

# Beyond Mechanics: The Intersection of Securities Lending and ESG Investing

**Bridget Realmuto LaPerla**

Head of ESG Research, State Street Associates

**Travis Whitmore**

Securities Finance Research, State Street Associates



**In early December 2019, one of the world's largest pension funds announced that it "decided to suspend stock lending until further notice."<sup>1</sup> This is one example of a growing number of asset owners evaluating their securities lending practices due to environmental, social and governance (ESG) concerns as long-term investors.<sup>2</sup> Concerns have been raised that short sellers (borrowers) could potentially undermine long-term stewardship efforts by mispricing or not considering ESG characteristics.<sup>3</sup>**

**The immediate impact of these events on the world's lending supply was limited. For context, in June 2019, global on-loan balances were around US \$2.45 trillion, representing a small proportion of the US \$18.47 trillion available within lending programs.<sup>4</sup>**

However, as the number of asset owners with these ESG-related concerns grows, the lending supply may further decline. And, between 2018 and 2019 the United Nation's Principles for Responsible Investment (UNPRI) reported a 16% increase in the number of asset owner signatories committed to ESG investing, bringing the total to over 2,300 signatories with more than US \$86.3 trillion in assets under management.<sup>5, 6</sup>

In this editorial, we attempt to form a perspective on the intersection of ESG investing and securities lending based on academic findings. After an extensive literature review, there are four main findings that we cover:

- Empirical evidence supports foundational assumptions in financial theory, which suggests that short selling, facilitated by securities lending, improves market efficiency and allows for the proper allocation of capital
- Increasing number of regulations and investor demands are driving the adoption of sustainable investment strategies

- Lenders have attempted to integrate ESG, but with fewer examples of borrowers with ESG investment philosophies, some lenders are concerned about the potential negative impacts on their long-term ESG stewardship efforts due to borrowers mispricing these characteristics
- While research indicates that short selling does not destroy a company's long-term value, the relationship between short selling and material ESG performance is unclear

#### **What are the ESG concerns of long-term investors?**

A growing number of asset owners and managers are voicing concerns that securities lending limits their ability to exercise proper stewardship on underlying investments, highlighting three key concerns:

1. The transfer of stock ownership rights. When stocks are on loan, the voting rights for those shares are also transferred. This is inconsistent with the wishes of asset owners who mandate that their asset managers need to conscientiously exercise voting rights on all their shares.
2. There is a transparency concern because owners do not have clarity on who borrows shares nor the reasoning behind those decisions.<sup>7</sup>

3. Underlying these points is the perception that short sellers (borrowers) destroy long-term value due to a misalignment in the longer-term investment time-horizon of lenders (beneficial owners). This raises issues of “short-termism,” which can be defined as the “excessive focus on short-term results at the expense of long-term interests.”<sup>8</sup>

Asset owners are not the first institutions to direct concerns at short sellers. Financial regulators have historically viewed short selling with a level of skepticism, especially during times of financial turmoil. For example, in the 2008 financial crisis, the Securities and Exchange Commission (SEC) pointed to short sellers as a reason behind the sharp decline in prices and banned short selling on 799 financial stocks.<sup>9</sup> The continued debate has attracted interest from academics, which we can turn to for a better understanding of the role of short sellers in capital markets.

### **What is short selling’s role in capital markets?**

Before tackling whether short selling harms long-term value, we need to understand its role in capital markets. Empirical studies that explore short selling’s role in markets tend to fall into three main categories: (1) cross-country variation, (2) event studies and (3) time-series and cross-sectional analyses. Each research methodology provides a different perspective on the securities lending market.

Cross-country variation studies use variations in regulations and market practices across countries to study the impact short selling has

## **The two primary considerations when examining short selling’s impact on capital markets are Liquidity and Price discovery.**

on market efficiency. Event studies analyze the impact of short-selling constraints and regulations on various events (e.g., bans during the 2008 financial crisis). Lastly, time-series and cross-sectional analysis uses daily or intra-day stock-loan data to examine the impact of shorting flow at securities level.

The two primary considerations when examining short selling’s impact on capital markets are liquidity and price discovery.

**Liquidity** is the ease with which an asset can be sold or bought and is commonly proxied for by the bid-ask spread. In illiquid markets, bid-ask spreads are wider resulting in costlier trades.

**Price discovery** is a critical process in financial markets in which the proper price of an asset is determined based on the incorporation of all available public information.

**Liquidity:** In theory, the impact of short-selling constraints on liquidity is ambiguous. Numerous studies have shown that short sellers are informed market participants – increases in borrowing rates or shorting demand are correlated with abnormal negative returns.<sup>10, 11</sup> Removing informed sellers reduces the asymmetry of information and narrows bid-ask spreads. At the same time, the market mechanism is disrupted and revelation of information is slower, which could widen spreads.

Empirical findings from all three types of academic studies tend to agree that short selling constraints reduce liquidity at the single-stock and broader market level:

- 1. Cross-county variation:** A study of 111 countries found that in countries where short selling is more feasible, turnover, a proxy for liquidity, was 15% higher. That is, there is increased liquidity of market indices when short selling is possible.<sup>12</sup>
- 2. Event studies:** Financial stocks subject to shorting bans during the 2008 financial crisis resulted in spreads that were two to three times wider while controlling for previous behavior.<sup>13, 14, 15</sup>
- 3. Time-series:** Suggest that short sellers can be liquidity suppliers when spreads are especially wide, providing a stabilizing force in the stock market.<sup>16</sup>

**Price discovery:** The theoretical impact of short selling on the speed of price discovery is clearer than it is for liquidity. Short-selling constraints restrict traders with negative information from expressing their sentiment, slowing the speed with which bad news is incorporated into market prices.

Empirical evidence from the three categories tends to agree with this theory:

- 1. Cross-county variation:** An analysis of 46 equity markets reveals that countries that permit short selling, incorporate information into prices quicker. Additionally, short sales restrictions don't reduce negative skewness of returns at the stock level.<sup>17</sup>

- 2. Event studies:** Price discovery was slower for stocks impacted by the short-selling bans during the 2008 financial crisis, especially where negative news was concerned.<sup>15</sup>
- 3. Time-series:** Prices of stocks with short-selling *constraints* (such as low lending supply) are less informative. Evidence also suggests increased "shorting flow reduces post-earnings-announcement drift for negative earnings surprises".<sup>18, 19, 20</sup>

### **Is short selling detrimental to long-term value?**

The studies cited above provide empirical evidence that short selling is important for efficient capital markets and when viewed holistically, suggest that short selling is not detrimental to long-term value. Additionally, there are several specific studies that found no statistical difference in excess returns of stocks for which short sales were banned and for those stocks in which short selling was permitted.<sup>21, 22, 15</sup> To summarize, a body of academic evidence indicates that short sellers are informed in that they anticipate price declines. However, they are not responsible for driving asset prices down.

### **What does this mean for investors?**

While it is often claimed that the short-term horizon of borrowers is at odds with long-term objectives, existing literature suggests this is not the case and instead, reveals short selling to be an important market mechanism. Moreover, evidence indicates that short sellers' presence in a market increases liquidity.

Increased liquidity means reduced transaction costs on average, while price discovery helps investors get more accurate prices and potentially prevents disruptive price bubbles.

Basic financial theory suggests and empirical evidence supports the idea that short selling, facilitated by securities lending, improves market efficiency and allows for the proper allocation of capital.<sup>23</sup>

With that said, this view only looks at short selling from a purely economic perspective but does not necessarily speak to the interplay between short selling and ESG characteristics of securities.

### **The growing presence of ESG in investing**

To understand the intersection of ESG and securities lending, we pull insights from empirical studies on investor behavior in climate finance and ESG investment management of listed equities.

In our 2019 paper, *Decarbonization Factors*, a collaboration with Harvard Business School professor, George Serafeim, we shed light on how active institutional flows move around environmental characteristics, specifically operational carbon intensity, and the long-term implications of such patterns of flow.<sup>24</sup>

This seminal work on decarbonization factors and investor behavior revealed that active institutional investor flows contain information about anticipated climate-related fundamentals and returns. To put it simply, for those

seeking alpha opportunities, tilting towards low carbon strategies experiencing positive contemporaneous flows improves returns. In addition, we observed a low correlation between strategies in the United States and Europe. This was particularly salient after 2016, when almost all US decarbonization factors experienced outflows after the change in presidential administration, an effect not seen in Europe.

There is regional specificity seen in investor behavior as well as regulation. For environmental metrics, such as carbon emissions, companies are increasingly paying the price through the 58 sovereign and sub-sovereign pricing schemes globally.<sup>25</sup> Additionally, the EU Commission has set legislation around the Task Force for Climate Related Financial Disclosure (TCFD), Japan's stewardship code recommends company engagement to promote sustainable growth and France's Energy Transition Law (Article 173) requires institutional investors to disclose information on their ESG integration and how strategies align with an energy and ecological transition.<sup>26</sup> Companies are disclosing more ESG metrics to be listed on any of the 94 sustainable stock exchanges requiring some level of ESG disclosure, a number that has

### **The EU Commission has set legislation around the Task Force for Climate Related Financial Disclosure (TCFD).**

significantly increased over the last 10 years.<sup>27</sup> ESG characteristics are being considered throughout the investment landscape. For example, recently Goldman Sachs announced that they will not “take a company public unless there is at least one diverse board candidate.”<sup>28</sup>

These efforts are extensions of empirical research revealing that investors are focusing on material “E,” “S” and “G” metrics. Leading frameworks, most notably the Sustainability Accounting Standards Board identifies material ESG metrics as meaningful to the financial or operational performance of a company.<sup>29</sup> In Serafeim’s foundational paper, *Corporate Sustainability: First Evidence on Materiality*, he and his co-authors, Mozaffar Khan and Aaron Yoon, studied novel materiality sustainability characteristics to discover value implications of ESG investments.<sup>30</sup> To understand how public sentiment has changed over the years, in 2018 Serafeim found that the valuation premium of strong material ESG performance has increased over time as a function of “positive public sentiment momentum.”<sup>31</sup> Alpha was recognized through the creation of a low sentiment ESG factor, designed to identify firms improving ESG performance with low public sentiment. This research found that public sentiment on ESG has indeed changed and that this perception influences investor views on the value of ESG performance. This ESG investing literature and our climate finance research suggest that investors are increasingly incorporating material ESG characteristics into their investment decisions and diving deeper into these characteristics with company fundamentals.

## **Some long-term investors hold companies responsible for key ESG characteristics in an effort to improve performance over time.**

### **Can ESG investing and securities lending co-exist?**

To some extent, investors are already integrating ESG metrics into their lending (borrowing) strategies. We know this through Harvard case studies and public reporting to UNPRI. Asset owners currently exercise their shareholder rights by recalling securities on loan or by setting a threshold on how many shares can be on loan at a given time. For example: some Swedish asset owners have instituted a policy of recalling all securities on loan prior to annual general meetings, some Australian asset owners recall domestic securities on loan to vote prior to key votes and some French asset owners limit the percentage of a holding on loan to 90% when a vote is considered to be “high impact.”<sup>32</sup>

Shareholders looking to communicate their views on a company’s performance and governance regarding material metrics vote on key themes and engage with companies on those themes. The demand for transparency from some long-term investors (lenders) stems from thinking about fiduciary duty across generations, which raises concerns that lenders are undermining their own long-term ESG stewardship efforts by loaning stocks to borrowers who potentially disagree with (or ignore) the value of those

ESG characteristics.<sup>33</sup> These lenders hold companies responsible for key ESG characteristics in an effort to improve performance over time.

Currently, lender to borrower transparency is limited due to privacy agreements between brokers and borrowers. ESG investors lending stocks may appreciate information about the borrower or request ESG collateral of those borrowing their stocks. These requests and the solutions could take many forms and may change the pricing of the stock being lent.

While limited literature exists on borrowers integrating ESG, a recent paper published by AQR, illustrates a borrower's perspective on ESG short-selling opportunities.<sup>34</sup> This borrower looked to improve performance by shorting poorly ESG ranked stocks (as a proxy for ESG performance), relative to an ESG-screened long-only strategy (or long/short ESG-screened strategy). Mirroring the ESG concerns and views on stewardship of long-term ESG beneficial owners (lenders), these short positions exert pressure on the corporate boards of companies with poor

# 16%

**increase in the number of asset owner signatories committed to ESG investing between 2018 and 2019 was reported by UNPRI.**

ESG rankings, as boards are aware of the percentage of their stock being shorted. While not a prevalent approach for borrowers, this sheds light on how long-term ESG investors can take part in the securities lending market.

## **Conclusion**

Empirical evidence indicates that short selling, facilitated by securities lending, improves market efficiency and market liquidity. A holistic view of academic studies suggests that constraints on short selling can lead to overpricing. This alleviates concerns of short-termism stemming from time horizon misalignment of short sellers with long-term ESG investors.

Leveraging empirical ESG and climate finance research, we know that investors are using material ESG metrics in their investment decisions to improve their risk and return profiles. An increasing number of lenders and some borrowers apply these characteristics when considering what they loan (borrow) and to whom.

We do not yet know the impact that short selling has on a company's material ESG performance in the long term. New insights will come from studying the changing dynamics between lenders and borrowers and the potential impact on a company's material ESG performance. Through systematic empirical research, we may find ways and opportunities for the securities lending market to evolve and potentially grow. We look forward to approaching these questions and continuing to apply a rigorous data-driven approach to understanding this space.

## End notes

1. Leo Lewis and Billy Nauman (2019). Short sellers under fire from investment boss of world's largest pension fund, Financial Times
2. Mizuno, H., Ailman, C.J. and Pilcher, S. (March 2020). Joint Statement on the Importance of Long-term, Sustainable Growth.
3. Henderson, R., Serafeim, G., Lerner, J. and, Jinjo, N. (2019). Should a Pension Fund Try to Change the World? Inside GPIF's Embrace of ESG.
4. International Securities Lending Association (ISLA) (2019) Annual Report.
5. UNPRI.org. (accessed February 10, 2020).
6. We define "ESG investing" as the practice of systematically integrating ESG and climate finance concerns into an investment process, which is in line with the UNPRI and the leading research cited in this paper.
7. Suspension of Stock Lending Activities (December 3, 2019). GPIF.
8. CFA Institute
9. Baja, V. and Bowley, G. (2008). "S.E.C. Temporarily Blocks Short Sales of Financial Stocks". New York Times.
10. Boehmer, E., Jones, C.M. and Zhang, X. (2008), Which Shorts Are Informed? The Journal of Finance
11. Cohen, L., Diether, K. B., & Malloy, C. J. (2007). Supply and demand shifts in the shorting market. The Journal of Finance
12. Daouk and Charoenrook (2009). A Study of Market-Wide Short-Selling Restrictions. Working paper, Cornell University.
13. Boehmer, E., Jones, C. M. and Zhang, X. (2013). Shackling Short Sellers: The 2008 Shorting Ban. The Review of Financial Studies.
14. Marsh, I. and Payne, R. (2012). Banning Short Sales and Market Quality: The UK's Experience. Journal of Banking & Finance.
15. Beber, A., Pagano, M. (2013). Short-Selling Bans Around the World: Evidence from the 2007–09 Crisis. Journal of Finance.
16. Comerton-Forde, C., Jones, C. M. and Putniņš, T. J. (2016). Shorting at Close Range: A Tale of Two Types. Journal of Financial Economics.
17. Bris, A., Goetzmann, W. N. and Zhu, N. (2007). Efficiency and the Bear: Short Sales and Markets Around the World. The Journal of Finance.
18. Saffi, P. A. and Sigurdsson, K. (2010). Price Efficiency and Short Selling. The Review of Financial Studies.
19. Reed, A. (2007). Costly Short-selling and Stock Price Adjustment to Earnings Announcements, Working paper, University of North Carolina.
20. Boehmer, E and Wu, J. (2012). Short Selling and the Price Discovery Process. Review of Financial Studies.
21. Battalio, R., Mehran, H., and Schultz, P. (2011). "Market Declines: Is Banning Short Selling the Solution?". Federal Reserve Bank of New York Staff Reports
22. Beber, A., Fabbri, D., Pagano, M., Simonelli, S. (2018). "Short-selling bans and bank stability". Working paper: European Systemic Risk Board.
23. The CAPM theory underpins modern portfolio theory and provides a basis for allocating portfolios between risky and risk-free assets. Two CAPM assumptions are: that short positions are allowed and there are no transaction costs. The foundation of CAPM was published in the following papers: William Sharpe. (1964). Capital Asset Prices: A Theory of Market Equilibrium. Journal of Finance.
24. Cheema-Fox, A., LaPerla, B.R., Serafeim, G., Turkington, D. and Wang, H. (2019). Decarbonization Factors. Working Paper on SSRN.
25. World Bank Carbon Pricing Dashboard. (accessed February 10, 2020). UNPRI.org.
26. Responsible Investment Regulation Map (as of September 9, 2019). UNPRI.org
27. Sustainable Stock Exchanges Initiative website (February 10, 2020). SSEInitiative.org. SSEI partners with the UNPRI.
28. "The CEO of Goldman Sachs Says the Bank Won't Take Companies Public Unless There is at Least One 'Diverse' Board Member." (January 23, 2020). Forbes.com
29. Sustainability Accounting Standards Board (SASB) SASB.org.
30. Serafeim, G. (2015). Corporate Sustainability: First Evidence on Materiality. The Accounting Review.
31. Serafeim, G. (2018). Public Sentiment and the Price of Corporate Sustainability. Harvard Business School. Working Paper.
32. UNPRI Practical Guide to Active Ownership. (2018). UNPRI.org.
33. Henderson, R., Serafeim, G., Lerner, J. and, Jinjo, N. (2019). Should a Pension Fund Try to Change the World? Inside GPIF's Embrace of ESG.
34. Palazzolo, C., Pomorski, L. and Fitzgibbons, S. (2018). Hit 'Em Where It Hurts: ESG Investing 2.0. Investments & Pensions Europe.

## Disclaimers and Important Risk Information

The information provided herein is not intended to suggest or recommend any investment or investment strategy, does not constitute investment advice, does not constitute securities, futures, or swap research, is not market commentary, and is not a solicitation to buy or sell securities, derivatives, foreign exchange or any financial product. It does not take into account any investor's particular investment objectives, strategies or tax status. Clients should be aware of the risks trading foreign exchange, equities, fixed income or derivative instruments or in investments in non-liquid or emerging markets. Derivatives generally involve leverage and are therefore more volatile than their underlying cash investments. Past performance is no guarantee of future results.

This communication is not intended for and must not be provided to retail investors. The products and services described in this communication may not be available in all jurisdictions and this communication is not intended for distribution in any jurisdiction where such distribution would be prohibited. The products and services outlined herein are only offered to professional clients or eligible counterparties through State Street Bank and Trust Company, authorized and regulated by the Federal Reserve Board. State Street Bank and Trust Company is registered with the Commodity Futures Trading Commission as a Swap Dealer and is a member of the National Futures Association. Please note that certain foreign exchange business (spot and certain forward transactions) are not regulated.

This document is a marketing communication, and the information contained herein has not been prepared in accordance with legal requirements designed to promote the independence of investment research. It is for clients to determine whether they are permitted to receive research of any nature.

The products and services outlined in this document are generally offered in the **United States and Latin America** by State Street Bank and Trust Company. This communication is made available in **Japan** by State Street Bank and Trust Company, Tokyo Branch, which is regulated by the Financial Services Agency of Japan and is licensed under Article 47 of the Banking Act. **EMEA:** (i) State Street Bank and Trust Company, London Branch, authorised and regulated by Federal Reserve Board, authorised by the Prudential Regulation Authority, subject to regulation by the Financial Conduct Authority and limited regulation by the Prudential Regulation Authority. Details about

the extent of regulation by the Prudential Regulation Authority are available upon request; and/or (ii) State Street Bank International GmbH, authorised by Deutsche Bundesbank and the German Federal Financial Supervisory Authority and, in respect of State Street Bank International GmbH, London Branch, subject to limited regulation by the Financial Conduct Authority and Prudential Regulation Authority. Details about the extent of regulation by the Financial Conduct Authority and Prudential Regulation Authority are available upon request.

**Brazil:** The products in this marketing material have not been and will not be registered with the Comissão de Valores Mobiliários - the Brazilian Securities and Exchange Commission ("CVM"), and any offer of such products is not directed to the general public within the Federative Republic of Brazil ("Brazil"). The information contained in this marketing material is not provided for the purpose of soliciting investments from investors residing in Brazil and no information in this marketing material should be construed as a public offering or unauthorized distribution of the products within Brazil, pursuant to applicable Brazilian law and regulations. The products and services outlined in this document are generally offered in **Canada** by State Street Bank and Trust Company. This communication is made available in **Hong Kong** by State Street Bank and Trust Company which accepts responsibility for its contents, and is intended for distribution to professional investors only (as defined in the Securities and Futures Ordinance). This communication is made available in **Australia** by State Street Bank and Trust Company ABN 70 062 819 630, AFSL 239679 and is intended only for wholesale clients, as defined in the Corporations Act 2001. This communication is made available in **Singapore** by State Street Bank and Trust Company, Singapore Branch ("SSBTS"), which holds a wholesale bank license by the Monetary Authority of Singapore. In Singapore, this communication is only distributed to accredited, institutional investors as defined in the Singapore Financial Advisers Act ("FAA"). Note that SSBTS is exempt from Sections 27 and 36 of the FAA. When this communication is distributed to overseas investors as defined in the FAA, note that SSBTS is exempt from Sections 26, 27, 29 and 36 of the FAA. The products and services outlined in this document are made available in South Africa through State Street Bank and Trust Company, which is authorized in **South Africa** under the Financial Advisory and Intermediary Services Act, 2002 as a Category I Financial Services Provider; FSP No. 42671. This communication is made available in **Israel** by State Street Bank and Trust Company, which is not licensed under Israel's Regulation of Investment

Advice, Investment Marketing and Portfolio Management Law, 1995. This communication may only be distributed to or used by investors in Israel which are "eligible clients" as listed in the First Schedule to Israel's Regulation of Investment Advice, Investment Marketing and Portfolio Management Law 1995. This communication is made available in **Qatar** by State Street Bank and Trust Company and its affiliates. The information in this communication has not been reviewed or approved by the Qatar Central Bank, the Qatar Financial Markets Authority or the Qatar Financial Centre Regulatory Authority, or any other relevant Qatari regulatory body. This communication is made available in **Malaysia** by State Street Bank and Trust Company, which is authorized and regulated by the Federal Reserve Board. State Street Bank and Trust Company is not licensed within or doing business within Malaysia and the activities that are being discussed are carried out off-shore. The written materials do not constitute, and should not be construed as constituting: 1) an offer or invitation to subscribe for or purchase securities or futures in Malaysia or the making available of securities or futures for purchase or subscription in Malaysia; 2) the provision of investment advice concerning securities or futures; or 3) an undertaking by State Street Bank and Trust Company to manage the portfolio of securities or futures contracts on behalf of other persons. This communication is made available in **Turkey** by State Street Bank and Trust Company and its affiliates. The information included herein is not investment advice. Investment advisory services are provided by portfolio management companies, brokers and banks without deposit collection licenses within the scope of the investment advisory agreements to be executed with clients. Any opinions and statements included herein are based on the personal opinions of the commentators and authors. These opinions may not be suitable to your financial status and your risk and return preferences. Therefore, an investment decision based solely on the information herein may not be appropriate to your expectations. This communication is made available in **United Arab Emirates** by State Street Bank and Trust Company and its affiliates. This communication does not, and is not intended to, constitute an offer of securities anywhere in the United Arab Emirates and accordingly should not be construed as such. Nor does the addressing of this communication to you constitute, or is intended to constitute, the carrying on or engagement in banking, financial and/or investment consultation business in the United Arab Emirates under the rules and regulations made by the Central Bank of the United Arab Emirates, the Emirates Securities and Commodities

Authority or the United Arab Emirates Ministry of Economy. Any public offer of securities in the United Arab Emirates, if made, will be made pursuant to one or more separate documents and only in accordance with the applicable laws and regulations. Nothing contained in this communication is intended to endorse or recommend a particular course of action or to constitute investment, legal, tax, accounting or other professional advice. Prospective investors should consult with an appropriate professional for specific advice rendered on the basis of their situation. Further, the information contained within this communication is not intended to lead to the conclusion of any contract of whatsoever nature within the territory of the United Arab Emirates. This communication has been forwarded to you solely for your information, and may not be reproduced or passed on, directly or indirectly, to any other person or published, in whole or in part, for any purpose. This communication is addressed only to persons who are professional, institutional or otherwise sophisticated investors. This communication is made available in **South Korea** by State Street Bank and Trust Company and its affiliates, which accept responsibility for its contents, and is intended for distribution to professional investors only. State Street Bank and Trust Company is not licensed to undertake securities business within South Korea, and any activities related to the content hereof will be carried out off-shore and only in relation to off-shore non-South Korea securities. This communication is made available in **Indonesia** by State Street Bank and Trust Company and its affiliates. Neither this communication nor any copy hereof may be distributed in Indonesia or to any Indonesian citizens wherever they are domiciled or to Indonesian residents except in compliance with applicable Indonesian capital market laws and regulations. This communication is not an offer of securities in Indonesia. Any securities referred to in this communication have not been registered with the Capital Market and Financial Institutions Supervisory Agency (BAPEPAM-LK) pursuant to relevant capital market laws and regulations, and may not be offered or sold within the territory of the Republic of Indonesia or to Indonesian citizens through a public offering or in circumstances which constitute an offer within the meaning of the Indonesian capital market law and regulations. This communication is made available in **Oman** by State Street Bank and Trust Company and its affiliates. The information contained in this communication is for information purposes and does not constitute an offer for the sale of foreign securities in Oman or an invitation to an offer for the sale of foreign securities. State Street Bank and Trust Company is

neither a bank nor financial services provider registered to undertake business in Oman and is neither regulated by the Central Bank of Oman nor the Capital Market Authority. Nothing contained in this communication report is intended to constitute Omani investment, legal, tax, accounting, investment or other professional advice. This communication is made available in **Taiwan** by State Street Bank and Trust Company and its affiliates, which accept responsibility for its contents, and is intended for distribution to professional investors only. State Street Bank and Trust Company is not licensed to undertake securities business within Taiwan, and any activities related to the content hereof will be carried out off-shore and only in relation to off-shore non-Taiwan securities. **Peoples Republic of China ("PRC")**. This communication is being distributed by State Street Bank and Trust Company. State Street Bank and Trust Company is not licensed or carrying on business in the PRC in respect of any activities described herein and any such activities it does carry out are conducted outside of the PRC.

**For more information, please contact:**

**Bridget Realmuto LaPerla**

[BLaPerla@StateStreet.com](mailto:BLaPerla@StateStreet.com)

**Travis Whitmore**

[TWhitmore@StateStreet.com](mailto:TWhitmore@StateStreet.com)

These written materials do not constitute, and should not be construed as constituting: 1) an offer or invitation to subscribe for or purchase securities or futures in PRC or the making available of securities or futures for purchase or subscription in PRC; 2) the provision of investment advice concerning securities or futures; or 3) an undertaking by State Street Bank and Trust Company to manage the portfolio of securities or futures contracts on behalf of other persons.

State Street Global Markets® is the business name and a registered trademark of State Street Corporation®, and is used for its financial markets business and that of its affiliates.. State Street Associates® is a registered trademark of State Street Corporation, and the analytics and research arm of State Street Global Markets. Please contact your State Street representative for further information.

SSA MMD 2020-01.

**STATE STREET®**

State Street Corporation  
One Lincoln Street, Boston, MA 02111

[www.statestreet.com](http://www.statestreet.com)

©2020 State Street Corporation – All Rights Reserved  
Expiration date: 4/30/2021, 3020424.1.1.GBL