

# Special Notice

## Financial Technology Innovation

### FINRA Requests Comment on Financial Technology Innovation in the Broker-Dealer Industry

Comment Period Expires: October 12, 2018

#### Summary

New financial technology innovations, commonly known as “fintech,” can offer benefits for investors and the financial services industry, but can also present investor protection concerns where the safeguards of the securities laws are not respected. FINRA’s discussions with representatives of the fintech industry and our member firms through our Innovation Outreach Initiative<sup>1</sup> have enabled us to better understand market participants’ interest in efforts among regulators to create an environment supportive of fintech innovations that benefit investors and the capital markets. Moreover, we have received several requests to solicit feedback from the broader public regarding how FINRA may support fintech innovation consistent with our mission of investor protection and market integrity.<sup>2</sup> In response to these requests, we are seeking comments on how FINRA can support fintech development consistent with this mission. In addition, we request specific comment on certain fintech areas, including the provision of data aggregation services, supervisory processes concerning the use of artificial intelligence, and the development of a taxonomy-based machine-readable rulebook.

Questions regarding this *Notice* should be directed to:

- ▶ Haimera Workie, Senior Director, Office of Emerging Regulatory Issues (ERI), at (202) 728-8097;
- ▶ Kavita Jain, Director, ERI, at (202) 728-8128; or
- ▶ Alex Khachaturian, Director, ERI, at (202) 728-8275.

July 30, 2018

#### Suggested Routing

- ▶ Executive Representatives
- ▶ Senior Management



Financial Industry Regulatory Authority

## Action Requested

FINRA encourages all interested parties to comment on this *Notice*. Comments must be received by October 12, 2018.

Comments must be submitted through one of the following methods:

- ▶ Emailing comments to [pubcom@finra.org](mailto:pubcom@finra.org); or
- ▶ Mailing comments in hard copy to:  
Jennifer Piorko Mitchell  
Office of the Corporate Secretary  
FINRA  
1735 K Street, NW  
Washington, DC 20006-1506

To help FINRA process comments more efficiently, persons should use only one method to comment on this *Notice*.

**Important Notes:** All comments received in response to this *Notice* will be made available to the public on the FINRA website. In general, FINRA will post comments as they are received.<sup>3</sup>

## Background

Many traditional financial services providers are incorporating emerging technologies and services into their business processes. These fintech innovations can take many forms and affect many aspects of the securities industry. For example, fintech has been used in capital raising, trading, asset management and research. Fintech applications related to digital advice and social media tools are also altering the old models for wealth management and changing how brokerage and investment advice services are offered to investors. For example, some registered representatives are using these tools to enhance their ability to analyze portfolios and better communicate with investors. In addition, firms are augmenting market research with tools such as artificial intelligence, natural language processing and social media sentiment tracking in order to develop greater insight from vast amounts of data.

## FINRA's Innovation Outreach Initiative

FINRA, as a self-regulatory organization for the broker-dealer industry overseen by the Securities and Exchange Commission (SEC), is dedicated to investor protection and market integrity in a manner that facilitates vibrant capital markets. Consistent with this mission, FINRA is monitoring fintech developments, adapting its regulatory programs as necessary to respond to those developments, and considering ways in which it can support innovation that is in the interest of the investing public.

FINRA has already taken a number of steps to improve our understanding of how fintech is transforming the securities industry and to provide information to investors and our members about these developments. Actions that FINRA has undertaken include the following:

- ▶ FINRA developed an external website to provide the public with information related to FINRA’s Innovation Outreach Initiative as well as to provide a centralized FINRA location for fintech-related matters.<sup>4</sup>
- ▶ FINRA formed a Fintech Industry Committee composed of both large and small member firms, non-member firms offering fintech-related services, as well as committee observers from the SEC and the North American Securities Administrators Association (NASAA), to provide a platform for ongoing dialogue and analysis of fintech developments. Topics of focus for the committee include: (i) the potential impact of innovation on FINRA’s investor protection and market integrity objectives; (ii) challenges to the adoption of fintech-based products or services; (iii) opportunities to improve interactions with FINRA to support innovations that are consistent with FINRA’s investor protection and market integrity objectives; and (iv) possible FINRA fintech-related initiatives.
- ▶ FINRA held a blockchain symposium in July 2017, a San Francisco fintech regional roundtable in September 2017, a Dallas fintech regional roundtable in November 2017 and a New York City fintech regional roundtable in April 2018. The blockchain symposium was attended by over 200 participants and featured a panel of regulators and industry participants highlighting blockchain developments impacting the securities industry. The regional roundtables in San Francisco, Dallas, and New York City featured regional firms, market participants and regulators, discussing several emerging areas in fintech, including artificial intelligence, regulatory technology (regtech), initial coin offerings (ICOs), and big data analytics.
- ▶ At the FINRA Annual Conference in May 2018, FINRA hosted Fintech Office Hours and engaged in discussions with several member firms and industry participants regarding innovations that are being explored in the securities industry.
- ▶ In response to feedback we received through our discussions with market participants since the start of Innovation Outreach Initiative, FINRA is exploring the development of a report highlighting the implications of regtech for the securities industry. FINRA has also issued related Investor Alerts:
  - ▶ [Know Before You Share: Be Mindful of Data Aggregation Risks](#);
  - ▶ [Don’t Fall for Cryptocurrency-Related Stock Scams](#); and
  - ▶ [Initial Coin Offerings: Know Before You Invest](#).
- ▶ FINRA has previously issued other reports and Investor Alerts on a number of fintech areas highlighting the associated risks and benefits related to applicable innovations, including with respect to crowdfunding, distributed ledger technology, digital investment advice and automated investment tools.<sup>5</sup>

- ▶ FINRA has actively worked to engage with fellow regulators, both domestic and international, to share insights and approaches to address fintech-related issues.

In addition to these broader efforts related to fintech, FINRA has made a concerted effort to better understand and address the issues and risks presented by distributed ledger technology, ICOs and the digital asset market more generally. For example, our [report on distributed ledger technology](#) provided a description of some of the operational and regulatory considerations for broker-dealers seeking to get involved in this space. Additionally, the Investor Alerts on ICOs and digital currencies have helped make investors aware of the types of potential risks that are involved in this market.

## General Request for Comments on Facilitating Innovation

As outlined above, FINRA has already taken and is continuing to take a number of steps in support of fintech innovation consistent with our goals of investor protection and market integrity. As we consider taking additional steps, however, we are mindful of the desire expressed by market participants to have a forum to provide views concerning what additional actions may be helpful. Specifically, we have heard suggestions from market participants about the potential benefits of soliciting broader feedback regarding the effects of any FINRA rules or administrative programs on fintech innovation.<sup>6</sup>

Accordingly, FINRA welcomes comments that can help identify where our rules or administrative processes could be modified to better support fintech innovation without adversely affecting investor protection or market integrity. FINRA also requests comments on potential areas of innovation that would benefit from a greater focus on investor protection concerns and safeguards under the securities laws. In addition, we welcome comments that suggest programmatic changes that have been used effectively by other regulators to support innovation. For example, some industry participants in our Innovation Outreach Initiative suggested that FINRA consider ways to modify our rules to permit an activity-limited broker-dealer model to test new fintech-based models. Others have asked whether additional measures may be taken to address issues presented by the digital asset market.

In addition to the general request for comments, FINRA is requesting comment on three specific topics that are under discussion by market participants and have been raised as potential areas for engagement by FINRA through the Innovation Outreach Initiative:

- ▶ provision of data aggregation services through compiling information from different financial accounts into a single place for investors;
- ▶ supervisory processes concerning the use of artificial intelligence; and
- ▶ development of a taxonomy-based machine-readable rulebook.

## Data Aggregation

Many investors have started using data aggregation services that compile their financial data from different financial institutions into one place in order to offer a variety of services such as financial planning, portfolio analysis, budgeting, and other types of financial analysis or advice. Such services may involve developing a personalized financial “dashboard,” sometimes called a personal financial management (PFM) portal, which may include information such as investments, savings, insurance holdings and credit balances. Having a central place to review all relevant financial information may prove helpful for some investors.

To compile financial data, data aggregation service providers may obtain their clients’ username/password credentials for the accounts that the clients seek to have aggregated. These security credentials would allow the aggregation service provider to grab or “scrape” the data reflected in an applicable financial institution by accessing the online accounts of its clients. Scraping is the practice of using an automated process involving a code or a “robot” that goes out to the third-party websites, registers using the applicable security credentials and collects applicable account information. Typically, in this context, the aggregation service provider and the financial institution do not have any contractual agreement.

As an alternative to scraping, a growing number of financial institutions are offering data aggregation service providers an “application programming interface” (API), which establishes a set of protocols for developing direct transfers of data from the financial institution to the aggregator. APIs could give consumers the ability to authorize (or revoke) access, limit scope and specify whether fund transfers are permitted. A contractual agreement between the aggregator and the financial institution is generally a prerequisite for this type of access. These agreements typically impose responsibilities and technical requirements on both sides to safeguard data and privacy.

Broker-dealers may play a variety of roles in the context of data aggregation. For example, a broker-dealer may be the financial institution from which an aggregation service provider seeks to obtain data on behalf of the aggregator’s client. Broker-dealers may also function as aggregation service providers themselves, either through the development of their own tools or working in collaboration with a third-party aggregator.

Throughout the course of our discussions with market participants as part of the Innovation Outreach Initiative, many firms noted a number of issues related to the increased desire for data aggregation services by investors, including issues regarding data access, security, integrity, competition and innovation.<sup>7</sup> Some firms also suggested that it may be beneficial for FINRA to play a role in helping broker-dealers and investors address issues raised by data aggregation and requested that we solicit broader feedback on ways FINRA could be helpful (*e.g.*, through convening an industry working group or working with an existing group to facilitate the development of standards or protocols on relevant areas associated with data aggregation).<sup>8</sup>

FINRA previously published a *Regulatory Notice* that provided guidance to member firms regarding their responsibilities when providing customers with consolidated financial account reports, which may be generated using data aggregation services.<sup>9</sup> This *Notice* emphasized that consolidated reports are communications with the public and, as a result, must be clear, accurate and not misleading. This *Notice* also discussed supervisory and internal control systems, as well as sound practices, that help ensure that these reports are clear and accurate.

FINRA is requesting comments on what role, if any, FINRA should play to assist broker-dealers and investors in addressing issues raised by the increased use of data aggregation services in the financial industry. Relatedly, FINRA also requests comments on any technology or compliance challenges presented by attempts to develop consolidated statements in association with data aggregation.

## Supervision in the Context of Artificial Intelligence

During the course of our interactions with broker-dealers and vendors as part of the Innovation Outreach Initiative, FINRA observed a growing interest in applying artificial intelligence techniques,<sup>10</sup> including machine learning and natural language processing, to tools that broker-dealers use to support their business. Applications for artificial intelligence tools focus on areas such as anti-money laundering/know-your-customer compliance, trading, data management and customer service. The use of artificial intelligence in the securities industry has the potential to improve operational effectiveness and efficiency, both through the direct application of artificial intelligence, to enhance the customer experience, and through its use in tools that broker-dealers use to support their customer interactions or compliance efforts.

International financial regulatory bodies have provided insight into the challenges and benefits that the use of artificial intelligence tools by market participants may present, along with related policy implications. For example, both the Basel Committee on Banking Supervision (BCBS) and the Financial Stability Board (FSB) recently published papers addressing issues related to the use of artificial intelligence-based tools in the financial services industry.<sup>11</sup> While this information is helpful in the broader context of understanding issues that the use of artificial intelligence raises, many questions applicable to specific regulatory regimes are likely to remain.

Accordingly, as broker-dealers increase their use of artificial intelligence—including chat bot-based services—they are grappling with how these tools may fit into the regulatory framework under which they operate. For instance, [FINRA Rule 3110](#) requires a firm to establish and maintain a system to supervise the activities of its associated persons that is reasonably designed to achieve compliance with the applicable securities laws and regulations and FINRA rules.<sup>12</sup> FINRA has also previously stated that: “[A]s the use of algorithmic strategies has increased, the potential of such strategies to adversely impact

market and firm stability has likewise grown. When assessing the risk that the use of algorithmic strategies creates, firms should undertake a holistic review of their trading activity and consider implementing a cross-disciplinary committee to assess and react to the evolving risks associated with algorithmic strategies.”<sup>13</sup>

FINRA seeks to better understand the challenges or issues that broker-dealers may face in deploying artificial intelligence tools, and several questions in this regard are presented below. In this context, FINRA is requesting comment on any measures that FINRA could take to clarify or adapt its rules and processes in light of the evolving uses of such tools.<sup>14</sup> By asking these questions, FINRA intends to develop a deeper understanding of how artificial intelligence may affect the industry and the steps that FINRA may take to facilitate its use in ways that enhance investor protection and market integrity.

### Adoption of Artificial Intelligence Tools

- ▶ For what purposes are members using, or considering, artificial intelligence tools—including chat bots and robotic process automation (RPA) tools—in their brokerage businesses? What benefits do firms anticipate that these tools will bring to their businesses or to investors? What business risks or challenges do firms anticipate that these tools will pose to their operations? Are there any specific uses, benefits, risks or challenges that FINRA should consider when seeking to regulate firms deploying artificial intelligence tools?
- ▶ Do firms’ governance practices for the development and ongoing operation of artificial intelligence tools differ from those used for tools or processes that use more conventional operational techniques? What is the nature of any differences and how would such differences impact regulatory compliance efforts?
- ▶ What forms of gap analysis or quality assurance do firms typically conduct in the context of developing artificial intelligence tools and how does this type of analysis differ in comparison to other tools that may be used in compliance areas such as surveillance?

### Regulatory Requirements for Artificial Intelligence Tools

- ▶ Where are the greatest challenges in adapting the existing regulatory framework for financial services to work with the adoption of artificial intelligence tools? How do the challenges vary based on the application for which broker-dealers are seeking to use these tools?
- ▶ What challenges, if any, do firms face as they seek to develop artificial intelligence tools—including chat bots and RPA tools—and comply with applicable FINRA requirements, including those noted above related to supervision? What can FINRA do to support firms’ adoption of appropriate tools consistent with our regulatory mission of investor protection and market integrity?

- ▶ Are there difficulties associated with administering supervisory obligations in the context of decision making that is based on or facilitated by artificial intelligence? If so, what is the nature of these difficulties and how have firms attempted to address them?
- ▶ Are there specific regulatory issues that the use of artificial intelligence tools in the context of algorithmic trading strategies raises? If so, please describe the nature of any issues.

## Development of a Taxonomy-Based Machine-Readable Rulebook

Global expenditures on compliance programs are widely expected to increase in the coming years under a post-financial crisis regulatory environment that continues to evolve.<sup>15</sup> In turn, financial institutions are faced with the challenge of keeping pace with changes to regulatory requirements and are devoting significant resources to their internal regulatory compliance functions.

To address some of these challenges, certain regulators, financial institutions and fintech firms have been exploring how technology and innovation can be used to make regulatory compliance less complex and more efficient. The UK Financial Conduct Authority (FCA) and the Bank of England (BoE) have launched an initiative to examine how to simplify regulatory compliance through the digitization of rulebooks, making them “machine-readable.”<sup>16</sup> The term “machine-readable rulebook” is generally used to refer to a regulatory rulebook that is structured in a way that is more easily processed by a computer and, therefore, less time-consuming and costly for review by a firm’s compliance staff. Other regulators, such as the Commodity Futures Trading Commission (CFTC), have also publicly indicated that they may consider ways to develop this type of rulebook.<sup>17</sup>

Through the Innovation Outreach Initiative, FINRA staff has engaged with key stakeholders to learn more about available tools for building a machine-readable rulebook. In addition, FINRA is seeking to broaden the dialogue to gain a better understanding of the desirability and the feasibility of the development of a machine-readable rulebook.

For instance, in theory, building a machine-readable regulatory rulebook could provide the foundation for the later development of machine-executable rules with related links to firms’ compliance policies, procedures and transaction databases.<sup>18</sup> According to the FCA and BoE, such efforts have the potential to “fundamentally change how the financial services industry understands, interprets, and then reports regulatory information,”<sup>19</sup> by allowing firms to map relevant regulatory obligations to their business needs and processes. These changes could potentially benefit both firms and regulators by improving the accuracy of data submissions, lowering the costs of compliance and allowing for quicker implementation in response to changing regulatory requirements.<sup>20</sup>

The realization of such a vision is likely to be a complex and long road, particularly if there is a desire for financial regulators to adopt a consistent taxonomy for their rulebooks. However, as an incremental step, based on feedback from some market participants, FINRA is considering the feasibility and desirability of developing a type of machine-readable rulebook through the creation of an embedded taxonomy (*i.e.*, a method for classification and categorization) within its rules to help market participants better process applicable requirements. The rules could potentially reflect the relevant taxonomy through a tagging process using metadata (*i.e.*, summary information used to reflect the underlying data) to allow for more streamlined searches based on areas such as business lines, activities and themes.<sup>21</sup> This type of intelligent search capability using metadata potentially allows for quicker and easier data searches, opening up the accessibility of the FINRA rulebook to a wider audience.<sup>22</sup>

Accordingly, FINRA is soliciting comment on the potential benefits and challenges associated with developing a machine-readable rulebook, and requests responses to the questions below concerning potential uses associated with a machine-readable rulebook and the related development of a common taxonomy.

#### Uses of Machine-Readable Rulebook

- ▶ Who is likely to benefit if FINRA were to develop a machine-readable rulebook using an embedded taxonomy? For what purpose would it be used by market participants? What types of market participants would be most likely to use it?
- ▶ Would firms or third-party service providers seek to develop tools to interact with a machine-readable rulebook? Would such a rulebook assist with compliance efforts? If so, in what ways would it make compliance more efficient or effective?
- ▶ Is there a risk of over-reliance on output provided by a machine-readable rulebook, such that insufficient analysis may be done by individuals? What measures, if any, could be taken to limit the potential for over-reliance?

#### Development of Common Taxonomy

- ▶ As noted previously, certain regulators have developed, or are considering developing, a taxonomy-based machine-readable rulebook. What are the potential benefits and challenges associated with developing a consistent or harmonized taxonomy across regulators? What regulatory areas would have the greatest benefits or challenges from any such harmonization?
- ▶ Absent the development of a consistent or harmonized taxonomy across relevant regulators, would the creation of a machine-readable rulebook by FINRA be useful? Are there technology tools or processes that decrease the need for a consistent or harmonized taxonomy?
- ▶ What role should vendors and regulated firms play in the adoption, development and ongoing taxonomy maintenance?

## Endnotes

- 1 FINRA launched the [Innovation Outreach Initiative](#) in June 2017. The initiative consists of a cross-departmental effort to foster an ongoing dialogue with the securities industry that will help FINRA better understand fintech innovations and their impact on the industry. See FINRA press release, [FINRA Launches Innovation Outreach Initiative](#) (June 13, 2017).
- 2 Requests for FINRA to solicit feedback through an open process from the broader public have been made through the FinTech Industry Committee and regional fintech roundtables that were developed as part of the Innovation Outreach Initiative. In addition, a similar request was received in response to the [FINRA Special Notice—Engagement Initiative](#) (March 21, 2017). See related [comment letter](#) from Fidelity Investments.
- 3 Persons submitting comments are cautioned that FINRA does not redact or edit personal identifying information, such as names or email addresses, from comment submissions. Persons should submit only information that they wish to make publicly available. See *Notice to Members 03-73* (November 2003) (Online Availability of Comments) for more information.
- 4 See FINRA's [FinTech webpage](#).
- 5 See FINRA's [FinTech webpage](#).
- 6 FINRA notes that are our rules and administrative programs are only part of a broader framework of financial regulation, which is also administered by the SEC, the CFTC, banking agencies, state securities regulators and insurance commissioners, and other relevant regulatory agencies (both domestic and international). Making changes to this broader regulatory framework is beyond FINRA's control and, in certain cases, FINRA rules are mandated by, or must conform to, specific statutory requirements or SEC rules. Moreover, any change to FINRA rules requires SEC approval.
- 7 For instance, while the use of APIs may offer a more secure approach for accessing data there may be competitive disincentives for financial institutions to make such client data readily available to aggregators.
- 8 In October 2017, the Consumer Financial Protection Bureau (CFPB) outlined principles for consumer protection in the area of consumer-authorized financial data sharing and aggregation, with a particular focus on data protection and privacy. CFPB, [Consumer Protection Principles: Consumer-Authorized Financial Data Sharing and Aggregation](#) (Oct. 18, 2017). SIFMA has also issued [data aggregation principles](#). In Europe, the revised Payment Services Directive (PSD2) embraced the concept of "open banking," requiring banks to build APIs to establish a secure and efficient way for banks to share customer data with non-banking entities (e.g., financial intermediaries, technology vendors), allowing for greater innovation. Ryan Browne, [Europe's Banks Brace for a Huge Overhaul That Throws Open the Doors to Their Data](#), CNBC (Jan. 3, 2018).
- 9 See [Regulatory Notice 10-19](#) (Apr. 2010). *Regulatory Notice 10-19* reminds firms of their responsibilities to ensure that they comply with all applicable rules when engaging in the practice of providing customers with consolidated financial account reporting (e.g., reports offering a single document that combines information regarding most or all of the customer's financial holdings, regardless of where those assets are held). In addition, *Regulatory Notice 10-19* highlights a number of sound practices related to these types of activities.
- 10 While there is no universally agreed upon definition of artificial intelligence, the Financial Stability Board (FSB) describes artificial intelligence as "(t)he application of computation tools to address tasks traditionally requiring human sophistication." Machine learning and

- natural language processing are generally thought of as sub-categories of artificial intelligence. FSB, [Artificial intelligence and Machine Learning in Financial Services: Market Developments and Financial Stability Implications](#) (Nov. 2017).
- 11 BCBS, [Sound Practices: Implications of Fintech Developments for Banks and Bank Supervisors](#) (Aug. 31, 2017). FSB, [Artificial intelligence and Machine Learning in Financial Services: Market Developments and Financial Stability Implications](#) (Nov. 2017).
  - 12 See FINRA Rule 3110; see also, FINRA, [Supervision Frequently Asked Questions \(FAQ\)](#) (addressing questions around FINRA Rules 3110, 3120, and 3130 and noting, in part, that: “Rule 3110(c)(2) (B) permits firms to use reasonable risk-based criteria to determine the authenticity of the transmittal instructions”).
  - 13 [Regulatory Notice 15-09](#) (Mar. 2015).
  - 14 Firms are required to abide by all applicable FINRA rules in conducting their business, but certain rules may be particularly relevant to firms using, or considering using, tools that incorporate artificial intelligence techniques. In this context, artificial intelligence applications may raise questions regarding the application of rules such as FINRA Rule 3110(a) and (b), related to supervisory obligations; FINRA Rule 1032(f), concerning algorithmic trading strategies and responsibilities related to oversight of third-party service providers that used artificial intelligence-based tools (see [Notice to Members 05-48](#) (July 2005)); and, to the extent a firm uses artificial intelligence applications to create or distribute communications with the public, supervision responsibilities concerning such activity in accordance with the requirements of FINRA Rules 2210 and 3110.
  - 15 Accenture, [Compliance Costs for Financial Institutions Will Continue to Increase Over the Next Two Years Driven by Regulations and Emerging Risks, According to Global Accenture Survey of Executives](#) (Apr. 10, 2017).
  - 16 UK Financial Conduct Authority, [Model Driven Machine Executable Regulatory Reporting](#) (Nov. 1, 2017) (hereinafter UK FCA Work Programme).
  - 17 J. Christopher Giancarlo, Chairman, CFTC, [Remarks at the Singapore Fintech Festival](#) (Nov. 15, 2017); Daniel Gorfine, Director of LabCFTC and Chief Innovation Officer, CFTC, [Keynote Address Before the 33rd Annual FIA Futures & Options Expo](#) (Oct. 19, 2017). In addition, in March 2017, the Financial Transparency Act, a bipartisan proposal that directs U.S. financial regulators to adopt “a uniform, open, electronically searchable data format” for data reported by firms was introduced in an effort to streamline compliance requirements for businesses and to improve the transparency of information collected by regulators.
  - 18 Machine-executable rules may include, for instance, regulatory guidance issued in the form of computer code that could, therefore, be self-implementing (*i.e.*, automatically implemented through the use of machines) by market participants. See, *e.g.*, [Compliance in the Future: Machine-Executable Rules](#), *The Wall Street Journal* (Jan. 10, 2018).
  - 19 UK FCA Work Programme.
  - 20 UK FCA Work Programme. See also, UK Financial Conduct Authority, [Project Innovate: Call for Input Feedback Statement](#), at 14 (Oct. 2014).
  - 21 The term “taxonomy” has its roots in the Greek language, and the words *taxis* (signifying “order” or “arrangement”) and *nomos* (signifying “law” or “science”), roughly translating to “the law of ordering.”
  - 22 [Corlytics Helps Create ‘Intelligent’ Rule Book for FCA](#), *FinExtra* (Sept. 27, 2017).