Past performance is no guarantee of future results. US high yield bonds is represented with S&P U.S. High Yield Corporate Bond Index. Charts are provided for illustrative purposes and reflect hypothetical historical performance.

Source: S&P Dow Jones Indices LLC.

# Conclusions

- The liquid VIX futures market may serve as an innovative approach to hedge credit-focused fixed income sectors.
- The impact of the VIX futures term structure is twofold.
  - More often than not, the roll cost from contango made the hedge expensive and prohibitive.
  - In stressed markets, the roll yield from backwardation increased the negative correlation between VIX futures and credit-focused fixed income sectors, and further improved the effectiveness of the tail risk hedge.

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