



FIDELITY MANAGEMENT & RESEARCH COMPANY

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This brochure provides information about the qualifications and business practices of Fidelity Management & Research Company ("FMR"). Throughout this brochure and related materials, FMR may refer to itself as a "registered investment adviser" or "being registered." These statements do not in any way imply a certain level of skill or training. If you have any questions about the contents of this brochure, please contact us at 617-563-7000. The information in this brochure has not been approved or verified by the United States Securities and Exchange Commission ("SEC") or by any state securities authority.

Additional information about FMR also is available on the SEC's website at www.adviserinfo.sec.gov.

MATERIAL CHANGES

What follows is a discussion only of the material changes made since the annual update of this brochure was filed on March 28, 2017.

- Updates have been made to the “Brokerage Practices” section to reflect impacts to accounts managed by FMRIM (UK) and how third-party research is acquired as a result of the implementation of MiFID II.
- Updates have been made to the “Trade Allocation Policies” subsection of the “Brokerage Practices” section to reflect certain changes to the trade allocation policies.
- Updates have been made to the “Other Financial Industry Activities and Affiliations” section to reflect certain organizational changes impacting Fidelity Clearing Canada ULC, Fidelity Investments Canada ULC and Fidelity (Canada) Asset Management ULC.

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ADVISORY BUSINESS

Fidelity Management & Research Company ("FMR") serves as the investment adviser to certain of Fidelity's family of mutual funds (the "Fidelity Funds" or the "Fidelity group of funds") and various other institutional accounts. FMR, a wholly-owned subsidiary of FMR LLC, has been registered with the Securities and Exchange Commission ("SEC") since 1971.

FMR provides investment supervisory services, including sub-advisory services, to institutional accounts, principally investment companies (also referred to as "mutual funds") registered under the Investment Company Act of 1940 (the "1940 Act"). With regard to the Fidelity Funds, under the terms of its management contract with each fund, FMR acts as investment adviser and, subject to the supervision of each fund's Board of Trustees or Directors (as applicable) (each a "Board of Trustees" and collectively the "Boards of Trustees"), has overall responsibility for directing the investments of each fund in accordance with its investment objective, policies and restrictions as provided in its registration statement filed with the SEC. FMR or its affiliates provide all necessary office facilities and personnel for servicing the funds' investments, and also pay the salaries and fees of all officers of the funds; of all members of the Boards of Trustees who are "interested persons" of the funds, FMR or its affiliates; and of all personnel of the funds, FMR or its affiliates who perform services relating to research, statistical and investment activities. Though FMR may advise the mutual funds and other institutional accounts it manages regarding certain commodity interests, FMR is not registered as a commodity pool operator or commodity trading adviser.

As part of its non-discretionary advisory services, FMR or its affiliates provide investment research services, which may include written research notes and ratings and portfolio modeling services. FMR may provide this research to other affiliates and unaffiliated investment managers and financial institutions, in some instances on a delayed basis. In addition, FMR or its affiliates, subject to the supervision of the Board of Trustees of each fund in the Fidelity group of funds, provide the management and administrative services necessary for the operation of the Fidelity group of funds. These services include: providing facilities for maintaining each fund's organization; supervising relations with custodians, transfer and pricing agents, accountants, underwriters and other persons dealing with the funds; at the direction of the funds, preparing all general shareholder communications and conducting shareholder relations; at the direction of the funds, maintaining each fund's records and the registration and notice filing status of each fund's shares under federal and state law; developing management and shareholder services for each fund; and furnishing reports, evaluations and analyses on a variety of subjects to the Board of Trustees of each fund in the Fidelity group of funds.

FMR may, to the extent permitted by its advisory contracts, delegate investment discretion over all or a portion of the portfolio to one or more sub-advisers, including FMR's subsidiaries and affiliates and various subsidiaries and affiliates of FIL Limited ("FIL"). If FMR or its affiliates engages FIL or another unaffiliated entity to sub-advise an FMR fund or account, or a portion of an FMR fund or account, the sub-adviser's policies and procedures, including trade allocation and conflicts of interest, may apply to that fund or account, subject to applicable law. FMR has access to investment research on a substantially delayed basis from various subsidiaries and affiliates of FIL (including Fidelity (Canada) Asset Management ULC ("FCAM")), which are investment advisers registered with the SEC operating principally in the United Kingdom, Japan and Hong Kong or Participating Affiliates (as defined below) of such registered advisers. Certain of FIL's subsidiaries and affiliates (including FCAM), which are companies not registered with the SEC (each, a "Participating Affiliate"), may have access to information (such as through employees who work for both a FIL-registered adviser and the unregistered FIL subsidiary or affiliate) concerning securities recommendations for the registered adviser's U.S. clients. FMR disclaims that it is a related person of FIL.

In the course of FMR's providing its investment advisory services, a portfolio manager, analyst or other employee of FMR or its affiliates may, from time to time, express views regarding a particular company, security, industry or market sector. The views expressed by any such person are the views of only that individual as of the time expressed and do not necessarily represent the views of FMR or its affiliates or any other person in the Fidelity organization. Any such views are subject to change at any time based

upon market or other conditions and FMR disclaims any responsibility to update such views. These views may not be relied on as investment advice and, because investment decisions for an account managed by FMR or its affiliates are based on numerous factors, may not be relied on as an indication of trading intent on behalf of any such account.

FMR or its affiliates generally have authority to determine which securities to purchase or sell and the total amount of such purchases and sales. However, with respect to each discretionary account, FMR's and its affiliates' authority is subject to certain limitations, including the applicable investment objectives, policies and restrictions. These limitations may be based on a variety of factors, including regulatory constraints and policies formally imposed by a client or its governing body (e.g., Board of Trustees) through, for example, a management agreement. With respect to FMR's registered investment company clients, many of the applicable investment policies and limitations are set forth in each client's registration statement filed with the SEC.

As of December 31, 2017, FMR managed \$295,213,704,232 of client assets on a discretionary basis. As of December 31, 2017 FMR did not manage any client assets on a non-discretionary basis.

FEES AND COMPENSATION

The management fee arrangements with most of FMR's mutual fund clients generally consist of one or more of the following elements: a group fee rate, an individual fund fee rate, and a performance adjustment rate. The group fee rate is based on the assets of all of the registered investment companies for which FMR serves as advisor, and the rate decreases as total assets for these registered investment companies increase and vice versa. An individual fund fee rate is the portion of a fund's rate that takes into account the relative costs of executing that individual fund's investment strategy. The performance adjustment rate is the rate at which an individual fund's overall fee rate (i.e., the combined group fee rate and individual fund fee rate) adjusts based on whether the fund out- or underperforms its benchmark. Not all of FMR's mutual fund clients will have group fee rates or performance adjustment rates (e.g., clients that have flat fees or all-inclusive fee arrangements).

A generic fee schedule describing these arrangements is provided below:

*Fee Schedule**

Group Fee	+	Individual Fund Fee	+/-	Performance Adjustment (if any)	=	Management Fee
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** See individual fund's or account's registration statement or offering document for fee schedules specific to the fund or account*

For certain equity funds that have performance adjustments, the performance adjustment rate is calculated monthly by comparing the fund's performance relative to a benchmark over a 36-month performance period. The maximum annualized performance adjustment rate is $\pm 0.20\%$ of the fund's average net assets over the performance period. The performance adjustment rate is divided by twelve and multiplied by the fund's average net assets over the performance period, and the resulting dollar amount is then added to or subtracted from the basic fee.

The fees of bond and money market (also referred to as "fixed income") funds generally are fixed fees based on assets or a combination of a group fee rate and an individual fund fee rate, or fees that vary both with assets and fund income.

The specific rate charged to any particular fund may vary based on the application of the individual fund fee rate, group fee rate, and performance adjustment fee, if any. The fee applicable to any fund, along with its fee schedule, is disclosed in that fund's registration statement or offering document.

FMR or its affiliates do not receive a management fee for investment advisory services provided to certain funds available through fee-based programs offered by FMR's affiliates and are instead compensated for their services out of such fees.

FMR or its affiliates generally pay the organizational and promotional expenses of mutual funds comprising the Fidelity group of funds. The majority of FMR's clients in the Fidelity group of funds pay all of their other operating expenses. However, certain of FMR's clients have "all-inclusive fee" arrangements or other expense limitation agreements, pursuant to which FMR or its affiliates pay certain of the mutual fund's operating expenses.

FMR may provide non-discretionary advisory services, primarily in the form of research services, to other affiliated and unaffiliated investment managers or financial institutions, in some instances on a delayed basis. With respect to such services, fees are negotiable, paid in arrears, and generally relate to the amount of assets benefiting from the research or other advisory services.

In the case of investment companies registered under the 1940 Act, the advisory contract with FMR is subject to approval by the Board of Trustees, including trustees who are not interested persons (as defined in the 1940 Act) ("Independent Trustees"), of each mutual fund. FMR's fees for providing these services are negotiated on an individual basis and may vary significantly among clients, though each negotiated rate generally consists of one or more of the following elements: the group fee rate, the individual fund fee rate, and the performance adjustment rate, as discussed above. Fees charged to mutual fund clients are subject to negotiation prior to the initiation of FMR's services.

Compensation to FMR is deducted from a registered investment company's assets and payable on a monthly basis in arrears or on such other terms as FMR and the particular client may from time to time agree. Any investment advisory agreement concerning a registered investment company will terminate within two years of the effective date of the investment advisory agreement unless renewed by the investment company in a manner permitted by Section 15 of the 1940 Act. Any such agreement shall also terminate upon assignment or upon sixty (60) days' advance written notice by any party to the agreement or by the investment company concerned.

For FMR clients that are not registered investment companies, compensation to FMR is deducted from that client's assets in arrears generally on a monthly basis or at such other time as agreed between FMR and/or its affiliates and the particular client. When FMR is serving as a sub-adviser to clients that are not registered investment companies, the adviser to those clients may pay FMR directly. FMR and/or its affiliates and the particular client may also agree to other terms of compensation from time to time.

Where FMR sub-advises on behalf of other investment advisers, FMR may charge a sub-advisory fee computed as a percentage of assets under management or a percentage of the investment adviser's management fee, as negotiated with the investment adviser.

FMR may, from time to time, voluntarily or contractually agree to reimburse certain of its mutual fund clients for management fees and other expenses above a specified limit. FMR retains the ability to be repaid by such clients if expenses fall below the specified limit prior to the end of the client fiscal year. Reimbursement arrangements can decrease a fund's expenses and enhance its performance. Voluntary reimbursement arrangements may be discontinued by FMR at any time.

In addition to any management fee payable to FMR, fees payable to the transfer agent and pricing and bookkeeping agent, and costs associated with securities lending, most funds in the Fidelity group of funds or classes thereof, as applicable, pay all fund expenses that are not assumed by those parties. Most funds pay for the typesetting, printing, and mailing of their proxy materials to shareholders, legal expenses, and the fees of the custodian, auditor, and Independent Trustees. Most funds' management contracts further provide that the fund will pay for typesetting, printing, and mailing prospectuses, statements of additional information, notices, and reports to shareholders; however, under the terms of these funds' transfer agent agreements, the transfer agent bears these costs. Other expenses paid by a fund generally include interest, taxes, brokerage commissions, the fund's proportionate share of

insurance premiums and Investment Company Institute dues, and the costs of registering shares under federal securities laws and making necessary filings under state securities laws. A fund is also liable for such non-recurring expenses as may arise, including costs of any litigation to which the fund may be a party, and any obligation it may have to indemnify its officers and Trustees with respect to litigation. For information regarding FMR's brokerage arrangements, see "Brokerage Practices" on page 17.

PERFORMANCE-BASED FEES AND SIDE-BY-SIDE MANAGEMENT

The management of multiple funds and accounts (including proprietary accounts of FMR or one or more of its affiliates) may give rise to potential conflicts of interest if the funds and accounts have different objectives, benchmarks, time horizons, and fees as the portfolio manager must allocate his or her time and investment ideas across multiple funds and accounts. As described in "Fees and Compensation" on page 5, certain equity funds in the Fidelity group of funds have management fees that include a performance adjustment component. Where a portfolio manager manages multiple funds and accounts, and some of those funds and accounts include performance-adjusted fees and others do not, the portfolio manager may have an incentive to favor those funds and accounts that include a performance-adjusted component.

Potential conflicts of interest may also arise if fund or account orders do not get fully executed due to being aggregated with those of other funds or accounts managed by FMR or an affiliate. The portfolio manager also may execute transactions for another fund or account that may adversely impact the value of securities held by a fund. For example, the portfolio manager may manage funds or accounts that engage in short sales, and could sell short a security for such a fund or account where other funds or accounts may trade or hold the shorted security. Although FMR or an affiliate monitors such transactions to attempt to ensure equitable treatment of both the fund or account and a fund or account that engages in short sales, there can be no assurance that the price of a security held by the fund or account would not be impacted as a result. Also, securities selected for a particular fund or account may outperform the securities selected for other funds or accounts managed by the same portfolio manager. Portfolio managers may be permitted to invest in the funds or accounts they manage, even if a fund or account is closed to new investors.

FMR has adopted policies and procedures and maintains a compliance program designed to help manage such potential conflicts, which include trade allocation policies approved by the Fidelity Funds' Boards of Trustees. These policies and procedures seek to ensure that FMR is not favoring one fund or account over another, and that trading for all funds and accounts is conducted in a fair and equitable manner. There can be no assurance, however, that all conflicts have been addressed in all situations. For more information regarding conflicts of interests relating to the management of multiple funds and accounts, see "Code of Ethics, Participation or Interest in Client Transactions and Personal Trading" on page 16.

TYPES OF CLIENTS

FMR's clients are generally mutual funds or other institutional accounts. FMR may also sub-advise mutual funds or other institutional accounts for affiliated and unaffiliated advisers. FMR may serve as an adviser or sub-adviser to various accounts for which FMR's affiliates or FIL, FIL's subsidiaries or affiliates have contracted to provide investment advisory services. These accounts include, among others, unit and investment trusts, collective investment trusts, and investment companies authorized in jurisdictions outside the United States. FMR may provide investment supervisory services on behalf of clients of affiliated or unaffiliated advisers following similar investment strategies that FMR uses for another client.

FMR will generally accept only investment company clients or similar foreign mutual fund clients on a fully discretionary basis (subject to whatever limitations have been set forth by the client's or fund's investment

objectives, policies and restrictions, and as may be imposed by law). To the extent other accounts would be considered, an initial amount of \$5,000,000 would generally be required.

METHODS OF ANALYSIS, INVESTMENT STRATEGIES AND RISK OF LOSS

FMR may use a variety of methods of security analysis to select investments in managing client assets, including fundamental analysis (i.e., evaluating each issuer's financial condition, industry position, and the market and economic conditions impacting their profitability); quantitative analysis (i.e., mathematical and statistical modeling); technical analysis (i.e., statistical analysis of market activity); and cyclical analysis (i.e., evaluating issuers based in part on their sensitivity to business cycles). FMR may also use general macro-economic analysis as a component of its security analysis methods. In addition to relying on public financial statement information, FMR may use extensive corporate visits and interviews with issuer management teams in conducting research.

FMR may use a wide variety of investment strategies in managing client assets according to client investment objectives, including, but not limited to, investing in: stocks and other public and private equity securities; bonds and other debt securities of all types and repurchase agreements for those securities; real estate related investments of all types; derivatives, such as index futures, covered and uncovered options, interest rate, total return and credit default swaps, swaptions, and equity-linked notes; currency spot and forward trading and other currency related derivatives; other investment funds, including exchange traded funds; and FMR's or its affiliates' central funds (specialized investment vehicles used by Fidelity Funds to invest in particular security types or investment disciplines, or for cash management). FMR invests in securities of companies engaged in a variety of economic sectors and industries that are domiciled in the U.S. and outside the U.S. (in developed, emerging and frontier markets); in stocks with growth or value characteristics; and in companies with market capitalizations of all sizes. With respect to money market funds, FMR observes industry-standard regulatory requirements for money market funds for the quality, maturity, and diversification of investments.

FMR may use a variety of trading approaches to implement its investment strategies, including cash trading on- and off-exchange, covered short sales, margin transactions, and option writing, including covered options, uncovered options or spreading strategies. Margin may be required in connection with certain client futures and options transactions or in connection with short sales. FMR does not engage in the purchase of securities on margin, except it may do so in connection with clearance and settlement of securities transactions. The extent to which any of these strategies is used on behalf of any one client is based on that client's investment objective, policies and restrictions.

In addition, FMR may engage in securities lending to parties such as broker-dealers or other institutions. FMR has established policies for its clients reasonably designed to ensure that lending opportunities are apportioned appropriately among them over time. When supply/demand is insufficient to satisfy all eligible clients, lending opportunities are generally apportioned based on the client's security position size as a percentage of the client's net assets in that particular security.

The strategies presented above pose risks, and many factors affect each fund's or account's performance. Strategies that pursue investments in equities will be subject to stock market volatility, and strategies that pursue fixed-income investments (such as bond or money market funds) will see values fluctuate in response to changes in interest rates. All strategies are ultimately affected by impacts to the individual issuers, such as changes in an issuer's profitability and credit quality, or changes in tax, regulatory, market or economic developments. Non-diversified funds and accounts that invest in a smaller number of individual issuers can be more sensitive to these changes. Nearly all funds or accounts are subject to volatility in non-U.S. markets, either through direct exposure or indirect effects on U.S. markets from events abroad, including fluctuations in foreign currency exchange rates and, in the case of less-developed markets, currency illiquidity. Those funds and accounts with investments in emerging and frontier markets are potentially subject to heightened volatility from greater social, economic, regulatory, and political uncertainties, as the extent of economic development, political stability, market depth, infrastructure, capitalization, and regulatory oversight can be less than in more

developed markets. Trading, settlement, and custodial practices (including those involving securities settlement where fund or account assets may be released prior to receipt of payment) in non-U.S. markets may be less developed than those in U.S. markets and may result in increased investment or valuation risks, increased counterparty exposure, or substantial delays (including those arising from failed trades or the insolvency of, or breach of duty by, a broker-dealer, securities depository, sub-custodian, clearinghouse or other party). Additionally, funds or accounts that pursue debt investments are subject to risks of prepayment or default, and funds or accounts that pursue strategies that concentrate in particular industries or are otherwise subject to particular segments of the market (e.g., money market funds' exposure to the financial services industry, municipal funds' exposure to the municipal bond market, or international, emerging markets or frontier markets funds' exposure to a particular country or region) may be significantly impacted by events affecting those industries or markets. Strategies that lead funds or accounts to invest in other funds bear all the risks inherent in the underlying funds in which those funds invest, and strategies that pursue leverage risk, including investment in derivatives—such as swaps (interest rate, total return, and credit default) and futures contracts—and forward-settling securities, magnify market exposure and potential losses. Additionally, funds and accounts may be subject to operational risks, which can include risks of loss arising from failures in internal processes, people or systems, such as routine processing errors or major systems failures, or from external events, such as securities exchange outages.

Ultimately, a fund's or account's share price and/or net asset value changes daily based on changes in market conditions, foreign currency exchange rates, and interest rates, and in response to other economic, political, or financial developments. A fund's or account's reaction to these events will be affected by the types of securities in which the fund or account invests; the financial condition, industry and economic sector, and geographic location of an issuer; and the fund's or account's level of investment in the securities of that issuer. A fund's or account's investment in such securities involves risk of loss that clients of the fund or account would, and should, be prepared to bear. When a shareholder sells or redeems shares in the fund, the shares may be worth more or less than what the shareholder paid for them, which means that the shareholder could lose money by investing in the fund. Similarly, an account owner could lose money due to a decline in the account's net asset value.

Due to regulatory and issuer-specific limits that apply to the ownership of securities of certain issuers, FMR and its affiliates may limit investments in the securities of such issuers. Similar limitations may apply to futures and other derivatives, such as options. In addition, FMR and/or its affiliates may from time-to-time determine that, because of regulatory requirements that may apply to FMR and/or its affiliates in relation to investments in a particular country or in an issuer operating in a particular regulated industry, investments in the securities of issuers domiciled or listed on trading markets in that country or operating in that regulated industry above certain thresholds may be impractical or undesirable. The foregoing limits and thresholds may apply at the account level or in the aggregate across all accounts (or certain subsets of accounts) managed, sponsored, or owned by, or otherwise attributable to, FMR and its affiliates. For investment risk management and other purposes, FMR and its affiliates also generally apply internal aggregate limits on the amount of a particular issuer's securities that may be owned by all such accounts. In connection with the foregoing limits and thresholds, FMR may limit or exclude clients' investment in a particular issuer, future, derivative and/or other instrument (or limit the exercise of voting or other rights) and investment flexibility may be restricted. In addition, to the extent that client accounts already own securities that directly or indirectly contribute to such an ownership threshold being exceeded, FMR may sell securities held in such accounts in order to bring account-level and/or aggregate ownership below the relevant threshold. In the event that any such sales result in realized losses for client accounts, those client accounts may bear such losses depending on the particular circumstances.

With respect to FMR's mutual fund and other institutional account clients, more detailed information relating to the methods and strategies and their associated risks are set forth in that fund's or account's prospectus and registration statement filed with the SEC or other applicable offering or account guideline documents.

With the increased use of technologies to conduct business, FMR and its affiliates are susceptible to operational, information security and related risks. In general, cyber incidents can result from deliberate

attacks or unintentional events and may arise from external or internal sources. Cyber attacks include, but are not limited to, gaining unauthorized access to digital systems (e.g., through “hacking” or malicious software coding) for purposes of misappropriating assets or sensitive information; corrupting data, equipment or systems; or causing operational disruption. Cyber attacks may also be carried out in a manner that does not require gaining unauthorized access, such as causing denial-of-service attacks on websites (i.e., efforts to make network services unavailable to intended users). Cyber incidents affecting FMR, its affiliates, or any other service providers (including, but not limited to, accountants, custodians, transfer agents and financial intermediaries used by a fund or account) have the ability to cause disruptions and impact business operations, potentially resulting in financial losses, interference with the ability to calculate NAV, impediments to trading, the inability to transact business, destruction to equipment and systems, violations of applicable privacy and other laws, regulatory fines, penalties, reputational damage, reimbursement or other compensation costs, or additional compliance costs. Similar adverse consequences could result from cyber incidents affecting issuers of securities in which a fund or account invests, counterparties with which a fund or account engages in transactions, governmental and other regulatory authorities, exchange and other financial market operators, banks, brokers, dealers, insurance companies and other financial institutions (including financial intermediaries and service providers) and other parties.

DISCIPLINARY INFORMATION

On September 8, 2009, the Securities and Exchange Board of India (“SEBI”) issued a consent order announcing the settlement of proceedings against FMR. The consent order contained an allegation, which FMR neither admitted nor denied, that FMR violated Regulation 10(C) of SEBI’s Foreign Institutional Investor (“FII”) Regulations (1995) by not providing timely notification to SEBI of a change in the name of an FII sub-account on whose behalf FMR makes investments in Indian securities. FMR paid an amount of 325,000 rupees (approximately US \$7,000) to SEBI in connection with the settlement.

OTHER FINANCIAL INDUSTRY ACTIVITIES AND AFFILIATIONS

Broker-Dealers

FMR has relationships or arrangements with the following broker-dealers:

Fidelity Distributors Corporation (“FDC”), a wholly-owned subsidiary of Fidelity Global Brokerage Group, Inc., acts as principal underwriter and general distribution agent of the registered investment companies advised by FMR. FDC is a registered broker-dealer under the Securities Exchange Act of 1934 (“Exchange Act”).

Fidelity Brokerage Services LLC (“FBS”), a wholly-owned subsidiary of Fidelity Global Brokerage Group, Inc., is a registered broker-dealer under the Exchange Act, and provides brokerage products and services including the sale of shares of investment companies advised by FMR to individuals and institutions, including retirement plans administered by affiliates. Pursuant to referral agreements and for compensation, representatives of FBS may refer customers to various services offered by FBS’s related persons. In addition, FBS is the distributor of insurance products, including variable annuities, which are issued by FMR’s related persons, Fidelity Investments Life Insurance Company (“FIL”) and Empire Fidelity Investments Life Insurance Company (“EFIL”). FBS may provide shareholder services to certain of FMR’s or FMR’s affiliates’ clients.

Fidelity Global Brokerage Group, Inc., a wholly-owned subsidiary of FMR LLC, wholly-owns four broker-dealers: Fidelity Brokerage Services LLC, National Financial Services LLC, Fidelity Investments Institutional Services Company, Inc. and Fidelity Distributors Corporation, and also has an equity interest in eBX LLC (“eBX”), a holding company and a registered broker-dealer under the Exchange Act, which was formed for the purpose of developing, owning and operating an alternative trading system, the “Level ATS.” Transactions for clients of FMR or other entities for which FMR serves as adviser or sub-adviser or

provides discretionary trading services, as well as clients of FMR's affiliates, may be executed through the Level ATS. FMR disclaims that it is a related person of eBX.

Fidelity Clearing Canada ULC ("FCC") is engaged in the institutional brokerage business and provides clearing and execution services for other brokers. FCC is an indirect wholly-owned subsidiary of 483 Bay Street Holdings LP, which is a joint venture majority owned by FIL Limited and minority owned by Fidelity Canada Investors LLC. FCC is a registered investment dealer in all provinces and territories of Canada, a futures commission merchant in Ontario and Manitoba, a derivatives dealer in Québec and a member of the Investment Industry Regulatory Organization of Canada. Certain owners of Fidelity Canada Investors LLC are also employees of FMR LLC. FMR disclaims that it is a related person of FCC.

National Financial Services LLC ("NFS") is engaged in the institutional brokerage business and provides clearing and execution services for other brokers. NFS is a wholly-owned subsidiary of Fidelity Global Brokerage Group, Inc., a holding company that provides administrative services to NFS. Fidelity Capital Markets ("FCM"), a division of NFS, may execute transactions for FMR's investment company and other clients. Additionally, NFS operates CrossStream, an alternative trading system that allows orders submitted by its subscribers to be crossed against orders submitted by other subscribers. NFS charges a commission to both sides of each trade executed in CrossStream. CrossStream may be used to execute transactions for FMR's or FMR's affiliates' investment company and other advisory clients. NFS is a registered broker-dealer under the Exchange Act, and NFS is also registered as an investment adviser under the Investment Advisers Act of 1940 ("Advisers Act"). NFS may serve as a clearing agent for client transactions that FMR places with certain broker-dealers. NFS may provide transfer agent or sub-transfer agent services and custodial services to certain of FMR's or FMR's affiliates' clients.

Luminex Trading & Analytics LLC ("LTA"), a registered broker-dealer and alternative trading system, was formed for the purpose of establishing and operating an electronic execution utility (the "LTA ATS") that allows orders submitted by its subscribers to be crossed against orders submitted by other subscribers. FMR Sakura Holdings, Inc., a wholly owned subsidiary of FMR LLC is the majority owner of LTA. LTA charges a commission to both sides of each trade executed in the LTA ATS. The LTA ATS may be used to execute transactions for FMR's or FMR's affiliates' investment company and other advisory clients. NFS serves as a clearing agent for transactions executed in the LTA ATS.

FMR is authorized to place portfolio transactions with FCM and use CrossStream and LTA ATS, alternative trading systems operated by NFS and LTA, respectively, if it reasonably believes the quality of the transaction is comparable to what it would be with other qualified broker-dealers. In addition, FMR may place client trades with broker-dealers that use NFS or FCC as a clearing agent.

In all cases, transactions executed by affiliated brokers on behalf of investment company clients are effected in accordance with Rule 17e-1 under the 1940 Act, and procedures approved by the Trustees of FMR's clients in the Fidelity group of funds.

FCM and LTA may cross transactions on an agency basis between clients of FMR or its affiliates, including investment company clients, non-investment company clients, and other non-advisory clients (agency cross transactions), as permitted by applicable rules and regulations. Such transactions will be executed, to the extent required by law, in accordance with (i) Rule 206(3)-2 under the Advisers Act, requiring written consent, confirmations of transactions and annual reporting, and (ii) procedures adopted by the Board of Trustees of FMR's clients in the Fidelity group of funds pursuant to Rule 17e-1 under the 1940 Act.

Fidelity Investments Institutional Services Company, Inc. ("FIISC"), a wholly-owned subsidiary of Fidelity Global Brokerage Group, Inc., primarily markets Fidelity mutual funds and other products advised by FMR or an affiliate thereof to third party financial intermediaries and certain institutional investors. FIISC is a registered broker-dealer under the Exchange Act.

The potential conflicts of interest that may arise from dealings with affiliated brokers are governed by various policies adopted by the Fidelity Funds Boards of Trustees. For example, Section 10(f) of the

1940 Act is intended to prevent affiliated underwriters from “dumping” undesirable securities on funds or otherwise using fund purchases to benefit the underwriting syndicate. In accordance with Rule 10f-3, the Fidelity Funds Boards of Trustees have adopted procedures by which the funds may purchase securities in offerings for which FCM acts as a principal underwriter, provided that certain conditions are satisfied. FMR reports quarterly to the Board any purchases by the funds in such offerings. Additionally, Section 17(a) prevents affiliated brokers on their own behalf from selling securities to or buying securities from the funds, except to the extent allowed by law, in order to prevent those affiliated brokers from taking advantage of the funds. The Fidelity Funds Boards of Trustees have adopted policies and procedures preventing affiliated brokers from engaging in such transactions, except to the extent allowed by law. Furthermore, Section 17(e) prevents affiliated brokers from charging excessive fees for transactions on behalf of the funds. Under Rule 17e-1, affiliated brokers may receive a “usual and customary brokerage commission” in connection with transactions effected on a securities exchange, and the Rule 17e-1 procedures adopted by the Fidelity Funds Boards of Trustees ensure that the fees do not exceed the usual and customary requirements.

Investment Companies

FMR provides portfolio management services for a number of investment companies, including investment companies in the Fidelity group of funds. FMR disclaims that it is a related person of the investment companies for which it provides investment management services.

Other Investment Advisers

FMR or its affiliates have relationships or arrangements with the following investment advisers:

FMR Co., Inc. (“FMRC”) is a wholly-owned subsidiary of FMR and a registered investment adviser under the Advisers Act. FMRC provides portfolio management services as an adviser or sub-adviser to certain of FMR's clients and Fidelity Funds. FMRC may also provide portfolio management services as an adviser or a sub-adviser to clients of other affiliated and unaffiliated advisers.

Fidelity Investments Money Management, Inc. (“FIMM”) is a wholly-owned subsidiary of FMR LLC and a registered investment adviser under the Advisers Act. FIMM provides portfolio management services as an adviser or sub-adviser to certain of FMR's clients and Fidelity Funds. FIMM may also provide portfolio management services as an adviser or a sub-adviser to clients of other affiliated and unaffiliated advisers.

FMR Investment Management (UK) Limited (“FMRIM (UK)”), an indirect wholly-owned subsidiary of FMR, is registered as an investment adviser under the Advisers Act and is authorized by the U.K. Financial Conduct Authority to provide investment advisory and portfolio management services. FMRIM (UK) provides investment advisory and portfolio management services as a sub-adviser to certain of FMR's clients, including investment companies in the Fidelity group of funds, and may also provide trading services to FMR and its affiliates. FMRIM (UK) may provide portfolio management services as an adviser or sub-adviser to clients of other affiliated and unaffiliated advisers. FMRIM (UK) is also authorized to undertake insurance mediation as part of its benefits consulting business.

Fidelity Management & Research (Japan) Limited (“FMR (Japan)”), a direct wholly-owned subsidiary of FMR, is a registered investment adviser under the Advisers Act and is authorized by the Japan Financial Services Agency (Kanto Local Finance Bureau) to provide investment advisory and discretionary investment management services. FMR (Japan) supplies investment research and investment advisory information and provides discretionary investment management services to certain clients of FMR and its affiliates, including investment companies in the Fidelity group of funds, and to clients of other affiliated and unaffiliated advisers.

Fidelity Management & Research (Hong Kong) Limited (“FMR (Hong Kong)”), a wholly-owned subsidiary of FMR, is a registered investment adviser under the Advisers Act and is authorized by the Hong Kong Securities and Futures Commission to advise on securities, provide asset management services, and conduct equity trading services. FMR (Hong Kong) provides investment advisory or portfolio management services as a sub-adviser with respect to certain clients of FMR and its affiliates, including

investment companies in the Fidelity group of funds, and also provides trading services to FMR and its affiliates. FMR (Hong Kong) provides portfolio management services as an adviser or sub-adviser to clients of other affiliated and unaffiliated advisers.

Fidelity SelectCo, LLC ("SelectCo") is a wholly-owned subsidiary of FMR LLC and a registered investment adviser under the Advisers Act. SelectCo provides portfolio management services as an adviser to certain of FMR's clients and Fidelity Funds.

Fidelity Personal and Workplace Investors LLC ("FPWA"), a wholly-owned subsidiary of Fidelity Advisory Holdings LLC, which in turn is wholly-owned by FMR LLC, is a registered investment adviser under the Advisers Act. FPWA provides non-discretionary investment management services and serves as the sponsor of investment advisory programs. Strategic Advisers (as defined below) acts as sub-advisor to FPWA in providing discretionary portfolio management services to certain FPWA client accounts, and assists FPWA in evaluating other sub-advisors.

Strategic Advisers LLC ("Strategic Advisers") is a wholly-owned subsidiary of Fidelity Advisory Holdings LLC, which in turn is wholly-owned by FMR LLC, and is a registered investment adviser under the Advisers Act. Strategic Advisers provides discretionary and non-discretionary advisory services and acts as the investment manager to registered investment companies that invest in affiliated and unaffiliated funds and as sub-adviser to various retail accounts, including separately managed accounts. Strategic Advisers acts as sub-advisor to FPWA in providing discretionary portfolio management services to certain FPWA client accounts, and assists FPWA in evaluating other sub-advisors. FMR, or its affiliates, provides portfolio management services as a sub-adviser to certain of Strategic Advisers' customers.

FIAM LLC ("FIAM") is a wholly-owned subsidiary of FIAM Holdings LLC, which in turn is wholly-owned by FMR LLC, and provides investment management services, including sub-advisory services to FMR or its affiliates. FIAM is a registered investment adviser under the Advisers Act. FIAM is also registered with the Central Bank of Ireland.

Ballyrock Investment Advisors LLC ("Ballyrock") is a wholly-owned subsidiary of FMR LLC, and is registered as an investment adviser under the Advisers Act. Ballyrock provides investment advisory services to various types of institutional accounts, with a focus on investments in high yield debt securities, including bank loans. FMR or its affiliates may provide portfolio management services as a sub-adviser to clients of Ballyrock.

Impresa Management LLC ("Impresa") is owned by trusts, the trustees of which are individuals, certain of whom are employees of FMR LLC. Impresa is a registered investment adviser under the Advisers Act and may serve as an investment adviser to (i) the general partners or managers for certain limited liability companies, which are employees' securities companies ("ESCs"), and certain limited partnership funds (which, together with the "ESCs" will be referred to herein as the "Partnership Funds"); and (ii) the general partners or managers (either directly or indirectly through subsidiary entities) and/or investment advisers to certain collective investment entities in which the Partnership Funds may invest and to funds or other special purpose vehicles that co-invest or hold investments alongside such collective investment vehicles. Impresa may also provide investment advisory services as an adviser or sub-adviser to other affiliated or unaffiliated entities. Impresa may place orders in public securities with FMR's or its affiliates' trading personnel for execution.

Fidelity Management & Research (Canada) ULC ("FMR-Canada") is an indirect wholly-owned subsidiary of Fidelity Management & Research Company ("FMR"). FMR-Canada is registered as a portfolio manager with the Ontario Securities Commission. FMR-Canada provides portfolio management services as a sub-adviser to certain of FMR's and its affiliates' clients.

FIL Limited ("FIL"), a Bermuda company, was incorporated in 1969 and serves as investment manager and adviser to non-U.S. funds and institutional accounts. FMR disclaims that it is a related person of FIL. FIL Investments (Japan) Limited ("FIJ") is an indirect wholly-owned subsidiary of FIL and is registered as an investment adviser under the Advisers Act. FIJ may provide research, investment advisory and

discretionary investment management services to FMR's or its affiliates' clients with respect to Japan and other Asian countries and issuers, and may serve as sub-adviser (generally through a delegation from FIL Investment Advisors) for certain of FMR's clients. FIJ may recommend to its clients, or invest in on behalf of its clients, securities that are the subject of recommendations to, or discretionary trading on behalf of, FMR's or its affiliates' clients. FMR disclaims that it is a related person of FIJ.

FIL Investment Advisors ("FIA") is a wholly-owned subsidiary of FIL and is registered as an investment adviser under the Advisers Act. FIA may provide research, investment advisory and discretionary investment management services to FMR's or its affiliates' clients with respect to companies outside the United States, and may serve as sub-adviser for certain of FMR's or its affiliates' clients. FIA may recommend to its clients, or invest in on behalf of its clients, securities that are the subject of recommendations to, or discretionary trading on behalf of, FMR's or its affiliates' clients. FMR disclaims that it is a related person of FIA.

FIL Investment Advisors (UK) Limited ("FIA (UK)") is an indirect, wholly-owned subsidiary of FIL and is registered as an investment adviser under the Advisers Act. FIA (UK) may provide research, investment advisory and discretionary investment management services to certain of FMR's or its affiliates' clients with respect to companies outside the United States and serves as sub-adviser (generally through a delegation from FIA) for certain of FMR's or its affiliates' clients. FIA (UK) may recommend to its clients, or invest in on behalf of its clients, securities that are the subject of recommendations to, or discretionary trading on behalf of, FMR's or its affiliates' clients. FMR disclaims that it is a related person of FIA (UK).

FIL Investment Management (Singapore) Limited ("FI(S)L") is an indirect wholly-owned subsidiary of FIL and is a "Participating Affiliate" of FIA. FI(S)L may, under the supervision and review of FIA and in accordance with FIA's applicable investment guidelines and compliance policies, determine the securities to be purchased and sold for a limited number of FIA's clients. FI(S)L may recommend to its clients, or invest in on behalf of its clients, securities that are the subject of recommendations to, or discretionary trading on behalf of, FMR's or its affiliates' clients. FMR disclaims that it is a related person of FI(S)L.

Fidelity (Canada) Asset Management ULC ("FCAM") is an indirect, wholly-owned subsidiary of 483 Bay Street Holdings LP, which is a joint venture majority owned by FIL and minority owned by Fidelity Canada Investors LLC. FCAM is registered as a portfolio manager and a commodity trading manager with the Ontario Securities Commission. FCAM also maintains a branch office in Montreal, Quebec that is registered with the Autorité des marchés financiers as a portfolio manager. Certain owners of Fidelity Canada Investors LLC are also employees of FMR LLC. FMR disclaims that it is a related person of FCAM.

Fidelity Investments Canada ULC ("FIC") is an indirect, wholly-owned subsidiary of 483A Bay Street Holdings LP, which is a joint venture majority owned by FIL and minority owned by Fidelity Canada Investors LLC. FIC, a registered investment fund manager and mutual fund dealer in all provinces and territories of Canada, provides management and administrative services to Canadian mutual funds, pooled funds and institutional accounts. FMR or its affiliates may serve as sub-adviser for accounts managed or distributed by FIC or its affiliates. Certain owners of Fidelity Canada Investors LLC are also employees of FMR LLC. FMR disclaims that it is a related person of FIC.

FMR or its affiliates may provide certain investment management personnel to or use the investment management personnel of certain of the foregoing investment advisors under personnel sharing arrangements or other inter-company agreements. In addition, FMR or its affiliates may provide certain administrative services to certain of the foregoing investment advisors, including, but not limited to, securities and derivatives trade execution, investment compliance and proxy voting.

Banking or Thrift Institutions

FMR or its affiliates may have relationships or arrangements with the following banking and trust institutions:

Fidelity Management Trust Company (“FMTC”), a trust company organized and operating under the laws of The Commonwealth of Massachusetts, provides non-discretionary trustee and custodial services to employee benefit plans and IRAs through which individuals may invest in mutual funds managed by FMRC or its affiliates, and discretionary investment management services to institutional clients, and acts as trustee and investment manager of collective investment trusts. FMR or its affiliates provide portfolio management services as a sub-adviser to certain of FMTC’s clients. FMTC is a wholly-owned subsidiary of FMR LLC.

Fidelity Personal Trust Company, FSB (“FPTC”) is a federal savings bank limited to trust powers. FPTC is an indirect, wholly-owned subsidiary of FMR LLC. FPTC provides Trustee or Co-Trustee, agent for trustee, custody, recordkeeping, and investment management services to various trust accounts.

Fidelity Institutional Asset Management Trust Company (“FIAM TC”), a non-depository trust company organized under the laws of the State of New Hampshire, provides investment management services principally for institutional clients, including employee benefit plans and acts as trustee and investment manager of collective investment trusts. FIAM TC is a wholly-owned subsidiary of FIAM Holdings LLC, which in turn is wholly-owned by FMR LLC.

FMR or its affiliates may provide certain investment management personnel to certain of the foregoing banking and trust institutions under personnel sharing arrangements or other inter-company agreements. In addition, FMR or its affiliates may provide certain administrative services to certain of the foregoing banking and trust institutions, including, but not limited to, securities and derivatives trade execution, investment compliance and proxy voting.

Insurance Companies or Agencies

FMR or its affiliates have relationships or arrangements with the following insurance companies and agency:

Fidelity Investments Life Insurance Company (“FIL”), a wholly-owned subsidiary of FMR LLC, is engaged in the distribution and issuance of life insurance and annuity products that may offer shares of investment companies managed by FMR or its affiliates.

Empire Fidelity Investments Life Insurance Company (“EFIL”), a wholly-owned subsidiary of FIL, is engaged in the distribution and issuance of life insurance and annuity products that may offer shares of investment companies managed by FMR or its affiliates to residents of New York.

Fidelity Insurance Agency, Inc., a wholly-owned subsidiary of FMR LLC, is engaged in the business of selling life insurance and annuity products of affiliated and unaffiliated insurance companies.

Participating Affiliates

Fidelity Business Services India Private Limited (“FBS India”), with its registered office in Bangalore, is incorporated under the laws of India and is ultimately owned by FMR LLC through certain of its respective direct or indirect subsidiaries. Certain employees of FBS India (FBS India Associated Employees) may from time to time provide certain research services for FMR and its affiliates, which FMR and its affiliates may use for their U.S. clients.

FBS India is not registered as an investment adviser under the Advisers Act and is deemed to be a “Participating Affiliate” (as this term has been used by the SEC’s Division of Investment Management in various no-action letters granting relief from the Advisers Act’s registration requirements for certain affiliates of registered investment advisers) of FMR. FMR deems FBS India and certain of its employees as associated persons within the meaning of Section 202(a)(17) of the Advisers Act, because FBS India may, through such employees, contribute to FMR’s research process and may have access to information concerning which securities are being recommended to FMR’s U.S. clients prior to the effective dissemination of such recommendations. FBS India may also provide certain affiliates of FMR with certain research relating to securities that are the subject of research it provides to FMR. As a

Participating Affiliate of FMR, FBS India has agreed to submit itself to the jurisdiction of United States courts for actions arising under U.S. securities laws in connection with investment advisory activities conducted for FMR's U.S. clients. FMR maintains a list of the employees of FBS India whom it has deemed associated persons, which it will make available to current and prospective U.S. clients upon request.

CODE OF ETHICS, PARTICIPATION OR INTEREST IN CLIENT TRANSACTIONS, AND PERSONAL TRADING

FMR may purchase or sell for the accounts of clients securities in which FMR's or its affiliates' in-house accounts (including institutional accounts), affiliates, directors, officers or employees have a position. This situation results, in part, from the breadth of securities purchased by FMR's or its affiliates' varied clients and from FMR's and its affiliates' personnel being permitted to invest in securities for their personal accounts. The potential conflicts of interest involved in such transactions are governed by FMR's Code of Ethics for Personal Investing ("Code"), which has been adopted and approved by the Board of Trustees of FMR's or its affiliates' mutual fund clients in the Fidelity group of funds in accordance with Rule 17j-1 under the 1940 Act, and which incorporates the Adviser's Code of Ethics ("Adviser's Code") adopted in accordance with Rule 204A-1 under the Advisers Act.

The Code applies to all officers, directors, and employees of FMR ("Advisory Personnel") and requires that they place the interests of FMR's clients above their own. The Code establishes securities transactions requirements for all Advisory Personnel and their covered persons, including their spouses. More specifically, the Code: (i) requires Advisory Personnel and their covered persons to move their covered accounts to Fidelity Brokerage Services LLC unless an exception has been granted; (ii) requires pre-clearance of transactions in covered securities; (iii) requires reporting of transactions in covered securities on a quarterly basis; (iv) requires reporting of accounts and holdings of covered securities on an annual basis; (v) generally prohibits purchases or sales by portfolio managers of securities which are traded in client accounts within seven days before or after the trade; (vi) prohibits purchases of securities in initial public offerings unless an exception has been approved; (vii) prohibits investments in limited offerings without prior approval; and (viii) requires disgorgement of profits from short-term transactions unless an exception has been approved. Violation of the Code's requirements may also result in the imposition of remedial action.

In addition, the Adviser's Code, as incorporated in the Code: (1) describes the fiduciary duty Advisory Personnel have to FMR's clients; (2) requires Advisory Personnel of FMR to comply with federal securities laws; (3) requires certain Advisory Personnel of FMR to report, and for FMR to review, such Advisory Personnel's and their covered persons' mutual fund share transactions and holdings periodically (money market funds excepted) for funds advised by FMR or an affiliate and certain other funds specified in the Adviser's Code; (4) requires Advisory Personnel of FMR to report any violations of the Code to FMR's Ethics Office; and (5) requires FMR to provide each Advisory Personnel with a copy of the Code and any amendments, and requires Advisory Personnel to acknowledge their receipt and understanding of the Code.

FMR will provide a copy of its Adviser's Code, as integrated into the Code, to any client or prospective client upon request.

The purchase or sale of securities for the accounts of clients may be restricted in connection with distributions of securities where FMR, its affiliates or their clients are proposing to act as selling shareholders in the distribution. Any such activity is evaluated in accordance with Regulation M under the Exchange Act, the 1940 Act and other applicable rules and regulations and may result in restrictions on the ability of client accounts to purchase or sell in the distribution and/or in the secondary market. FCM, a division of NFS, an affiliated broker-dealer of FMR, may be a selling agent or principal underwriter in underwritings of municipal, equity or other securities which FMR recommends to clients. The Trustees of

FMR's or its affiliates' mutual fund clients in the Fidelity group of funds evaluate any such activity by FMR in accordance with Rule 10f-3 under the 1940 Act and procedures adopted pursuant to Rule 10f-3.

Conflicts of interest may arise where a portfolio manager considers investing a client account in securities of an issuer in which FMR, its affiliates or their (or their fund clients') respective directors, officers or employees already hold a significant position for their own account, including positions held indirectly through certain funds or accounts managed by FMR or one of its affiliated advisers. Such investments are evaluated in accordance with the 1940 Act, as well as other applicable laws and regulations, and there may be instances where FMR or its affiliates' client accounts, including accounts sub-advised by third parties, are prohibited from participating in offerings of such securities (including initial public offerings and other offerings occurring before or after an issuer's initial public offering) or acquiring such securities in the secondary market. FMR has adopted policies and procedures and maintains a compliance program designed to help manage such actual and potential conflicts of interest.

Conflicts of interest may arise if the funds' orders do not get fully executed due to being aggregated with those of other accounts managed by FMR or an affiliate, including FMR's or its affiliates' in-house accounts. FMR has adopted policies and procedures (for example, trade allocation procedures) and maintains a compliance program designed to help manage these actual and potential conflicts. There can be no assurance, however, that all conflicts have been addressed in all situations. Trading in personal accounts, which may give rise to potential conflicts of interest, is restricted by a fund's Code.

From time to time, in connection with its business, FMR may obtain material non-public information that is usually not available to other investors or the general public. In compliance with applicable laws, FMR has adopted a comprehensive set of policies and procedures that prohibit the use of material non-public information by investment professionals or any other employees. FMR also has procedures addressing the use of third party paid research consultants.

In addition, FMR has implemented a policy on Business Entertainment and Workplace Gifts intended to set standards for business entertainment and gifts and help employees make sound decisions with respect to these activities and ensure that the interests of FMR's clients come first. Similarly, to support compliance with applicable "pay to play" rules, FMR has implemented a Political Contributions and Activities policy which requires employees to pre-clear political contributions and activities. FMR also has a policy regarding commercial bribery and bribery of government officials that prohibits directly or indirectly giving, offering, authorizing, promising, accepting, or receiving any bribe, facilitation payment, kickback, or payoff (whether in cash or any other form) with the intent to improperly obtain or retain business or any improper advantage.

BROKERAGE PRACTICES

Selection of Brokers and Dealers to Effect Client Transactions

FMR or its affiliates generally have authority to select brokers (whether acting as a broker or a dealer) to place or execute clients' portfolio securities transactions. FMR or its affiliates may be responsible for the placement of portfolio securities transactions for certain client accounts for which an affiliate or related person has investment discretion. In selecting a broker or dealer for a specific securities transaction, FMR or its affiliates evaluate a variety of criteria and use good faith judgment in seeking to obtain execution of portfolio securities transactions at commissions or costs that are reasonable in relation to the brokerage and research services provided, where allowed under applicable law.

In selecting securities broker-dealers ("brokers"), including affiliates of FMR, to execute client portfolio securities transactions, FMR or its affiliates consider the factors they deem relevant in the context of a particular trade and in regard to FMR's or its affiliates' overall responsibilities with respect to the fund and other investment accounts, including any instructions from the client's portfolio manager, which may emphasize, for example, speed of execution over other factors. Based on the factors considered, FMR or its affiliates may choose to execute an order using electronic channels, including broker-sponsored algorithms, internal crossing, or by verbally working an order with a broker. Other possibly relevant

factors may include, but are not limited to, the following: price; costs; the size, nature and type of the order; speed of execution; financial condition and reputation of the broker; broker specific considerations (e.g., not all brokers may be able to execute all types of trades); broker willingness to commit capital; the nature and characteristics of the markets in which the security may be traded;; the trader's assessment of whether and how closely the broker likely will follow the trader's instructions to the broker; confidentiality and the potential for information leakage; the nature or existence of post-trade clearing, settlement, custody and currency convertibility mechanisms; and the provision of brokerage and research products and services, if applicable and where allowed by law.

The trading desks through which FMR or its affiliates may execute trades are instructed to execute portfolio transactions on behalf of clients based on the quality of execution without any consideration of Research and Brokerage Services (as defined below) the broker or dealer may provide. The administration of Research and Brokerage Services is managed separately from the trading desks, and traders have no responsibility for administering the research program, including the payment for research.

In seeking best qualitative execution for portfolio securities transactions, FMR or its affiliates may select a broker that uses a trading method, including algorithmic trading, for which the broker may charge a higher commission than its lowest available commission rate. FMR or its affiliates also may select a broker that charges more than the lowest commission rate available from another broker. FMR or its affiliates may execute an entire securities transaction with a broker and allocate all or a portion of the transaction and/or related commissions to a second broker where a client does not permit trading with an affiliate of FMR or in other limited situations. In those situations, the commission rate paid to the second broker may be higher than the commission rate paid to the executing broker. For futures transactions, the selection of a futures commission merchant is generally based on the overall quality of execution and other services provided by the futures commission merchant. FMR or its affiliates may choose to execute futures transactions electronically.

If FMR grants investment management authority to a sub-adviser, that sub-adviser will be authorized to provide the services described in the sub-advisory agreement. Furthermore, the sub-adviser's trading and associated policies, which may differ from FMR's policies, may apply to that fund or account, subject to applicable law.

Identification and Resolution of Errors

As an investment adviser, FMR maintains policies and procedures that address the identification and correction of errors consistent with applicable standards of care and clients' investment management agreements. To the extent that an error occurs, FMR's policy is to identify and resolve the error as promptly as possible. FMR will address and resolve errors on a case by case basis, in its discretion, based on each error's facts and circumstances. FMR is not obligated to follow any single method of resolving errors.

An incident is any occurrence or event that interrupts normal investment-related activities or that may deviate from applicable law, the terms of an investment management agreement, or applicable internal or external policies or procedures. Incidents can occur at FMR or at one of FMR's service providers, and can be identified by any of the same.

The determination of whether an incident constitutes an error is made by FMR in its sole discretion based on the relevant facts and circumstances of each incident considered in light of the applicable standard of care. Errors may include, without limitation: (i) purchases or sales that exceed the amount of securities intended to trade for a fund or account; (ii) the purchase (or sale) of a security when it should have been sold (or purchased); (iii) the purchase or sale of a security not intended for the fund or account, and/or contrary to investment guidelines or restrictions; and (iv) incorrect allocations of trades.

Situations that generally would be considered by FMR to be incidents but not errors include, without limitation, (i) failure by a portfolio manager to provide timely notification of an incorrect purchase of a security although the security purchased was appropriate for the fund or account; (ii) passive or active breach of an internal or account-level limit; (iii) failure to update a portfolio manager in a timely manner

regarding an increase in shares outstanding or additional room to buy for a security that had been at an aggregate limit; and (iv) external events, such as securities exchange outages. Other situations that result from failures in internal processes, people or systems, such as other routine processing errors or major systems failures, may be deemed to be incidents and not errors depending on the facts and circumstances.

Additionally, incidents involving fund monitoring or aggregate monitoring compliance violations may or may not be deemed by FMR to be errors depending on the facts and circumstances. For example, an active breach of a client mandate or regulatory limit (e.g., due to an acquisition of additional securities for an account) may be deemed to be an error and may be compensable depending on the particular circumstances, but a passive breach of such a limit (e.g., due to a reduction in the issuer's outstanding securities) would not be considered an error and would not be compensable. Active breaches of issuer or regulatory limits, including poison pill limits, may be deemed to be errors and may be compensable depending on the circumstances, but passive breaches generally will not. Further, a passive breach of an aggregate limit on holdings of a security established internally by FMR and its affiliates, and instances where all available aggregate capacity on a security is not fully utilized, generally are not considered errors and are not compensable, but an active breach of an internal aggregate limit may be deemed to be an error and compensable depending on the particular circumstances. To the extent that client accounts already own securities that directly or indirectly contribute to certain ownership thresholds being exceeded, FMR may sell securities held in such accounts in order to bring account-level and/or aggregate ownership below the relevant threshold. If any such sales result in losses for client accounts, those client accounts may bear such losses depending on the particular circumstances.

FMR is responsible for notifying, when appropriate, the affected client of an error. FMR generally will not notify clients about incidents deemed not to be errors and non-compensable errors, unless otherwise agreed with particular clients. All errors requiring reimbursement to a Fidelity affiliated mutual fund of \$100,000 or more must be reported to the Compliance Committee (or other applicable Committee) of the fund's Board of Trustees at its next scheduled meeting.

When FMR determines that reimbursement is appropriate, the account will be compensated as determined in good faith by FMR. Resolution of errors may include, but is not limited to, permitting client accounts to retain gains or reimbursing client accounts for losses resulting from the error. The calculation of the amount of any loss will depend on the facts and circumstances of the error, and the methodology used by FMR may vary. Unless prohibited by applicable regulation or a specific agreement with the client, FMR will net a client's gains and losses from the error or a series of related errors with the same root cause and compensate the client for the net loss. In general, compensation is expected to be limited to direct monetary losses and will not include any amounts that FMR deems to be speculative or uncertain, nor will it cover investment losses not caused by the error. FMR may elect to establish an error account for the resolution of errors which could be used depending on the facts and circumstances.

Investment Research Products and Brokerage Services Furnished by Research Providers and Brokers

FMR and its affiliates have established policies and procedures relating to brokerage commission uses in compliance with Section 28(e) of the Exchange Act, the provisions of the 1940 Act, and various interpretations of the staff of the SEC thereunder, and with regard to FMRIM (UK), where applicable, the revised Markets in Financial Instruments Directive in the European Union, commonly referred to as "MiFID II", and the implementation of MiFID II within the United Kingdom through the Conduct of Business Sourcebook Rules of the UK Financial Conduct Authority (the "FCA").

For accounts managed outside the European Union, FMR or its affiliates may execute portfolio securities transactions with brokers that provide products and services that assist them in fulfilling their investment management responsibilities ("Research and Brokerage Services") in accordance with applicable law. Research and Brokerage Services that FMR or its affiliates may have received during the last fiscal year include, when permissible under applicable law, but are not limited to, economic, industry, company, municipal, sovereign (U.S. and non-U.S.), legal, or political research reports; market color; company

meeting facilitation; compilation of securities prices, earnings, dividends and similar data; quotation services, data, information and other services; analytical computer software and services; and investment recommendations. In addition to receiving these Research and Brokerage Services via written reports and computer-delivered services, such reports may also be provided by telephone and in-person meetings with securities analysts, corporate and industry spokespersons, economists, academicians and government representatives and others with relevant professional expertise. FMR or its affiliates may request that a broker provide a specific proprietary or third-party product or service. Some of these Research and Brokerage Services supplement FMR's or its affiliates' own research activities in providing investment advice to their clients.

In addition, Research and Brokerage Services may include, when permissible under applicable law, those that assist in the execution, clearing, and settlement of securities transactions, as well as other incidental functions (including, but not limited to, communication services related to trade execution, order routing and algorithmic trading, post-trade matching, exchange of messages among brokers or dealers, custodians and institutions, and the use of electronic confirmation and affirmation of institutional trades).

To the extent permitted by applicable law, brokers who execute client transactions may receive compensation in recognition of their Research and Brokerage Services that is in excess of the amount of compensation that other brokers might have charged. In addition, FMR or its affiliates may have an incentive to select or recommend a broker-dealer based on their interest in receiving the Research and Brokerage Services, rather than on FMR's or its affiliates' clients interest in receiving most favorable execution. FMR's or its affiliates' expenses likely would be increased if they attempted to generate these additional Research and Brokerage Services through their own efforts or if they paid for these Research and Brokerage Services with their own resources. FMR and its affiliates manage the receipt of Research and Brokerage Services and the potential conflicts through their Commission Uses Program. The Commission Uses Program effectively "unbundles" commissions paid to brokers who provide Research and Brokerage Services, i.e., commissions consist of an execution commission, which covers the execution of the trade (including clearance and settlement), and a research charge, which is used to cover Research and Brokerage Services.

In selecting brokers for executing transactions on behalf of clients of FMR and its affiliates, the trading desks are instructed to select brokers and execute portfolio transactions on behalf of their clients based on the brokers' quality of execution and without any consideration of what Research and Brokerage Services the broker provides. Where commissions paid to a broker include both an execution commission and a research charge, while the broker receives the entire commission, it retains the execution commission and either credits or transmits the research portion to a commission sharing arrangement ("CSA") pool, also known as "soft dollars," which is used to pay research expenses. (In some cases, FMR or its affiliates may request that a broker which is not a party to any particular transaction provide a specific proprietary or third-party product or service, which would be paid for from the CSA pool.) The administration of Research and Brokerage Services is managed separately from the trading desks, and traders have no responsibility for administering the research program, including the payment for research. Furthermore, where permissible under applicable law, certain of the Research and Brokerage Services that FMR or its affiliates receive are furnished by brokers on their own initiative, either in connection with a particular transaction or as part of their overall services. Some of these Research and Brokerage Services may be provided at no additional cost to FMR or its affiliates or might not have an explicit cost associated with them.

In connection with the allocation of client brokerage, FMR or its affiliates make a good faith determination that the compensation paid to brokers and dealers is reasonable in relation to the value of the Research and Brokerage Services provided to FMR or its affiliates, viewed in terms of the particular transaction for the client or FMR's or its affiliates' overall responsibilities to that client or other clients for which FMR or its affiliates have investment discretion; however, each Research and Brokerage Service received in connection with a client's brokerage may not benefit the client. While FMR or its affiliates may take into account the Research and Brokerage Services provided by a broker or dealer in determining whether compensation paid is reasonable, neither FMR, its affiliates, nor their respective clients incur an obligation to any broker, dealer, or third-party to pay any Research and Brokerage Services (or portion thereof) by

generating a specific amount of compensation or otherwise. Typically, these Research and Brokerage Services assist FMR or its affiliates in terms of their overall investment responsibilities to a client or any other client accounts for which FMR or its affiliates have investment discretion. Certain client accounts may use brokerage commissions to acquire Research and Brokerage Services that may also benefit other client accounts managed by FMR or its affiliates.

Accounts that are managed within the European Union by FMR's affiliate, FMRIM (UK) will use research payment accounts ("RPAs") to cover costs associated with equity and high income external research that is consumed by those accounts in accordance with MiFID II and FCA regulations. With RPAs, clients pay for external research through a separate research charge that is generally assessed and collected alongside the execution commission.* For accounts that use an RPA, FMR or its affiliates will establish a research budget. The budget will be set by first grouping accounts by strategy (e.g., asset allocation, blend, growth, etc.), and then determining what external research is consumed to support the strategies and portfolio management services provided within the European Union. In this regard, research budgets are set by research needs and are not otherwise linked to the volume or value of transactions executed on behalf of the account. For accounts where portions are managed both within and outside the European Union, external research may be paid using both a CSA and an RPA. Determinations of what is eligible research and how costs are allocated will be made in accordance with FMR's and its affiliates' policies and procedures. Costs for research consumed by accounts that use an RPA will be allocated among the accounts within defined strategies pro rata based on the assets under management for each account. While the research charge paid on behalf of any one client that uses an RPA may vary over time, the overall research charge determined at the client level on an annual basis will not be exceeded.

FMRIM (UK) will be responsible for managing the RPA, and may delegate its administration to a third-party administrator for the facilitation of the purchase of external research and payments to research providers. RPA assets will be maintained in accounts at a third-party depository institution, held in the name of FMRIM (UK). FMRIM (UK) will provide to client accounts, on request, a summary of: (i) the providers paid from the RPA; (ii) the total amount they were paid over a defined period; (iii) the benefits and services received by FMRIM (UK); and (iv) how the total amount spent from the RPA compares to the research budget set for that period, noting any rebate or carryover if residual funds remain in the RPA. Client accounts may choose not to purchase external research through use of an RPA. If a client account declines to pay for external research through use of an RPA, or agrees to an amount less than what FMRIM (UK) is seeking to charge, FMRIM (UK) may allocate the declining client account's share of the external research costs to other client accounts within that same strategy, provided that those client accounts give informed consent to paying additional amounts.

Impacted accounts, like those accounts that participate in CSA pools, may make payments to a broker that include both an execution commission and a research charge, but unlike CSAs (for which research charges may be retained by the broker and credited to the CSA, as described above), the broker will receive separate payments for the execution commission and the research charge and will promptly remit the research charge to the RPA. Assets in the RPA will be used to satisfy external research costs consumed by the accounts. If the costs of paying for external research exceed the amount collected from accounts in a given strategy, the adviser may continue to charge those accounts beyond the agreed amount in accordance with the requirements of MiFID II, continue to acquire external research for the accounts using its own resources (referred to as "hard dollars"), or cease to purchase external research for those accounts until the next annual research budget. In the event that assets for specific accounts remain in the RPA at the end of a period, they may be rolled over to the next period to offset next year's research charges for those accounts or rebated to those accounts.

* The staff of the SEC addressed concerns that reliance on an RPA mechanism to pay for research would be permissible under Section 28(e) of the Exchange Act by indicating that they would not recommend enforcement action against investment advisers who used an RPA to pay for Research and Brokerage Services so long as certain conditions were met. Therefore, references to "research charges" as part of the RPA mechanism to satisfy MiFID II requirements can be considered "commissions" for Section 28(e) purposes.

Accounts managed by FMR or its affiliates that trade only fixed income securities will not participate in RPAs because fixed income securities trade based on spreads rather than commissions, and thus unbundling the execution commission and research charge is impractical. Therefore, FMR and its affiliates have established policies and procedures to ensure that external research that is paid for through RPAs is not made available to FMRIM (UK) portfolio managers that manage fixed income accounts in any manner inconsistent with MiFID II and FCA regulations.

Although FMR or its affiliates do not use client commissions to pay for products or services that do not qualify as Research and Brokerage Services, they may use commission dollars to obtain certain products or services that are not used exclusively in FMR's or its affiliates' investment decision-making process ("mixed-use products or services"). In those circumstances, FMR or its affiliates will make a good faith effort to evaluate the various benefits and uses to which they intend to put the mixed-use product or service, and will pay for that portion of the mixed-use product or service that does not qualify as Research and Brokerage Services with their own resources (referred to as "hard dollars").

FMR or its affiliates have arrangements with certain third-party research providers and brokers through whom FMR or its affiliates effect client trades, whereby FMR or its affiliates may pay with account commissions or hard dollars for all or a portion of the cost of research products and services purchased from such research providers or brokers. If hard dollar payments are used, FMR or its affiliates may still cause the client to pay more for execution than the lowest commission rate available from the broker providing research products and services to FMR or its affiliates, or that may be available from another broker. FMR or its affiliates view hard dollar payments for research products and services as likely to reduce the client's total commission costs even though it is expected that in such hard dollar arrangements the commissions available for recapture and used to pay client expenses, as described below, will decrease. FMR's or its affiliates' potential determination to pay for research products and services separately is wholly voluntary on FMR's or its affiliates' part and may be extended to additional brokers or discontinued with any broker participating in this arrangement.

If FMR has engaged a subadviser to an FMR account or a portion of an FMR account, subject to applicable law, the subadviser's policies will apply to trading for that account. Those policies may differ from FMR's policies.

Other Considerations and Brokerage Arrangements

Commission Recapture and Broker Restrictions

FMR or its affiliates may engage in brokerage transactions with brokers (who are not affiliates of FMR) who have entered into arrangements with FMR or its affiliates under which the broker may rebate a portion of the compensation paid by a client account ("commission recapture"). Not all brokers with whom the client account trades have been asked to participate in brokerage commission recapture.

FMR or its affiliates recommend that clients do not request them to direct client portfolio transactions to specific brokers. Clients may nonetheless make such requests, subject to FMR's or its affiliates' attempt to seek quality execution and provided that the broker is an approved counterparty of FMR or its affiliates. Clients should be aware that if they require FMR or its affiliates to direct portfolio transactions to specific brokers, or if clients restrict trading with specific brokers (for example, because of affiliations) (a) FMR or its affiliates may be unable to achieve most favorable execution of such directed or restricted broker transactions; (b) the client may pay higher brokerage commissions on such directed or restricted broker transactions because FMR or its affiliates may be unable to aggregate such transactions with other orders; (c) the client may receive less favorable prices on such directed or restricted broker transactions; and (d) if eligible, a client may not simultaneously participate in commission recapture as well as a directed brokerage program established or subscribed to by the client.

Transactions with Certain Brokers

FMR or its affiliates may place trades with certain brokers, including NFS and LTA, with whom they are under common control or otherwise affiliated, provided FMR or its affiliates determine that these affiliates' trade-execution abilities and costs are comparable to those of non-affiliated, qualified brokerage firms, and that such transactions be executed in accordance with applicable rules under the 1940 Act and procedures adopted by the Board of Trustees or Directors (as applicable) of FMR's clients in the Fidelity group of funds and subject to other applicable law. Where FMR has engaged a sub-adviser for a fund or other client account, the sub-adviser may, subject to applicable regulatory limitations, also place portfolio transactions with FMR's affiliated broker-dealers.

In addition, FMR or its affiliates may place client trades with brokers that use NFS or FCC as a clearing agent.

Transactions Among Clients

FMR or its affiliates may execute transactions between mutual funds and other accounts they manage (either on an advisory or sub-advisory basis), as well as with certain other clients managed by their affiliates. Such transactions for clients in the Fidelity group of funds will be executed in accordance with applicable rules under the 1940 Act, the Advisers Act and procedures adopted by the Board of Trustees or Directors (as applicable) of FMR's clients in the Fidelity group of funds. FMR or its affiliates may also execute transactions between non-mutual fund clients, and such transactions will be executed in accordance with applicable rules under the Advisers Act and procedures adopted thereunder. When FMR or its affiliates engage in adviser cross transactions, where FMR or its affiliates directly effect an agency transaction between advisory clients without involving a broker, FMR or its affiliates will receive no compensation (other than its advisory fee), directly or indirectly, for the agency transaction.

Non-U.S. Securities Transactions

To facilitate trade settlement and related activities in non-U.S. securities transactions, FMR or its affiliates may effect spot foreign currency transactions with foreign currency dealers. In certain circumstances, due to local law and regulation, logistical or operational challenges, or the process for settling securities transactions in certain markets (e.g., short settlement periods), spot currency transactions may be effected on behalf of clients by parties other than FMR or its affiliates, including clients' custodian banks (working through sub-custodians or agents in the relevant non-U.S. jurisdiction) or broker-dealers that executed the related securities transaction.

Trade Allocation Policies

Bunched Trades

It is generally FMR's or its affiliates' practice, when appropriate, to combine or "bunch" orders of various accounts, including those of its clients, its affiliates' clients, and, in certain instances, proprietary accounts for order entry and execution. Bunched orders may be executed through one or more brokers. The allotment of trades among brokers is based on a variety of factors, which may include price, order size, the time of order, the security and market activity. A bunched trade executed with a particular broker is generally allocated pro-rata among the accounts that are participating in the bunched trade until any account has been filled. After any account has been filled, the trade is allocated pro-rata among any remaining accounts. Each broker's execution of a bunched order may be at a price different than another broker's bunched order execution price for the same security. Additionally, as a result of accommodating the differing arrangements regarding the payment for research that is required by MiFID II, clients of a bunched trade may not pay a pro rata share of all costs associated with that bunched trade.

Allocation of Trades

FMR and its affiliates have established allocation policies for their various accounts (including proprietary accounts) and securities types (e.g., equity, fixed income and high income) to ensure allocations are appropriate given clients' differing investment objectives and other considerations. These policies also

apply to initial and secondary offerings. When, in FMR's or its affiliates' opinion, the supply/demand is insufficient under the circumstances to satisfy all outstanding orders, across all securities types the amount executed generally is distributed among participating accounts based on account net asset size (for purchases) and security position size (for sales), or otherwise according to the allocation policies. With limited exceptions, the trading systems contain rules that allocate trades on an automated basis in accordance with these policies. Generally, any exceptions to FMR's and its affiliates' policies (i.e., special allocations) must be approved by senior trading and compliance personnel and documented.

FMR's and its affiliates' trade allocation policies identify circumstances under which it is appropriate to modify or deviate from the general allocation criteria and describe the alternate procedures. For allocations based on net assets, the trade allocation policies for each of equity, fixed income, and high income define the method of calculating net assets to be used depending on particular circumstances or needs. The trade allocation policies define net assets generally by reference to each account's assets managed by each of the equity, fixed income, or high income divisions, and by reference to certain security and account types, such as high income, investment grade or equity securities and accounts. For example, both the high income and fixed income trade allocation policies provide that 100% of a high income account's net assets may be taken into account when allocating high income securities, but only 1% of an investment grade bond account's or equity account's net assets may be taken into account when allocating high income securities to those accounts along with the high income accounts. The high income trade allocation policy also defines net assets similarly for bank loan and real estate accounts when acquiring bank loan and real estate securities, respectively. Similarly, the fixed income trade allocation policy provides that 100% of an investment grade bond account's net assets may be taken into account when allocating investment grade bonds, but only 1% of a high income or equity account's net assets would be taken into account.

Likewise, the equity trade allocation policy generally provides that 100% of an equity account's net assets may be taken into account when allocating equity securities, but only 1% of a high income account's or investment grade bond account's net assets would be taken into account. The equity trade allocation policy further provides that certain portfolios that are not managed by the equity division but as part of their principal investment strategies or objectives trade common stock and instruments that trade on the equity desk, would receive an asset measure that is based on the theoretical maximum amount that each portfolio could invest in securities that trade on the equity desk. The equity and high income trade allocation policies also provide that certain multi-asset class portfolios that have principal investment strategies or objectives that include securities across all asset types will have 100% of their assets taken into account for allocation purposes when trading on the equity or high income trading desks, respectively. Additionally, under the fixed income trade allocation policy, when defining what constitutes net assets for separately managed account (SMA) clients when trading alongside other client accounts, SMAs that follow similar investment strategies may have their assets grouped into an omnibus trading account, where that omnibus trading account is treated as a single portfolio for allocation purposes. The equity trade allocation policy defines net assets generally by reference to each account's overall net assets. The equity trade allocation policy allows for certain specialized accounts, such as international, real estate investment or convertible securities accounts to receive an increased allocation by increasing the weighting of an account's net assets by a factor of two or four where the securities correlate closely to the investment objective or focus of the account. FMR and its affiliates utilize standard criteria, such as country of incorporation, to determine whether an international security correlates to the investment objective or focus of the account. Short sale and "buy to cover" transactions generally are subject to the same general allocation criteria as non-short sale transactions, and thus could experience significant delays in execution, which could materially impact the performance of accounts whose strategies rely on short sales.

Alternate allocation methods other than net asset size (for purchases) and security position size (for sales) may be employed under certain circumstances. The equity trade allocation policy allows for certain accounts designed to have common investment and trading strategies (e.g., one portfolio modeled on another portfolio) to receive allocations that would facilitate keeping the portfolios' holdings proportionately balanced. The fixed income trade allocation policy allows for several alternate allocation methods, in some cases only where the portfolio managers of all accounts involved in the allocation

agree to the use of the alternate method(s). These alternate methods include pro rata allocations based on the size of the accounts' orders; rotating investment opportunities among accounts that trade consistently on specific trading desks (e.g., taxable bond desks or money market desks); bunching securities or other investments that may be deemed to be fungible and then allocating the bunched orders on a series basis so as to keep like-securities or other investments grouped together; and/or providing a priority allocation for trades the execution of which are contingent on the execution of other trades. The fixed income trade allocation policy also provides for increased or priority allocations for accounts specializing in a particular type of security or other investment. These include priority allocations for certain accounts for repurchase agreements; increased allocations of municipal securities to single state municipal money market and municipal bond accounts for obligations that are tax-exempt within their state; and a priority allocation of U.S. Treasury money market securities to Treasury-only money market accounts.

All of the trade allocation policies generally provide for minimum allocations based on market-defined minimum denominations, or otherwise may allow increased or decreased allocations (i) to avoid a *de minimis* allocation, (ii) to round to a trading round lot, or (iii) in the case of the high income trade allocation policy, to complete a sale of all holdings in order to avoid residual holdings in an amount less than a basic unit of trading. Trade allocations may also be impacted by various regulatory requirements depending on where the trade is executed and what types of accounts are included in the trade. In such circumstances, some accounts may need to be prioritized over others when supply/demand is insufficient. Client accounts receive priority of allocation over proprietary accounts. Accounts for which all the assets are those of FMR or its affiliates and are not otherwise used to seed new investment products or to meet potential claims of insurance policyholders are generally considered to be proprietary accounts. Accounts owned or managed for the benefit of individual employees of FMR or its affiliates or officers or trustees of various investment products are generally considered client accounts, subject to applicable law.

REVIEW OF ACCOUNTS

Portfolio management assignments are made based on several factors, including the relevant experience and ability of the managers, the complexity of the funds' mandate and structure, and similarities among funds assigned to a manager. Each portfolio manager regularly reviews the holdings in the funds or accounts for which he or she is responsible.

Portfolio managers may draw on a large research and trading staff of FMR or its affiliates for support. FMR's and its affiliates' investment activities are organized on a group basis, with portfolio managers of similar accounts forming these groups. There are various groups directly related to portfolio management and other groups comprising FMR's or its affiliates' fundamental research departments, each of which has a Chief Investment Officer or Managing Director of Research. Each Chief Investment Officer and Managing Director of Research regularly receives detailed analysis of the funds in their oversight groups, and conducts periodic fund reviews with each manager.

FMR and its affiliates generally apply investment guidelines consistent with any applicable policies as determined by FMR or its affiliates, which may include default interpretative guidance for certain phrases or terminology in the absence of specific and/or explicit guidance from a client, in the case of a separate or sub-advised account, or in a collective investment vehicle's investment guidelines.

The Trustees of each investment company client review at least annually the activities of FMR's responsible portfolio managers, and review on a regular basis the performance of the Fidelity Funds. FMR's Treasurer's Office monitors the operations of the Fidelity Funds on an ongoing basis. FMR may also provide investment advisory services on a discretionary or non-discretionary basis to other entities, or clients of other entities, related or unrelated to FMR. These entities, or their clients, may similarly review the activities of FMR's portfolio managers and other investment professionals.

Members of the Board of Trustees of each of FMR's or its affiliates' investment company clients in the Fidelity group of funds are supplied periodic reports providing, among other items, comparative

performance data, sales and redemptions of shares information, and certain brokerage commission reports.

FMR generally supplies similar data in its capacity as a sub-adviser. Reports to other non-investment company clients may be prepared as requested by such clients. In limited circumstances in response to client inquiries, FMR or its affiliates may provide research related information with respect to securities held in the relevant client's portfolio, in some instances on a delayed basis.

CLIENT REFERRALS AND OTHER COMPENSATION

FMR does not have client referral arrangements.

CUSTODY

FMR may be deemed to have custody of client assets because certain of its related persons may have the legal capacity to access certain collective fund clients' accounts (even though an independent, qualified custodian has been appointed by such clients to serve as custodian). To the extent such clients receive account statements from the qualified custodian that has been appointed to serve as custodian with respect to the clients' accounts, the clients should review those statements carefully.

INVESTMENT DISCRETION

FMR's discretionary authority to manage accounts on behalf of its clients, and any limitations that may be imposed on such authority, are described in "Advisory Business" on page 4.

FMR exercises its discretionary authority on behalf of its mutual fund clients pursuant to management contracts and sub-advisory agreements (together, the "Advisory Contracts"). The Advisory Contracts are entered into in accordance with Section 15 of the 1940 Act, and approved and renewed by each fund's Board of Trustees, including the Independent Trustees. In approving the Advisory Contracts, the Board of Trustees authorizes by resolution FMR's ability to exercise discretionary authority, and the Advisory Contracts contain the terms and limitations, if any, with regard to the authority granted.

In considering whether to approve or renew the Advisory Contracts for a fund, the Board of Trustees considers all factors it believes relevant, including (i) the nature, extent, and quality of the services to be provided to the fund and its shareholders (including the investment performance of the fund); (ii) the competitiveness of the fund's management fee and total expenses; (iii) the total costs of the services to be provided by and the profits to be realized by FMR or its affiliates from its relationship with the fund; (iv) potential "fallout benefits," if any, FMR or its affiliates may receive as a result of their association with Fidelity's mutual funds ; and (v) whether economies of scale have been realized in respect of the management of the fund, whether the fund has appropriately benefited from any such economies of scale, and whether there is potential for realization of any further economies of scale.

With respect to FMR's non-mutual fund clients, FMR provides advisory services pursuant to management or sub-advisory agreements, the terms of which are negotiated with such clients. As with FMR's mutual fund clients, the management and/or sub-advisory agreements contain the terms and limitations, if any, with regard to the authority granted.

VOTING CLIENT SECURITIES

When authorized by clients, FMR or its affiliates generally cast votes on behalf of client accounts by proxy at shareholder meetings of issuers in which FMR or its affiliates invest client assets. The Boards of Trustees of the Fidelity Funds have established formal written proxy voting guidelines (the “Guidelines”) that are designed to ensure that proxies on behalf of the Fidelity Funds are voted in a manner consistent with the best interests of shareholders. FMR has also adopted these Guidelines as part of its proxy voting policies and procedures in accordance with Rule 206(4)-6 under the Advisers Act.

FMR or its affiliates vote on behalf of the Fidelity Funds in accordance with the Guidelines that have been approved by the Boards of Trustees of the Fidelity Funds. The power to vote or direct the voting of shares owned directly by the Fidelity Funds resides with each Fund’s Board of Trustees, who have delegated to FMR or an affiliate the responsibility of carrying out the voting of shares owned by the Fidelity Funds in accordance with the Guidelines. FMR’s Investment Proxy Research Group (“IPR”) casts the votes on behalf of the Fidelity Funds.

Except as set forth in the Guidelines, FMR or its affiliates will generally vote on proposals based on an evaluation of a proposal’s likelihood to enhance the long-term economic returns or profitability of the portfolio company or to maximize long-term shareholder value.

For proposals not covered by the Guidelines or that involve other special circumstances, FMR evaluates them on a case-by-case basis with input from the appropriate FMR analyst or portfolio manager with review by a member of senior management within Investment Proxy Research or an attorney within FMR’s General Counsel’s office. If there is a significant pattern of these proposals or other special circumstances, FMR will refer them to the appropriate Fidelity Fund Board Committee.

Proposals Relating to Director Elections

FMR or its affiliates generally will withhold authority for the election of all directors or directors on responsible committees if: a poison pill or other anti-takeover provision was adopted or extended without shareholder approval; options were repriced without shareholder approval; the board is not composed of a majority of independent directors; the director attended less than 75% of the aggregate number of board and committee meetings during the company’s prior fiscal year; or the company has not adequately addressed concerns communicated by FMR in the process of discussing executive compensation. FMR and its affiliates will generally support proposals calling for directors to be elected by a majority of votes cast, provided that the proposal allows for plurality voting standard in the case of contested elections. FMR and its affiliates may consider voting against such shareholder proposals where a company has adopted an alternative measure, such as a director resignation policy, that provides a meaningful alternative to the majority voting standard and appropriately addresses situations where an incumbent director fails to receive the support of a majority of the votes cast in an uncontested election.

In uncontested elections, FMR and its affiliates will generally vote in favor of incumbent and nominee directors except where a director has failed to exercise reasonable judgment. FMR and its affiliates will generally withhold authority on the election of all directors or directors on responsible committees if the directors acted contrary to certain aspects of the Guidelines during the period.

FMR and its affiliates believe that strong management creates long-term shareholder value and we generally support management of companies in which the Fidelity Funds’ and other clients’ assets are invested. In contested elections, FMR and its affiliates will vote on a case-by-case basis, taking into account factors such as management’s track record and strategic plan for enhancing shareholder value; the long-term performance of the target company compared to its industry peers; the qualifications of the shareholder’s and management’s nominees; and other factors. Ultimately, FMR and its affiliates will vote for the outcome they believe has the best prospects for maximizing shareholder value over the long term.

Proposals Relating to Executive Compensation

FMR or its affiliates generally will vote for proposals to ratify executive compensation unless such compensation appears misaligned with shareholder interests or is otherwise problematic, taking into account: (i) the actions taken by the board or compensation committee in the previous year, including whether the company repriced or exchanged outstanding stock options without shareholder approval; adopted or extended a Golden Parachute without shareholder approval; or adequately addressed concerns communicated by FMR in the process of discussing executive compensation; (ii) the alignment of executive compensation and company performance relative to peers; and (iii) the structure of the compensation program, including factors such as whether incentive plan metrics are appropriate, rigorous and transparent; whether the long-term element of the compensation program is evaluated over at least a three-year period; the sensitivity of pay to below median performance; the amount and nature of non-performance-based compensation; the justification and rationale behind paying discretionary bonuses; the use of stock ownership guidelines and amount of executive stock ownership; and how well elements of compensation are disclosed.

Proposals Relating to Equity Compensation Plans

The Guidelines generally oppose plans or amendments to plans that: have option exercise prices less than 100% of fair market value on the date of grant; include an evergreen provision; provide for the acceleration of vesting of equity awards even though an actual change in control may not occur; give the ability to reprice outstanding stock options without shareholder approval; or cause excessive dilution to shareholders by considering the average three-year burn rate, based on the company's market capitalization. Large-capitalization companies are those included in the Russell 1000® Index or the Russell Global ex-U.S. Large Cap Index; small-capitalization companies are those not included in the Russell 1000® Index or the Russell Global ex-U.S. Large Cap Index that are not micro-capitalization companies; and micro-capitalization companies are those with a market capitalization under US \$300 million.

Proposals Relating to Changes in Corporate Control

The Guidelines generally oppose measures that are designed to prevent or obstruct corporate takeovers. Such measures include: fair price amendments, classified boards, "blank check" preferred stock, executive "golden parachutes," shareholders rights plans ("poison pills"), supermajority provisions, restricting shareholders' right to call special meetings or to set board size, and any other provision that eliminates or limits shareholder rights.

Proposals Relating to Shareholder Rights

The Guidelines generally: (i) support simple majority voting, (ii) oppose cumulative voting, (iii) support confidential voting, and (iv) oppose new classes of stock with differential voting rights.

Proposals Relating to Environmental and Social Issues

FMR or its affiliates generally will vote in a manner consistent with management's recommendation on shareholder proposals concerning environmental or social issues, as they generally believe that management and the board are in the best position to determine how to address these matters. In certain cases, however, FMR or its affiliates may support shareholder proposals that request additional disclosures from companies regarding environmental or social issues, where they believe that the proposed disclosures could provide meaningful information to the investment management process without unduly burdening the company. For example, FMR or its affiliates may support shareholder proposals calling for reports on sustainability, renewable energy, and environmental impact issues. FMR or its affiliates also may support proposals on issues such as equal employment, and board and workforce diversity.

Conflicts of Interest

The Guidelines have been designed so that proxies are voted in the best interests of FMR's and its affiliates' clients, and to resolve potential conflicts of interest. Potential conflicts generally may arise in connection with business arrangements of FMR or its affiliates. For example, FMR's affiliates may manage or administer employee benefit plans, or provide brokerage, underwriting, insurance, or banking services to a company whose management is soliciting proxies. FMR or its affiliates may also have business or personal relationships with participants in proxy contests, corporate directors or candidates for directorships. FMR or its affiliates vote shares in a manner consistent with the Guidelines and without regard to any other relationship, business or otherwise, that FMR or its affiliates may have with companies in which FMR or its affiliates invest client assets.

IPR, which is part of FMR's Investment Operations department, is charged with administering the Guidelines as agent to facilitate the voting of proxies relating to portfolio securities held by the Fidelity Funds. IPR votes proxies without regard to any other Fidelity companies' relationship, business or otherwise, with that portfolio company. Like other Fidelity employees, IPR employees have a fiduciary duty to never place their own personal interest ahead of the interests of fund shareholders. Fidelity employees, including IPR, are instructed to avoid situations that could present even the appearance of a conflict. In the event of a conflict of interest, Fidelity employees are required to follow the escalation process included in Fidelity's corporate policy on conflicts of interest.

A complete set of the Guidelines, as well as information on how the Fidelity Funds' proxies were voted, may be obtained on www.fidelity.com.

If FMR has engaged a sub-adviser, that sub-adviser may vote proxies according to its own proxy voting guidelines and policies, which may differ from the Guidelines, for those Fidelity Funds (or portions thereof) for which the sub-adviser has been granted such authority.

FINANCIAL INFORMATION

FMR does not solicit prepayment of client fees. Furthermore, there are no financial conditions that are reasonably likely to impair FMR's ability to meet any of its contractual commitments to its clients.

REQUIREMENTS FOR STATE-REGISTERED ADVISERS

FMR is not registered with any state securities authority.