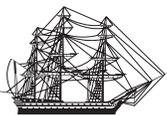


Global Investment Management Policies

Vanguard Investment Management Group



Vanguard[®]

Vanguard: A client-focused company by design

Vanguard is owned by its clients*, not by outside investors or stockholders looking to maximize their quarterly profit. That means you never need to question whose agenda is more important to us—our clients' interests are the only interests we serve.

Fast facts

- Vanguard serves institutional and individual investors, 401(k) and 403(b) plan sponsors, nonprofits, consultants, and financial professionals across four continents.
- We have more than 14,000 crew in the United States and worldwide (as of December 31, 2015).
- Crew development is part of our culture. Vanguard University® employs 150 specialists dedicated to training and development to ensure our clients are served by the most exceptional people in the industry.
- Our corporatewide continuous improvement effort is called Vanguard Unmatchable Excellence™. It's part of what we do every day and is a key tool for delivering value to you.

Our global investment management policies support our firm's mission of taking a stand for all investors, treating them fairly, and giving them the best chance for investment success.

* The Vanguard Group is owned by Vanguard's U.S.-domiciled funds. Those funds, in turn, are owned by their investors.

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1. Global policy statement

Vanguard Investment Management Group's global investment management policies apply to all internally managed equity and fixed income funds and separately managed accounts (collectively, "clients") for which The Vanguard Group, Inc. (VGI), and Vanguard Global Advisers, LLC (VGA), in the United States and its affiliates Vanguard Asset Management, Limited (VAM), in the United Kingdom, and Vanguard Investments Australia Ltd (VIA) in Australia (collectively, "Vanguard") provide portfolio management and trade execution services. Vanguard Investment Management Group (IMG) is the organizational group of the portfolio managers, traders, and risk personnel involved in the front line of the investment management process.

1.1 Purpose of policies

Vanguard believes that the establishment and maintenance of these policies and monitoring to ensure compliance is good business practice that helps ensure sound risk management and protection of client assets.

In addition, the policies serve to demonstrate compliance with applicable regulatory requirements around the globe.

Each Vanguard entity provides portfolio management and trade execution services to its respective clients across investment strategies and geographic markets. Vanguard has adopted an operating model whereby portfolio managers based in one location are able to send trade orders for execution to another Vanguard

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entity located elsewhere so the financial instruments that are to be bought or sold may be traded in the time zone closest to the market in which the transaction will occur. With the exception of foreign exchange instrument transactions, Vanguard does not operate a separate trading desk and, as such, portfolio managers may also act as traders.

1.2 Overview of regulatory requirements

These policies reflect the regulatory requirements to which Vanguard is subject. Our portfolio managers, traders, and risk professionals work closely with our Legal and Compliance Departments to ensure that regulatory requirements are understood, incorporated into policies, and monitored. Vanguard is regulated in each country in which it provides portfolio management services. The regulatory agencies include the U.S. Securities and Exchange Commission (SEC) in the United States, the Financial Conduct Authority in the United Kingdom (FCA), and the Australian Securities and Investments Commission (ASIC) in Australia. These agencies oversee regulation and impose rules that, in general, place a fiduciary duty on investment advisors and managers to, among other things, provide fair and equitable treatment of all clients. As an investment advisor/manager to funds domiciled in Ireland, Canada, and Hong Kong, Vanguard is also cognizant of rules imposed in those countries requiring the fair and equitable treatment of clients. As a fiduciary, an investment advisor owes its clients a duty of loyalty and must act in each client's best interest. An investment advisor recognizes that it may be subject to conflicting duties and loyalties with respect to managing client assets. To meet its fiduciary obligations, an investment advisor must avoid including the appearance of, among other things, investment or trading practices that systematically advantage or disadvantage select client accounts.

1.3 Notification and escalation of breaches

Vanguard requires crew members to escalate actual or suspected incidents, issues, concerns, and/or breaches of policies and procedures to their supervisor, the IMG Operational Risk Group, and their regional Compliance Departments.

2. Global investment management policies

2.1 Authorized Trader Policy

This policy applies when, in the course of providing portfolio management and trade execution services to clients, IMG personnel place orders for, and/or execute transactions in, financial instruments.

The policy specifies that only authorized crew members can make investment decisions and create orders and/or execute trades on behalf of clients. Such authorization requires certain competencies and qualifications related to the respective roles to be met and, in some cases, for the crew member to be licensed with an applicable regulator.

This policy also restricts the placing of orders and trading activity to be carried out during standard market hours in the specific region and to be performed only at Vanguard premises within the country in which the authorized crew members are employed using only approved trading platforms and trading desk phone systems.

“Only authorized crew members can make investment decisions and create orders and/or execute trades on behalf of clients.”

Authorization

The board of directors of VGI, VIA, VGA, and VAM have delegated overall authority to appoint and remove crew members to portfolio manager and trader roles for their respective clients to VGI’s chief executive officer, chief investment officer, and global heads of equities and fixed income as well as regional heads of investments for the U.K. and Australia.

Authority is based upon these criteria:

- The region in which the role is based.
- The role (portfolio manager and/or trader) and asset class (equity, fixed income, or foreign currency exchange trading).
- The trading platform(s) that may be used.
- In certain circumstances, client requirements.

Approved trading platforms

IMG uses multiple systems and tools in providing portfolio management and trade execution services. In each instance, access to platforms may provide the ability to view portfolios, create orders (including their cancellation or amendment), and/or execute transactions on behalf of clients. Platforms may be administered internally or by a third party, but in either case, the IMG Operational Risk Management Group must give prior approval of each platform to ensure appropriate controls are implemented to mitigate risk based on the type of activity.

Exceptional circumstances and regional holidays

Vanguard may be required from time to time to generate orders and/or execute transactions in a manner that diverges from this policy because of systems failures, market disruptions, or other reasons that are unavoidable or beyond Vanguard’s reasonable control. These situations are categorized as “contingency events,” and the actions must be authorized by formal declaration of a contingency event and approved as policy exceptions by the IMG Operational Risk Management Group. Vanguard will limit exceptions to this policy to the duration of the contingency event. Such activity will be monitored by the IMG Operational Risk Management Group.

2.2 Allocation and Aggregation Policy

Vanguard's policy is to treat all clients fairly and not favor one account over another. To that end, Vanguard will allocate investment opportunities and transactions it identifies as appropriate and prudent—including initial public offerings and other investment opportunities that might have a limited supply—among its clients on a fair and equitable basis. We prohibit allocation of trades that would allow any particular client account or group of client accounts to systematically receive more favorable treatment than other client accounts or that would result in any client being defrauded or in the front running of investments.

This policy recognizes that each aggregation and allocation decision for a client account is the result of rigorous and detailed investment processes that accord weight to a number of factors, many of which are subjective and may vary over time. In addition, while a variety of aggregation and allocation methods may be acceptable, consistency in application is an essential element of the policy and associated procedures.

Vanguard's policy is to treat all clients fairly and not favor one account over another.

Investment factors

The portfolio managers must take into consideration the interests of each client account when aggregating and allocating investment opportunities and transactions. While portfolio managers typically manage to an investment strategy or a model and seek to treat all client accounts they manage fairly and equitably, there may be a variety of factors that influence whether an

investment opportunity is appropriate for certain client accounts and not for others. These investment factors that must be evaluated include, but are not limited to:

- Suitability.
- Client account-specific restrictions.
- Client account composition.
- Available cash.
- Fund position targets.

Due to the differences in the applicability of investment factors to each client account, there may be differences in the factors considered and the weighting given to each factor.

Pre-trade aggregation and allocation

Certain regulatory requirements state that investment advisors and managers be able to show evidence that pre-trade allocation statements are created before trade execution.

The trade order will include, among other things, an allocation statement that identifies the client accounts participating in the transaction and the level of participation (quantity). Portfolio managers will either follow a documented aggregation methodology for certain classes of trades and associated accounts or document the reasons they recommend certain accounts participate or not participate in a transaction. This will afford the portfolio manager an opportunity to show evidence of a fair and equitable aggregation and allocation process based on application of the investment factors listed above.

Portfolio managers seeking to place orders in the same security across multiple client types (e.g., index and separately managed accounts) may, but are not required to, aggregate trade orders. Active portfolio trade orders do not have to be aggregated with index trade orders.

Cash flow orders are handled based upon the timing of the cash flows except for when the characteristics of the order or prevailing market conditions make this impractical. When an order is transmitted to another geographic location for execution, trades are executed when that order is received, subject to any specific

instructions, other characteristics of the order, and/or market conditions. For most index funds, orders are, where appropriate, aggregated for execution for benchmark rebalancing.

If a portfolio manager/trader places or receives a new order for the same security but for different accounts and there is an open order for that security, then the new order may be aggregated with the unfilled portion of the open order if the relevant investment factors are met. Where a new order is added to the unfilled portion of an open order, two separate average prices must be established: one for the first position executed and another for the combined order.

Post-trade allocation

Orders filled "in full" are allotted the security based on the initial allocation statement. This is considered a full allocation.

A "partial fill" is an order that is not completely executed. For partial fills, security allocation decisions follow a systematic methodology starting with pro rata allocation in accordance with the pre-trade allocation statement. Adjustments from pure pro rata allocation may be made to account for the particular investment factors of the accounts participating in an allocation such as minimum lot sizes and/or minimum trade sizes.

A "residual fill" is an order that is ultimately completed but is not filled all at the same time. A residual fill may result in multiple prices and differing brokerage fees. The partial allocation methodologies discussed above also apply to residual fills.

Alternate allocation methods may only be applied subject to the prior written approval of the regional chief compliance officer, the global head of fixed income or global head of equities as appropriate, and the global head of the Operational Risk Management Group or, in their absence, their designee.

Client accounts included in an aggregated order will generally receive the average price and the pro rata share of the aggregated transaction costs, except where and to the extent that applicable regulations or contractual obligations require separate treatment. To be eligible for any type of post-execution modification, the trade order must be a partial fill and must be completed by the end of the trading day.

Avoidance of inequitable allocation

Each portfolio manager/trader shall avoid any allocation of investment opportunities that would result in any client being defrauded or in the front running of investments, such as through the following types of inequitable allocations:

- Disproportionately allocating hot initial public offerings, restricted securities, or other limited issues to "favored" funds and accounts, such as personal accounts, accounts that have relatively poor performance, and new accounts.
- Allocating securities with the most favorable execution price to "favored" funds and accounts and allocating securities with the least favorable execution price to "disfavored" funds and accounts.
- Delaying the decision to allocate securities transactions that have already been entered in order to take advantage of market movements for the benefit of favored funds and accounts and to the disadvantage of disfavored funds and accounts.

Modifying an allocation statement

Any exceptions to this policy require approval from the global head of equities or global head of fixed income and the global head of the Operational Risk Management Group or, in their absence, their designees. Exceptions to this policy are subject to review by the regional Compliance Departments.

2.3 Best Execution Policy

We are required to provide information to our clients about our order execution policy. The purpose of this document is to provide such information to obtain their consent to such policy. This policy applies when, in the course of providing portfolio management and trade execution services to a client, Vanguard places an order for, or executes a transaction in, a financial instrument. Vanguard's policy is to take all sufficient steps to obtain the best possible results for its client in terms of "total cost" (in the case of purchases) and "total proceeds" (in the case of sales) when executing transactions. Total cost and total proceeds mean the: (a) price, (b) cost, (c) speed, (d) likelihood of execution and settlement, (e) size, (f) market impact, (g) nature, or (h) any other consideration relevant to the execution of an order.

Overview of regulatory requirements related to best execution

In certain markets, advisors are required to disclose their "execution policy" to clients. They can also be required to monitor the effectiveness of their order execution arrangements and execution policy to identify and, where appropriate, correct any deficiencies. In addition, in certain markets, advisors must review annually their execution policy as well as their order execution arrangements. A Vanguard's policy is to monitor for compliance with policies and to review them at least annually. This policy is available to all clients and a list of our key execution venues is available. We will disclose our top five execution venues in terms of trading volume and information regarding the quality of execution will be available on our website.

"Vanguard's policy is to take all sufficient steps to obtain the best possible results for its client in terms of 'total cost' (in the case of purchases) and 'total proceeds' (in the case of sales) when executing transactions."

Order execution

The following sets forth the policy for executing transactions for clients. This policy recognizes that portfolio managers and traders must consider the relative importance of certain execution factors and criteria when selecting an execution venue that has been approved by Vanguard to execute a transaction for a client. The relative importance of each factor varies depending on the: (a) type of instrument, (b) trade purpose and strategy, (c) trading venue, and (d) client.

Financial instruments

The financial instruments covered by this policy are:

- Equities including American depositary receipts (ADRs), global depositary receipts (GDRs), and exchange-traded funds (ETFs).
- Fixed income.
- Foreign exchange.
- Derivatives.
- Collective/Managed investment schemes.

Execution venues

Vanguard will use various brokers, dealers, and execution venues to fulfill its regulatory responsibilities in relation to transaction execution. Transactions may be executed: (1) on regulated markets, (2) on multilateral trading facilities, (3) over the counter (OTC), and (4) outside such markets and facilities through the use of market makers, own-account dealers and counterparties, and other liquidity providers. All such parties must be approved for such transactions in accordance with IMG's Venue and Counterparty Approval and Monitoring Policy. From time to time, best execution may be achieved through internal crossing of trades between Vanguard-managed funds in accordance with the Interfund Transactions Policy.

Execution criteria

When placing an order or executing a transaction, Vanguard will take into account the following execution criteria:

- The characteristics of the client or fund.
- The characteristics of the transaction, including prevailing market conditions.
- The characteristics of the financial instruments that are the subject of that transaction.
- The characteristics of the brokers or execution venues available.
- The market obligations relevant to the transaction.

Execution factors

Vanguard takes into consideration a range of different execution factors when selecting the different venues on which to execute client orders. These include:

- Price.
- Liquidity of the market.
- Explicit costs (e.g., commissions, fees) and implicit costs (e.g., market impact) of the transaction.
- The reliability and accuracy of the venue's communications and settlement processing.
- Execution capabilities, expertise, reputation, and perceived soundness of the venue for the transaction.
- The venue's access to underwritten offerings and secondary markets.
- The need, ability, and willingness of the venue to commit capital to facilitate the transaction (in particular for initial creations on new ETF products and principal transactions).
- The need for timely execution (e.g., responsiveness of the venue) and/or confidentiality of the transaction.
- Size and nature of the transaction.
- Other matters relevant to the selection of a venue for portfolio transactions for any client.

Relative importance of execution factors

Although price will ordinarily merit high importance, the weighting given to these factors can be expected to vary according to, among other things: (1) the purpose of the trade, (2) the type of instrument, and (3) market conditions involved. These factors may vary throughout the day, even on the same type of trades, and require flexibility for effective implementation.

Client instructions

If a client gives Vanguard specific instructions for executing a particular transaction, and Vanguard accepts those instructions, those instructions will take priority over this policy and may prevent Vanguard from achieving the result it would have achieved in the absence of such instructions.

Exceptional circumstances

Vanguard may from time to time execute orders in a manner that differs from the process contemplated by this policy because of systems failures, market disruption, or other reasons that are unavoidable or beyond Vanguard's reasonable control. In such an event, Vanguard will still endeavor to place or, as the case may be, execute orders on the best terms available in the relevant circumstances.

Soft dollars

IMG does not have, nor do we anticipate entering into, any arrangements whereby a broker agrees to provide services—including computer software, computer hardware, and/or data services—free of charge or at discounted rates in consideration for a specified amount of brokerage.

2.4 Venue and Counterparty Approval and Monitoring Policy

Approved venue and counterparty list

The IMG Operational Risk Management Group maintains a single, global list of venues and counterparties that are categorized by risk profile and have been approved in accordance with this policy. All approved venues and counterparties must be appropriately registered and/or licensed with all applicable regulatory authorities.

Approval of venues and counterparties is required prior to trading and to being entered into the trading systems.

Approvals can be granted as “ongoing” or “temporary” in accordance with this policy. Approval decisions are based on risk assessments that consider the various risk factors associated with each venue and counterparty as outlined below and subject to having approved legal documentation in place as appropriate.

Venue and counterparty selection

The majority of new venue and counterparty requests are requested by the portfolio managers and/or traders. A rationale for adding a venue and counterparty is required to initiate the request for a change. The rationales include, but are not limited to, the following:

- Need for expanded capacity.
- Need for expanded liquidity.
- Need for expanded capabilities.
- New product offerings.
- Need to reduce concentration.
- Explicit costs.

Approval must be granted by IMG Operational Risk Management based on policy guidelines and any applicable client mandates.

Changes to approved venues and counterparties may also be initiated by the IMG Operational Risk Management Group, or by Legal, Compliance, or Global Portfolio Management teams based on regulatory actions or changes.

Risk factors

A risk-based framework has been adopted to enable IMG to react to a dynamic market landscape. The evaluation criteria, the weight given to that criteria, and the risk limits deemed appropriate for venues and counterparties may vary based on market conditions. Risk factors include, but are not limited to:

- Venue and counterparty criticality and replacement risk.
- Credit exposure profile.
- Settlement risk exposure.
- Operational exposure to a failed market/venue and counterparty.

Venue and counterparty approval and monitoring

Each recommendation for a new venue and counterparty is submitted for approval to the IMG Operational Risk Management Group in accordance with associated approved venue and counterparty procedures.

Venues and counterparties will be approved for different transaction types and/or clients. The approval process will vary based on the risks associated with the financial instrument traded (including the geographical location of the venue and counterparty) with the approval being tiered according to the risk. Certain approvals, where the IMG Operational Risk Management Group consider that a venue and counterparty poses an ongoing credit default exposure, will be reviewed by Fixed Income Credit Research prior to approval being granted.

Existing venues and counterparties must be resubmitted for approval when IMG wishes to transact different security types through them.

Venue and counterparty monitoring and maintenance

Ongoing monitoring by the venue and counterparty monitoring team within the IMG Operational Risk Management Group is based on the type and geographical location of the venue and counterparty as well as the type of transactions executed with the venue and counterparty.

Venues and counterparties approved subject to a credit approval will have ongoing credit surveillance performed in accordance with the associated approved venue and counterparty procedures.

Venues and counterparties may also be removed from the approved list based on negative outcomes of ongoing monitoring, expiration of temporary approvals, or lack of ongoing transaction activity with a particular venue and counterparty over a period of time. The IMG Operational Risk Management Group will periodically reconcile the approved venue and counterparty list to the list of venues and counterparties programmed into Vanguard's equity and fixed income trading systems.

2.5 Derivatives Usage Policy

The following sets forth the policy for approval and usage of the allowed derivative instruments. Usage will be dependent on regional regulatory allowances, each individual fund's prospectus or investment management agreement (IMA), each individual fund's investment strategy and objectives, as well as internal policies and restrictions. This policy recognizes that each product decision for a specific fund is the result of rigorous and detailed investment decisions and that, while general product approvals are given, specific restrictions will be encountered at the fund level. In addition, while derivative usage might be inconsistent across regions based on fund and market environment, consistency in application is an essential element of the policy and associated procedures. Vanguard's policy is to use derivatives only if the expected risks and returns are consistent with the investment objectives, policies, and strategies of each participating fund.

Definition of derivative

A derivative is any financial contract whose value depends on or is derived from the price of another security or securities. Such contracts include but are not limited to equity swaps, total return swaps, credit default swaps, forwards, futures, options, "swaptions," warrants, and other instruments, both listed and over the counter.

Derivative usage authorization

No derivative instrument may be used unless it has been specifically authorized for such usage. Each instrument must at minimum be reviewed and approved by, as appropriate to the type of usage of the instrument, the relevant head of equity and/or fixed income, the head of risk management, and the New Instrument Review Committee. Authorization is granted with the following categories:

- Type of instrument.
- Usage of the instrument (approved purpose for holding the instrument).
- Asset class (equity funds, fixed income funds, or both).
- In certain cases, the specific fund or client (fund or account restrictions).

The New Instrument Review Committees are regionally focused but must follow similar processes in their granting of approvals for proposed new instruments or significantly different usage of previously approved instruments.

Before implementing new instruments into the investment process, each interested party must sign off on operational readiness; these parties include portfolio managers, IMG Investment Risk, IMG Operational Risk, Fund Financial Services (FFS) Middle Office, FFS Compliance and Accounting, FFS Derivative Operations, and Legal.

"No derivative instrument may be used unless it has been specifically authorized for such usage."

Derivatives documentation

Market standard legal documentation must be in place with respect to each Vanguard fund and the prospective counterparty prior to trading. This includes ISDA master agreements and associated collateral documents such as credit support annexes and custody account control agreements for OTC instruments; futures and clearing agreements with executing brokers for futures, cleared swaps, and other listed instruments; clearing addendum and fee schedule for futures commission merchants (FCMs); clearing agreements and third-party access agreements for central clearing counterparties (CCPs); and rulebook and user agreements for swap execution facilities (SEFs).

Derivative instruments can be executed only with those counterparties that are approved for each respective role and that have the required documentation in place.

Usage limits

Current regulatory limits on a mutual fund's use of derivatives, as well as leverage restrictions, vary by jurisdiction. Additionally, hard limits are not expressly detailed by regulators in some instances. In response to this, Vanguard relies on conservative, internal derivative usage limits that are in all cases more stringent than regulatory limits where applicable.

Monitoring and compliance

Derivative usage reviews and post-trade compliance testing procedures are used to monitor adherence to this policy, as well as adherence to any additional prospectus, statements of additional information, and regulatory requirements on a daily basis. Compliance monitoring will be handled by either internal processes or external custodian administrators, based on the fund's domicile. In instances where administrators perform the compliance testing, Vanguard will review the testing results and output.

Any valid warnings or violations shall be immediately escalated to the appropriate personnel within IMG, including, but not limited to, IMG Global Operational Risk and portfolio managers. Additionally, valuation and associated collateral balances will be independently

monitored by IMG Operational Risk and Fund Financial Derivative Operations on a daily basis to ensure adequate collateralization and Vanguard is within our exposure limits.

Use of collateral

All instances of derivative usage are required to be accompanied by a collateralization process. Collateralization protects Vanguard and its funds from potential losses resulting from counterparty failures and decreases counterparty risk.

Additional risk management parameters, including but not limited to thresholds, minimum transfer amounts, valuation haircuts, and credit-rating limits, should be negotiated prior to trading, and must be approved by IMG Global Operational Risk prior to execution or changes.

2.6 Interfund Transactions Policy

There are certain situations when it may be advantageous for one client to sell to or buy from another client, i.e., an "interfund" transaction. The primary benefits of an interfund transaction are: (1) to save the clients from incurring brokerage commissions; (2) to avoid market impact; and (3) to contain bid/ask spread transaction costs. The aim of this policy is to ensure that (a) the prices allocated to the transactions are fair and beneficial to all participating clients in accordance with relevant regulation; and (b) the types of securities selected for interfund transactions do not unfairly advantage one or more clients to the detriment of other clients.

"The primary benefits of an interfund transaction are: (1) to save the clients from incurring brokerage commissions; (2) to avoid market impact; and (3) to contain bid/ask spread transaction costs."

Permissible interfund transactions

Only clients that are permitted to participate in interfund transactions may be included in such orders. A list of clients that are permitted to participate in interfund transactions is maintained by the Operational Risk Management Group in consultation with regional Compliance Departments. Any additions or removals from the list must be approved by IMG Operational Risk Management Group and the regional Compliance Department responsible for the applicable client.

Approved pricing methodologies for interfund transactions

All price methodologies used for the execution of interfund transactions require the prior approval of the regional Compliance Department responsible for compliance oversight of the applicable client and IMG Operational Risk Management. All interfund transactions must be executed free of commission. Pricing vendors used to price interfund transactions must be selected from the list of approved pricing sources.

Disclosure and reporting requirements

The regional Compliance Department of the relevant client will liaise with trustees, depositaries, custodians, boards, independent review committee and client services, as applicable, to obtain any third-party prior approvals that may be required.

Our Fund Financial Services group is responsible for all applicable post-trade reporting in reports and accounts to trustees, custodian and boards, and separately managed account clients, including any supporting documentation to validate the price at which the interfund transaction was executed.

2.7 Model Risk Policy

Policy statement

The nature of IMG's business places a heavy emphasis on quantitative analysis of a wide variety of data for many purposes in support of product management, investment processes, risk management, and operations. IMG has a large number of models in place across our global locations. The purpose of this policy is to provide a framework to govern the end-to-end model life-cycle process to minimize model risk exposure and mitigate potential losses due to model failure.

Regulatory guidance related to model risk management

The Office of the Comptroller of the Currency and the Federal Reserve Board have issued comprehensive guidance on mitigating potential risks arising from reliance on computer-based financial models. Vanguard has incorporated this guidance into our oversight and management of model risk.

Documentation and risk mitigation controls

This policy requires adherence to industry best practices and regulatory guidance to ensure that model risk is adequately addressed. Appropriate controls should be built into models that support IMG business processes. These include controls over documentation, access control, backup and recovery, version control, change control, calculation integrity control, data input, and output validation control.

The IMG Operational Risk Group is responsible for ensuring that model risks are appropriately addressed.

“This policy requires adherence to industry best practices and regulatory guidance to ensure that model risk is adequately addressed.”

2.8 Order Handling Policy

Market structures and regulatory requirements globally are constantly evolving and changing, with listed products being traded through a variety of means by traders in each region where we have a presence. Given the complexity of the markets in which we transact, this policy provides the principles under which we expect our counterparts to operate when transacting orders placed by Vanguard traders. In all instances, our objective is to obtain the best overall execution in the context of the conditions present at the time of our trades. Within this objective, Vanguard strives to ensure that orders placed with different counterparties and execution venues are handled appropriately, with Vanguard clients' best interests in mind at all times. This means orders should be accepted only from authorized Vanguard traders, accepted for execution only via approved Vanguard means of communication, transacted only with approved counterparties, handled confidentially, and executed in a manner that is always consistent with Vanguard order instructions.

“Vanguard strives to ensure that orders placed with different counterparties and execution venues are handled appropriately, with Vanguard clients' best interests in mind at all times.”

Order handling principles

Vanguard's order handling principles must be communicated to each counterparty and execution venue where we place orders. The principles include:

- Orders may be accepted for execution only if they have been placed by an authorized trader.
- Orders may be accepted for execution only if they have been communicated via an approved Vanguard means of trade order communication.
- Orders may be transacted only with Vanguard-approved counterparties.
- Orders must be handled confidentially.
- Orders must be executed in a manner that is always consistent with Vanguard order instructions subject to these principles.
- Exceptions to these principles require prior authorization from IMG Operational Risk Management or the global heads of equity and fixed income, such as may occur during a contingency event.

Security types

All securities traded by IMG traders globally are subject to this policy. This includes equities, bonds, options, futures, FX forwards, FX spots, swaps, warrants, and rights.

Counterparties and venues

Vanguard traders may trade only with counterparties and venues that are listed as approved on the global venue matrix, maintained in association with the Venue and Counterparty Approval and Monitoring Policy. In addition, Counterparty Risk Management may from time to time designate certain venues on the global venue matrix as prohibited based on ongoing monitoring of market structure developments. Venues may be designated as prohibited for reasons including concerns around a particular venue's business practices, operational risks, information technology issues, financial strength, market conditions impacting the venue, or other factors. Orders may not be routed by Vanguard traders or by Vanguard's trading counterparties to any prohibited venues.

Changes to venue order handling processes or operations

Updates or changes to the methodology, operations, or processing performed by trading algorithms and/or routing systems must be communicated to Vanguard's Counterparty Risk Management in advance, including information about the type of testing conducted prior to introducing the changes into production.

"Vanguard's policy is to ensure, based on the specific facts and circumstances of each case, that trade errors resulting in losses are corrected appropriately and reimbursed in a timely manner so that clients are not materially impacted."

2.9 Trade Error Correction Policy

Vanguard's policy is to ensure the execution of portfolio management decisions is handled accurately and in a timely manner based on a reasonable standard of care to ensure we fulfill our fiduciary obligation to each client. There are occasions in which errors made in formulating investment decisions or in executing trades may result in a financial gain or loss that does not represent the intended outcome in managing a particular client or group of clients. Vanguard's policy is to ensure, based on the specific facts and circumstances of each case, that trade errors resulting in losses are corrected appropriately and reimbursed in a timely manner so that clients are not materially impacted. Gains resulting from trade errors remain with the client.

Trade error identification and treatment

Portfolio management decisions are implemented through trading. Numerous factors play a role in reaching a portfolio management decision, generating any related orders, and then executing transactions in accordance with such orders. Trade executions (or missed trade executions) that, based on the specific facts and circumstances, appear to have been the result of an error must be promptly reported to the IMG Operational Risk Management Group in the region where the error is first detected and to the head of the desk (or his or her designee) of the team that made the error as soon as possible. In general, when the actual outcome of an investment decision is different from the intended outcome, the situation must be reported as a potential trade error.

Trade errors can also result from mistakes made by counterparties acting upon Vanguard's trade execution instructions.

Determination of trade errors

Regardless of the way a potential error is detected, determination of trade errors is handled by the IMG Operational Risk Management Group. The determination involves a review of the facts and circumstances. A comprehensive review of each actual or potential error, whether human or systematic, must be performed.

The IMG Operational Risk Management Group works with the respective desk(s) and support functions to document and record each incident as part of our established incident reporting and monitoring process.

Error correction

All reasonable efforts should be made to promptly correct trade errors to minimize the disruption to affected clients. Action should be appropriate for the facts and circumstances at hand and should be carefully executed so as not to worsen the situation. The head of the desk (or designee in his or her absence) of the team that made the error must be notified as soon as possible. Specific rules are in place specifying who has the discretion and authority to correct trade errors. For situations in which the markets to correct a position are closed, alternative strategies (e.g., index futures or ETFs) to mitigate the risk of exposure to the open trade

error may be devised in consultation with regional and global investment management leadership as well as the Operational Risk Management Group leadership.

For significant trade errors, the relevant Compliance team escalates reporting to the appropriate board and/or committee, and/or trustee/depositary, as necessary.

Calculation of impact

Once an incident has been determined to be a trade error, the financial impact of the error is calculated and verified by the IMG Operational Risk Management Group. The basis for each calculation is related to the facts and circumstances of the trade error.

3. Governance

Oversight of the effectiveness of our policies includes governance coverage by various group committees in each region where IMG has trading operations. Any exceptions or issues noted through IMG Operational Risk Management monitoring are reported quarterly to the Global Operational Risk Council.

4. Review by the IMG Operational Risk Group

The head of global operational risk for the Investment Management Group (or his or her designee) will periodically perform reviews as part of the overall IMG controls assurance testing and reporting program to ensure that the provisions of our policies are being followed. Reviews include the allocation and aggregation of investment opportunities, best execution, and order handling practices, to ensure fair and equitable treatment of all clients, and the safeguarding of their assets. Results of these reviews will be reported periodically to the Global Operational Risk Council.

5. Oversight by the regional Compliance Departments

The regional Compliance Departments will periodically monitor these policies and relevant procedures as part of the regional and global compliance programs. The results of any monitoring or surveillance activities will be documented. Any issues identified will be escalated to both the regional chief compliance officers and the global chief compliance officer (or their designees) and, as appropriate, escalated to senior business management and regional boards of directors.

6. Recordkeeping

All relevant records will be maintained by Vanguard and shall be available to the regional Compliance Departments or any applicable regulator at any time and from time to time for periodic, special, or other exams.

