

FINANCIAL MARKETS RESEARCH CENTER

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Owen Graduate School of Management

THE CONFERENCE IN REVIEW

Exchange-Traded Products:

BLESSING OR CURSE?

MAY 18, 2018, NASHVILLE

Ready to fight: State Street Global's U.S. Head of SPDR ETF Capital Markets David LaValle, defending the future of fixed income products during the industry panel discussion. Representatives from Invesco Powershares and Susquehanna International Group contributed to a lively debate.

Since their inception in 1993, exchange-traded funds have grown to account for more than 30 percent of all traded value in the United States. Benchmarked to indexes in a variety of different asset markets, some ETFs have thrived—like SPY, which has become the most actively traded security in the world—while others have failed. Even as ETFs proliferate, an ongoing debate about their benefit remains. Do their risks outweigh their benefits? Are ETFs making markets less efficient? Do they contribute to mindlessness in markets? Participants in the 30th annual Financial Markets Research Center spring conference considered both sides—along with a number of other important issues related to exchange-traded products from information efficiency to smart beta strategies.

Continued on inside cover



Continued from front

FMRC Director **Robert Whaley**, Valerie Blair Potter Professor of Management at Vanderbilt Owen Graduate School of Management, and the finance faculty welcomed participants and presenters from as far away as Israel and Australia. Here we recap the papers presented at the conference, with special thanks to our industry sponsor for financial support.



Research highlights

The Financial Markets Research Center at Vanderbilt University has had another successful year at fostering and promoting financial markets research. Historically, the centerpiece of the FMRC's activities has been its annual spring conference, bringing together leading academics, industry participants, and regulators to discuss timely market-related issues. This year's conference was no exception. By all accounts, the May 2018 "Exchange-traded Products: Blessing of Curse?" conference on exchange-traded products contributed in important ways to the debate on their social usefulness and the idiosyncrasies of their design, market liquidity, and market volatility. But, equally as important as the conferences, albeit less transparent, was the outreach of FMRC faculty research. In 2018, FMRC research was presented and discussed in locations ranging from Charlevoix, Canada to Beijing, China and from Sydney, Australia to Barcelona, Spain. Our presence was known at all major finance research conferences including the American Finance Association, the Western Finance Association, the Northern Finance, the Financial Management Association, and the SFS Cavalcade. We were invited to present our research findings at research institutions including Boston College, Central University of Finance and Economics in Beijing, Nanjing University of Finance and Economics, Northeastern University, and the University of Cyprus. We addressed participants at meetings/roundtables of the Investment and Wealth Institute, the GARC Hedge Fund conference, the Vanderbilt Board of Trustees, the Financial Management Association, the Private Equity Research Consortium, and the Owen School's Board of Visitors. Below are some highlights.

Conference summary

The May 2018 FMRC conference focused on exchange-traded products (ETPs). Since their inception in 1993, ETPs have grown to account for more than 30 percent of all traded value in U.S. markets. Why the unbridled success? What are the costs? The success is driven by obvious benefits such as low management

fees, tax efficiency, and the ability to trade inter-day. The costs are less transparent. The first conference session focused squarely on this issue. On the "Curse" side of the debate, Doron Israeli argued that investor migration to ETPs has steadily siphoned firm-level liquidity and created disincentives for firm-specific research analysis. He showed that increases in ETP ownership are associated with higher trading costs in the underlying securities, lower future earnings response coefficients, higher stock return synchronicity, and reduced analyst coverage. In sum, security prices convey less information about the underlying firms. On the "Blessing" side, Larry Glosten suggested that increased ETP activity improves information efficiency by improving the link between fundamentals and stock prices. He showed that firms with more ETP activity reflect incrementally more earnings news in their current stock returns, especially for small firms with low analyst following.

Levered and inverse products are relatively new to the landscape of exchange-traded products. To generate promised daily index returns, dynamic, but predictable, end-of-day positioning is required. The research question addressed in this second conference session was whether rebalancing of levered and inverse fund position holdings induces end-of-day rate of return volatility beyond what is expected given market microstructural considerations. Using a sample of levered and inverse stock index funds, Pauline Shum found that, consistent with expectations, price impact and tracking error tend to be larger when market fluctuations are large. Michael O'Neill conducted a related investigation, but narrowed the focus to a single source of index price risk—the S&P 500 VIX Short-Term Futures Index. He showed that the impact of VIX ETPs on volatility in VIX futures market varies, with the most active products having the strongest contemporary effect. He also noted that at least part of the observed increased return volatility at the end of the day is driven by mismeasurement—the VIX ETP market is closed while VIX futures market remains open.

Continued on inside back cover

ETFs: Is there a dark side?

Doron Israeli | Arison School of Business

The rapid growth of exchange-traded funds in recent years is readily understandable. ETFs promote diversification, and they offer low management fees, tax efficiency and the ability to trade interday. On the other hand, as Doron Israeli acknowledges, “there is no such thing as a free lunch.” In a published paper, he and two colleagues investigated the relationship between ETFs and pricing efficiency—the speed and extent to which prices incorporate information. As Israeli noted, ETFs offer an attractive investment vehicle for uninformed, “noisy” traders, who tend to migrate toward ETFs and away from the underlying securities. Over time, this migration steadily siphons firm-level

liquidity and creates disincentives for informed traders to expend resources obtaining firm-specific information. Analysis by Israeli and his colleagues found that increases in ETF ownership are associated with higher trading costs in the underlying securities. These increases also lead to a reduction in future earnings response coefficients, higher stock return synchronicity, and a decrease in the number of analysts covering the firm. The collective impact of these results, the researchers found, involves higher trading costs and lower benefits from information acquisition, leading to less informed security prices for the underlying firms.

Doron Israeli



Lawrence Glosten



$\text{ETF_Fitted}_{i,t}$	(-0.92)
$\Delta \text{ETF_Residual}_{i,t}$	2.562***
$\text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t}$	15.747
$\text{Earn}_{i,t} * \Delta \text{ETF_Residual}_{i,t}$	10.505***
$\text{MTB}_{i,t}$	(1.34)
$\text{MTB}_{i,t} * \Delta \text{ETF_Residual}_{i,t}$	9.219**
$\text{MTB}_{i,t} * \text{ETF_Fitted}_{i,t}$	12.121
$\text{MTB}_{i,t} * \text{Earn}_{i,t}$	-0.000
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t}$	(-0.21)
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \Delta \text{ETF_Residual}_{i,t}$	-0.004***
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t}$	(-2.83)
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t}$	-1.364**
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t}$	(-5.42)
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t}$	0.005
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t}$	(-1.04)
$\text{MTB}_{i,t} * \text{Earn}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t} * \Delta \text{ETF_Residual}_{i,t} * \text{ETF_Fitted}_{i,t}$	0.233***
$\text{Earn}_{i,t}$	(6.93)
$\text{ETF}_{i,t}$	-0.074
$\text{ETF}_{i,t} * \text{Earn}_{i,t}$	(-0.00)
$\text{Low}_{i,t}$	(0.03)**
$\text{Low}_{i,t} * \text{Earn}_{i,t}$	(-6.51)
$\text{Low}_{i,t} * \text{ETF}_{i,t}$	-0.10
$\text{Low}_{i,t} * \text{ETF}_{i,t} * \text{Earn}_{i,t}$	(-1.25)
$\text{Int_residual}_{i,t}$	0.210*
$\text{Int_residual}_{i,t} * \text{Earn}_{i,t}$	(3.5)
$\text{Int_residual}_{i,t} * \text{ETF}_{i,t}$	0.2
$\text{Int_residual}_{i,t} * \text{ETF}_{i,t} * \text{Earn}_{i,t}$	(0.5)

ETF TRADING AND INFORMATIONAL EFFICIENCY

Lawrence Glosten | Columbia Business School

As a counterweight to Doran Israeli's paper, Lawrence Glosten suggested that, at least in certain circumstances, increased ETF activity is associated with improved information efficiency in the underlying stocks. While Glosten and Israeli both noted that they fundamentally agree with each other, Glosten and two fellow researchers found that ETF trading can increase informational efficiency by improving the link between fundamentals and stock prices. Specifically, firms with more ETF activity reflect incrementally more earnings news in their current stock returns. The positive effect on informational efficiency and increased ERC, however, is contingent on the "information environment." Consistent with his expectations, Glosten's research found "significant and improved informational efficiency" among small firms with market capitalization below the NYSE 50th percentile and in stocks with low (below the 75th percentile) analyst following. In contrast, they documented no improvement in informational efficiency for large firms and stocks with high analyst following. Their research also found that improvements in informational efficiency were attributable to the incorporation of more systematic fundamental information rather than firm-specific fundamental information.

Intraday share price volatility and leveraged ETF rebalancing.

Pauline Shum Nolan | York University

Because leveraged ETFs are synthetic products that do not hold the actual assets that make up the underlying index, returns on these products are achieved through private swaps or forward agreements with counterparties. Unlike their non-leveraged counterparts, leveraged ETFs are structured to track daily index returns, and their net asset values are reported only once a day, at the market's close. To maintain the required exposure, swap counterparties rebalance their holdings near the end of each day's trading session, in a highly predictable manner. Since the financial crisis there has been a contentious debate about whether ETFs increase end-of-day market volatility.

Pauline Shum and three colleagues examined data for the period from 2008-2011. As Shum explained in her presentation, both sides of the debate have some merit. The research found that end-of-day volatility was positively correlated at a statistically significant level, with the ratio of rebalancing trades to total trading volume. On an average day, the effect of these trades involving leveraged ETFs was too small to create much impact. However, on days when market fluctuations are large, the impact is more significant, and higher rebalancing costs produce larger tracking errors for leveraged ETFs during volatile periods.



Steve Oh from Nasdaq commenting on leverage-driven volatility.



Pauline Shum-Nolan



Session Chair **Buzz Gregory** (retired former head of macro derivatives strategy at Goldman Sachs) and MSF student **Evan Albert**



Michael O'Neill (Bond University, Australia on left) and **Vikas Agarwal** (Georgia State, J. Mack Robinson College of Business)

THE FUTURE OF EXCHANGE-TRADED PRODUCT

Ryan Kreger | Invesco Powershares

Ryan Kreger's presentation centered around smart beta ETFs, one of the fastest growing areas of the ETF space. While Smart beta ETFs represent 18.6 percent of ETF assets in the U.S., they account for 64 percent of the new fund launches in the past three years. Nearly three-fourths of institutions incorporate smart beta ETF into their portfolio, mostly by transitioning dollars away from active and passive mutual funds. They pursue this strategy as a means to achieve low volatility, high ROE and stable earnings growth, capture value from underpriced securities, and invest in securities expected to grow at a rate above the market average.



Bart Smith | Susquehanna

MARKETS

The conference's final session involved a discussion of three presentations on new products or directions in ETPs. Bart Smith examined the possibility of a Bitcoin ETF. He noted that approximately \$1 billion in Bitcoin is traded each day in regulated markets. In March 2017, the SEC disapproved a Bitcoin ETF. Nevertheless, Smith believes that such products will eventually be allowed. For one thing, he said, an ETF structure protects customers better than the alternatives today, "if you send it to the wrong address, it's gone." An ETF also creates opportunities for people who otherwise would not be able to invest in Bitcoin.



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FMRC faculty **David Parsley** and **Peter Haslag**.

INDUSTRY VIEWS OF ETP MARKETS FUTURE BRINGS LIVELY DISCUSSION

David LaValle | SPDR ETF Capital Markets

In discussing liquidity and best practices on trading ETFs, David LaValle focused on high-yield corporate bonds, which account for only 3.7 percent of assets under management in ETFs but make up 12.2 percent of their average daily volume. Increasingly, LaValle noted, sophisticated investors are involved in complex trades involving high-yield corporate ETFs and mutual funds, which offer liquidity, price transparency and an effective means of risk transfer when markets encounter sharp downturns. Some large insurance companies, for example, are having conversations with their risk teams about their ability to use ETFs to manage their liquidity profile.



Giang Bui, Cboe Global Markets





Bill Speth and Lawrence Glosten



Peter Layton, Chairman - BOX board of directors

On the Causality Between Price Movements in VIX Exchange-traded Products (ETPs) and VIX Futures Contracts.

DO ETPs

INCREASE VOLATILITY?



Michael O'Neill | Bond University, Australia

Since the introduction of VIX exchange-traded products in early 2009, VIX derivatives have become the most liquid of volatility investments in the world. Now, VIX futures are a “go-to” market, representing forward expectations VIX. However, as Michael O’Neill explained in presenting findings from research he conducted with two colleagues (including Vanderbilt’s Bob Whaley), volatility as an asset class is not well understood. The researchers analyzed the time-series relations between volatility ETPs—VXX, TVIX and XIV for different volatility regimes and VIX term structures. As they showed, the impact of VIX ETPs on volatility in VIX futures varies. While causal relations

between VXX and VIX futures are well established, with leads and lags generally short-lived, relations between inverse/levered products are not yet established. What really happened when XIV, a popular short volatility product, collapsed in early February 2018? As O’Neill explained, the demand to buy VIX futures grossly outsized the natural supply as traders sought to rebalance. However, SVXY, the ETF equivalent of XIV, did not liquidate, and assets under management have been returning toward past levels since February, raising questions about whether the market has learned its lesson from the event.

In 2013 Vanguard raised the possibility that revenues from exchange-traded funds might become sufficient for ETF providers to reduce charges to zero—or even pay clients to invest in their products. Jesse Blocher’s research, conducted with two Vanderbilt colleagues, explored whether such a scenario might be possible. To answer that question, the researchers focused on potential revenue that can be earned each day from securities lending and the volume of actual securities lending activity. Using the best available data, the researchers found that potential lending revenue from ETFs is approximately 184 percent of expense ratio, with a median of 144 percent. Moreover, a move of one percentage point in the lending rate yields a 3.5 percent increase in the likelihood a stock will be lent out. Since 2009, securities lending by ETFs has grown 500 percent, and growth in assets loaned to potential assets loaned experienced a 600 percent gain since 2012. Even so, 43 percent of funds reported lending no securities; funds that do lend reap only 10 percent of potential earnings. In reviewing the available data, the researchers concluded that no-fee ETFs are entirely possible going forward.


Exchange-Traded Funds: **THE TRANSPARENCY OF SECURITIES LENDING**



Jesse Blocher | Vanderbilt University

Innovation and corporate bond ETFs

Caitlin Dannhauser | Villanova University



Between 2000 and 2014, corporations issued bonds at record levels to take advantage of low interest rates. During that same period, ETF assets grew from slightly less than \$66 billion to approximately \$2 trillion. At the intersection of these developments are corporate bond ETFs, an innovation that has democratized a systemically important but difficult-to-access market—one in which they play an increasingly vital role. In examining the broader question on the effect of innovation on financial markets, Caitlin Dannhauser’s research focused on whether inclusion in an ETF affects the yield spread of the underlying bonds. Studying a monthly panel dataset of corporate bonds from 2009 through 2013, Dannhauser concluded that inclusion in an ETF significantly—and permanently—lowers yield spreads. One way that ETFs impact yield is by increasing the proportion of informed investors. In addition, inclusion in an ETF affects the liquidity of the underlying bonds. While there is no significant impact on transaction costs for high-yield bonds, ETFs create a significant negative impact on the liquidity of investment-grade bonds. Even so, she suggested, overall liquidity could improve as bond investors are able to transact in the highly liquid exchange-traded funds.

In spite of issuers' attempts at making ETPs transparent investment vehicles, certain product/market attributes that remain not well understood. One is securities lending. Jesse Blocher focused on the potential revenue that may be earned from securities lending and found that (a) the potential lending revenue from securities lending for a typical fund vastly exceeds its expense ratio, and (b) the actual revenue earned by the fund is well below what may be earned. Based on this evidence, no-fee ETPs are likely to be commonplace in the coming years. Another perplexing attribute is the slowness with which the market adopts new product structures. Arguably it took the market more than a decade to learn about the virtues of stock ETPs and integrate them into the tool box of long-term investment vehicles. The same is true of corporate bond ETPs. After a slow start in the early 2000's, they have only recently come into their own. Considering that these products inexpensive access to interest rate risk exposures that help diversify overall portfolio holdings, this is surprising. On the reverse side of the argument, Caitlin Dannhauser's research found that the trading activity of bond ETPs significantly lowers yields of constituent bond issues.

The capstone of the May 2018 conference was a panel discussion focusing on the future of exchange-traded product markets. Three prominent experts were invited to offer their views on where this important product market is headed. David LaValle of State Street was a fan of high-yield corporate bond ETPs. He pointed out that, while they account for only 3.7 percent of assets under management in the product space, they make up 12.2 percent of their average daily volume. He noted that sophisticated investors favor high-yield corporate ETPs and mutual funds because they offer liquidity, price transparency, and an effective means of risk transfer in sharp market downturns. Ryan Kreger of Invesco Powershares was a strong advocate of smart beta products. He observed that they are one of the fastest growing areas of the ETP space, accounting for 64 percent of the new fund launches in the past three years. He claimed that nearly three-fourths of institutions now incorporate smart beta ETPs, with the growth fueled by sales of active and passive mutual funds. The most popular smart beta strategies are currently those focusing on low volatility, high ROE, and security mispricing. Bart Smith of Susquehanna was enthusiastic about the prospect of active cryptocurrency ETP markets. He noted that about \$1 billion in Bitcoins trade each day in regulated markets. At the same time, he noted the reluctance of the regulatory authorities. In March 2017, the SEC disapproved an application for a Bitcoin ETP, and little progress had been made subsequently. Nonetheless, he remains optimistic, and views the SEC setback was a bump in the road. The integrity and the accessibility of the securities markets in which these instruments will trade and the transparency of their construction, he argued, will win the day.

On the road again

The importance of FMRC faculty research is reflected by the number of speaking invitations we received each year. Nick Bollen's latest research project, "Picking winners? Hedge fund performance prediction," was presented at both Northeastern University and Boston College in October, as well as at the Financial Management Association (FMA) meetings in San Diego. Jesse Blocher and Peter Haslag presented "Short trading and short investing" at the Northern Finance Association (NFA) meetings in Charlevoix, Quebec in September and at the FMA meetings in October. Haslag also discussed a paper on antitakeover provisions at the FMA meetings. Blocher presented "Stock options, stock loans, and the law of one price" at the SFS Cavalcade at Yale University in May and at the Western Finance Association (WFA) meetings in Coronado in June. Ben Munyan presented "What makes dealers central? Market dominance in bond and CDS interdealer networks" at the Financial Intermediation Research Society (FIRS) in Barcelona, Spain in June, and "The effects of the Volcker Rule on corporate bond trading: Evidence from the underwriting exemption" at the NFA meetings in Charlevoix, Quebec in September. In October, David Parsley presented "Blue states and red states: Business cycle divergence and risk sharing" at the Central University of Finance and Economics, Beijing, and at the Nanjing University of Finance and Economics and at the University of Cyprus. Josh White presented "Political uncertainty and firm disclosure" at the FMA's European Conference in Kristiansand, Norway in June. He also received the 2018 Haslam College of Business Outstanding Doctoral Alumnus Award from University of Tennessee in May and gave the keynote address at their Doctoral Awards Reception. Other important addresses were delivered by Nick Bollen addresses at the GARC Hedge Fund Conference in Boston, Berk Sensoy at the Private Equity Research Consortium in New York (he also became a PERC Research Fellow), Craig Lewis at the FMA meetings, and Bob Whaley at the Investment and Wealth Institute, the Vanderbilt Board of Trustees, the CBOE's 25th Year Celebration of the VIX, and the Owen School's Board of Visitors.

Research in action

In 1992, the Chicago Board Options Exchange commissioned Professor Whaley to create the CBOE Market Volatility Index based on prices from its S&P index option markets. They had two purposes in mind. The first was to create an index based on expected stock market volatility rather than observed stock market prices. The second was to create a reference asset upon which the CBOE could develop futures and options markets. "The rest, they say, is history." The CBOE began disseminating the level of VIX on a real time basis in April 1993. In March 2004, VIX futures contracts were launched, and VIX options followed in February 2006. Now, twenty-five years later, VIX has become the market's premier "fear gauge," and futures and options contracts on VIX have become among the most actively exchange-traded products ever launched. The event was commemorated in New York in April.

- ◆ **April 13, 1993**
Cboe begins disseminating the VIX Index
- ◆ **March 24, 2004**
Cboe introduces VIX futures
- ◆ **February 24, 2006**
Cboe introduces VIX options
- ◆ **March 15, 2011**
VIX options single-day volume tops 1 million contracts
- ◆ **June 16, 2011**
VIX futures single-day volume tops 2 million contracts
- ◆ **February 14, 2014**
VIX options single-day volume tops 2 million contracts
- ◆ **April 15, 2016**
Cboe begins overnight dissemination of the VIX Index
- ◆ **February 2, 2018**
VIX options volume hits single-day record of 4.34 million contracts
- ◆ **February 6, 2018**
VIX futures volume hits single-day record of 1.46 million contracts

The **VIX Index** methodology is used globally to calculate volatility expectations at exchanges across **North America, Asia and Europe**



19.37

The average VIX Index closing price is between 1990 and 2017

20.01

Largest single-day point move in VIX Index on February 5, 2018

24 x 5

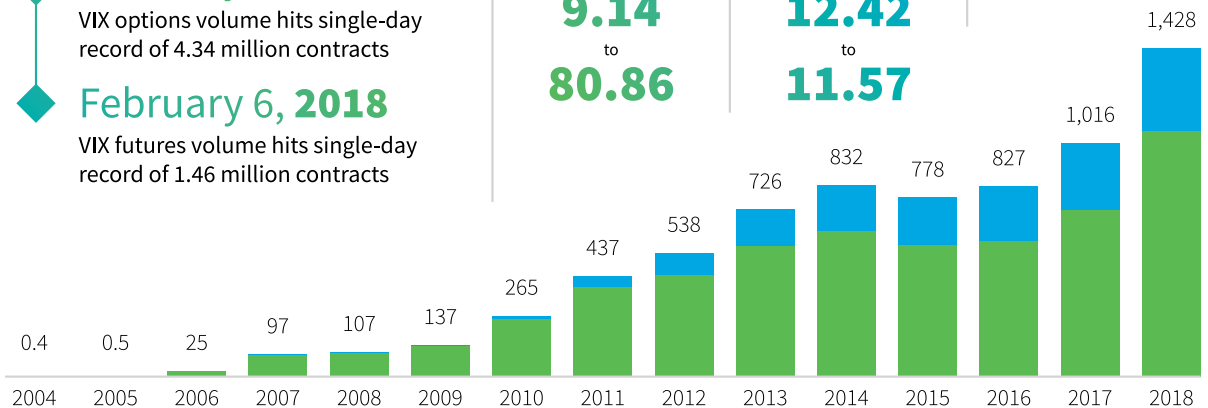
VIX futures trade nearly 24 hours a day, five days a week

The range of VIX Index closing prices is between

9.14
to
80.86

The most common closing levels of the VIX Index are

12.42
to
11.57



VIX Options and Futures Combined Annual ADV (Contracts, In Thousands)

2018 figure is year-to-date through end of March

■ VIX Options ■ VIX Futures

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Dear Colleagues,

Vanderbilt's Financial Markets Research Center (FMRC) annual conference brings together many of the brightest minds in academia and industry to explore timely market-related issues. This year, the focus turned to Exchange-Traded Products (ETPs), which have enjoyed enormous success since their inception in the early 1990s. Their benefits – low fees, tax efficiency, and liquidity – are well-known, but the risks remain murky. With ETPs now representing over 30% of traded value in U.S. markets, understanding their potential costs is more important than ever.

Featured research included an examination VIX Exchange-traded products, which entered the market in 2009. The underlying volatility measure, developed by FMRC Director and Vanderbilt Professor Robert Whaley for the Cboe, is celebrating its 25th anniversary this year. We are extremely fortunate to have such a pioneering mind at the Owen Graduate School of Management, advancing the field of finance and leading the important work of the FMRC.

The conference showcases academic research, industry expertise, and regulatory issues, and offers ample opportunity for participants to learn and debate. FMRC research from 2018 was presented and discussed across the world, at leading research conferences, universities, and roundtables. In the spirit of learning and discussion, we've attached a recap of that research.

The FMRC is one of the foremost academic organizations dedicated to the exploration of current topics in finance, and we are proud of its work. I look forward to hosting you again at the 2019 FMRC Conference.



Warm regards,

A handwritten signature in black ink, appearing to read 'M. Eric Johnson'.

M. Eric Johnson

Ralph Owen Dean

Bruce D. Henderson Professor of Strategy

Vanderbilt University Owen Graduate School of Management