

Model and Governance Framework

Contents

1 Purpose and Governance Objectives	8
1.1 Purpose of the Model Governance Framework	8
1.2 Definition of a Model	8
1.3 Governance Objectives	8
1.3.1 Contextual Integrity	9
1.3.2 Scope Control	9
1.3.3 Evidence Discipline	9
1.3.4 Risk Proportionality	9
1.3.5 Transparency and Accountability	9
1.4 Guiding Principles	9
1.4.1 Validity Is Conditional	9
1.4.2 Changes Are Substantive, Not Cosmetic	9
1.4.3 Trade-Offs Are Fundamental	9
1.4.4 Fragility Is a Risk Signal	10
1.4.5 Governance Follows Impact	10
1.5 Relationship to Other Firm Policies	10
1.6 Policy Authority and Enforcement	10
2 Model Inventory and Classification	10
2.1 Model Registry	10
2.2 Model Lifecycle Status	11
2.2.1 Research	11
2.2.2 Approved	11
2.2.3 Restricted	11
2.2.4 Retired	12
2.3 Mandatory Model Classification	12

2.3.1	Diagnostic Models	12
2.3.2	Translational Models	12
2.3.3	Deployable Models	13
2.4	Classification Integrity	14
2.4.1	Prohibition on Implicit Promotion	14
2.4.2	Mixed-Use Models	14
2.5	Model Composition and Interaction Risk	14
2.6	Ownership and Accountability	14
2.7	Relationship Between Classification and Evidence	15
3	Declared Operating Context	15
3.1	Requirement for a Declared Operating Context	15
3.2	Components of the Operating Context	15
3.2.1	Asset Universe	15
3.2.2	Data Inputs	16
3.2.3	Decision Horizon	16
3.2.4	Portfolio Construction and Execution	16
3.2.5	Transaction Costs and Market Impact	16
3.2.6	Risk Constraints	16
3.2.7	Capacity and Scale Assumptions	16
3.2.8	Intended Decision Supported	17
3.3	Scope Boundaries and Exclusions	17
3.4	Context Consistency and Evidence Alignment	17
3.5	Context Changes and Re-Approval	17
3.5.1	Definition of a Context Change	17
3.5.2	Governance Requirements for Context Changes	18
3.6	Context Hierarchy and Conservative Interpretation	18
3.7	Enforcement and Violations	18
3.8	Operating Context Documentation	18
4	Research and Validation Standards	18
4.1	Alignment of Evaluation with Intended Use	18
4.2	Permissible Evaluation Metrics by Model Classification	19
4.2.1	Diagnostic Models	19
4.2.2	Translational Models	19

4.2.3	Deployable Models	20
4.3	Evaluation Design Requirements	20
4.3.1	Temporal Integrity	20
4.3.2	Constraint Consistency	20
4.3.3	Fixed Environment Discipline	20
4.4	Trade-Off Presentation and Frontier Analysis	21
4.5	Robustness and Sensitivity Analysis	21
4.6	Interpretation and Claim Discipline	21
4.7	Independent Review and Challenge	22
4.8	Documentation Requirements	22
4.9	Consequences of Non-Compliance	22
5	Change Management and Version Control	23
5.1	Principle of Scope Preservation	23
5.2	Definition of a Model Change	23
5.2.1	Data and Feature Changes	23
5.2.2	Objective and Estimation Changes	23
5.2.3	Portfolio and Execution Changes	23
5.2.4	Assumption and Constraint Changes	23
5.2.5	Usage and Decision Changes	24
5.3	Model Versioning Requirements	24
5.4	Classification of Changes	24
5.4.1	Non-Impacting Changes	24
5.4.2	Diagnostic-Scope Changes	24
5.4.3	Translational or Deployable Changes	25
5.5	Prohibition on Retroactive Justification	25
5.6	Approval Authority for Changes	25
5.7	Emergency Changes	25
5.8	Audit Trail and Traceability	26
5.9	Consequences of Unauthorized Changes	26
5.10	Guiding Rule	26
6	Deployment Approval and Capital Allocation Controls	26
6.1	Principle of Controlled Deployment	26
6.2	Preconditions for Deployment Approval	27

6.2.1	Classification Eligibility	27
6.2.2	Completed Validation	27
6.2.3	Documented Operating Context	27
6.2.4	Independent Review	27
6.3	Deployment Approval Materials	27
6.4	Approval Authority	28
6.5	Capital Allocation Controls	28
6.5.1	Initial Capital Limits	28
6.5.2	Scaling Conditions	28
6.5.3	Prohibited Allocation Practices	28
6.6	Deployment Constraints and Controls	29
6.7	Conditional and Limited Deployment	29
6.8	Suspension and De-Escalation Authority	29
6.9	Post-Approval Obligations	30
6.10	Governing Standard	30
7	Ongoing Monitoring and Risk Controls	30
7.1	Purpose of Ongoing Monitoring	30
7.2	Monitoring Focus	30
7.2.1	Implementation Behavior	30
7.2.2	Signal and Decision Stability	31
7.2.3	Risk and Exposure Profile	31
7.2.4	Sensitivity to Operating Conditions	31
7.3	Monitoring Metrics and Thresholds	31
7.4	Detection of Operating Context Violations	32
7.5	Response to Monitoring Breaches	32
7.5.1	Initial Response	32
7.5.2	Escalation	32
7.5.3	Documentation	32
7.6	Performance Monitoring and Interpretation	32
7.7	Periodic Review Requirements	33
7.8	Authority to Restrict or Suspend Models	33
7.9	Learning and Feedback	33
7.10	Governing Principle	34

8 Review, Escalation, and Model Retirement	34
8.1 Purpose of Review and Escalation	34
8.2 Periodic Model Review	34
8.2.1 Review Frequency	34
8.2.2 Review Scope	34
8.3 Escalation Triggers	35
8.4 Escalation Process	35
8.4.1 Initial Assessment	35
8.4.2 Formal Review	35
8.5 Model Restriction	35
8.6 Dormant Models and Archiving	36
8.7 Model Retirement	36
8.7.1 Retirement Criteria	36
8.7.2 Retirement Process	36
8.8 Post-Retirement Review	37
8.9 Re-Activation of Retired Models	37
8.10 Documentation and Auditability	37
8.11 Governing Principle	37
9 Roles, Responsibilities, and Accountability	37
9.1 Purpose of Role Definition	37
9.2 Model Owner	38
9.2.1 Responsibilities of the Model Owner	38
9.3 Governance Reviewer (Independent Oversight)	38
9.3.1 Responsibilities of the Governance Reviewer	38
9.4 Risk Management Function	39
9.5 Investment Committee	39
9.6 Research Function	39
9.7 Operations and Technology	40
9.8 Compliance and Legal (Where Applicable)	40
9.9 Incentive Alignment and Cultural Safeguards	40
9.10 Accountability and Escalation	40
9.11 Governing Principle	41
10 Policy Review, Exceptions, and Amendments	41

10.1 Policy Review and Maintenance	41
10.1.1 Review Frequency	41
10.1.2 Review Responsibility	41
10.2 Policy Exceptions	41
10.2.1 Principle on Exceptions	41
10.2.2 Exception Approval	41
10.2.3 Monitoring of Exceptions	42
10.3 Amendments to the Framework	42
10.4 Interpretation and Precedence	42
10.5 Effective Date and Adoption	42
10.6 Final Statement	43
A Appendix A: Model Context Summary (Mandatory)	43
A.1 Model Identification	43
A.2 Intended Use	43
A.3 Declared Operating Context	43
A.4 Evaluation and Evidence Summary	45
A.5 Assumptions and Fragilities	45
A.6 Monitoring Expectations	45
A.7 Capital Allocation Controls (Deployable Models Only)	45
A.8 Change and Re-Approval Triggers	46
A.9 Approvals	46
A.10 Governing Statement	46
B Appendix B: Deployment Approval Checklist (Mandatory)	46
B.1 A. Model Identification	47
B.2 B. Context and Scope Verification	47
B.3 C. Evaluation and Evidence Alignment	47
B.4 D. Robustness and Fragility Assessment	47
B.5 E. Implementation Feasibility	48
B.6 F. Monitoring and Risk Controls	48
B.7 G. Capital Allocation Controls	48
B.8 H. Independent Review	48
B.9 I. Compliance with Governance Standards	49
B.10 J. Approval Determination	49

B.11 K. Sign-Off	49
B.12 L. Governing Statement	49
C Appendix C: Worked Example	50
C.1 ML Cross-Sectional Equity Signal	50
C.1.1 High-level description	50
C.1.2 Step 1: Appendix A – Model Context Summary	50
C.1.3 Verdict after Appendix A	53
C.1.4 Step 2: Appendix B – Deployment Approval Checklist	53
C.1.5 Final Outcome (This Is the Key)	55
C.1.6 Why this example matters	55
D Appendix D: Worked Example (Passing Case)	56
D.1 Stability-Aware Equity Factor Overlay	56
D.1.1 High-level description	56
D.1.2 Step 1: Appendix A – Model Context Summary	56
D.1.3 Step 2: Appendix B – Deployment Approval Checklist	59
D.1.4 Why this model passes (this is the lesson)	60
D.1.5 Final takeaway	62

1 Purpose and Governance Objectives

1.1 Purpose of the Model Governance Framework

This framework establishes firm-wide standards for the design, evaluation, approval, deployment, monitoring, and retirement of quantitative models used in investment-related activities.

The objective of the framework is to ensure that:

- models are used only for decisions they are demonstrably fit to support;
- conclusions drawn from models are valid under clearly specified operating conditions;
- changes in assumptions, data, or usage are identified and governed as changes in scope; and
- model-related risks are identified, documented, and managed proactively.

This framework is intended to protect the firm from losses arising not only from model error, but from **misinterpretation, misuse, or over-extension of otherwise sound models**.

1.2 Definition of a Model

For the purposes of this framework, a *model* is defined as any quantitative, statistical, algorithmic, or rules-based system that:

- transforms data into signals, forecasts, rankings, or decisions; and
- is referenced, directly or indirectly, in forming investment views, portfolio allocations, trade decisions, risk assessments, or execution strategies.

This definition includes, but is not limited to:

- predictive and classification models;
- ranking and scoring systems;
- portfolio construction and optimization routines;
- risk, exposure, and scenario models;
- execution and cost models; and
- externally sourced or third-party models adopted by the firm.

Ad hoc analyses or exploratory tools become subject to this framework once they are cited in decision-making, approval materials, or capital allocation discussions.

1.3 Governance Objectives

The framework is designed to achieve the following governance objectives:

1.3.1 Contextual Integrity

Ensure that each model is evaluated, approved, and used only within the operating conditions under which its behavior has been examined.

1.3.2 Scope Control

Prevent implicit expansion of model use beyond its validated purpose through clear definition of intended use and formal control of changes.

1.3.3 Evidence Discipline

Ensure that claims made about a model's performance, robustness, or suitability do not exceed the evidence generated under its declared operating conditions.

1.3.4 Risk Proportionality

Apply governance controls in proportion to the model's influence on investment decisions and the amount of capital or risk it affects.

1.3.5 Transparency and Accountability

Maintain a clear record of model assumptions, limitations, versions, and approvals to support internal review, audit, and learning.

1.4 Guiding Principles

All subsequent sections of this framework are governed by the following principles.

1.4.1 Validity Is Conditional

Model outputs are valid only within the conditions under which the model was evaluated. Performance observed under one set of assumptions does not justify use under materially different conditions.

1.4.2 Changes Are Substantive, Not Cosmetic

Changes to data, assumptions, horizons, objectives, or constraints alter the question being answered by a model and therefore constitute changes in model scope.

1.4.3 Trade-Offs Are Fundamental

Model quality cannot be reduced to a single metric. All models embody trade-offs (e.g., performance vs. turnover, responsiveness vs. stability), which must be made explicit.

1.4.4 Fragility Is a Risk Signal

Sensitivity of model behavior to reasonable changes in assumptions or conditions is treated as a model risk characteristic and must be disclosed and managed.

1.4.5 Governance Follows Impact

The rigor of validation, approval, and monitoring increases with the potential impact of the model on capital allocation, risk exposure, and firm outcomes.

1.5 Relationship to Other Firm Policies

This framework operates in conjunction with, and does not replace:

- investment approval and capital allocation policies;
- risk management and limits frameworks;
- compliance and market conduct policies; and
- technology and operational controls.

In the event of conflict, the most restrictive applicable requirement governs.

1.6 Policy Authority and Enforcement

Compliance with this framework is mandatory.

- Use of a model outside its approved scope constitutes a governance breach.
- Failure to document assumptions or changes as required may result in suspension of model use.
- Persistent or material violations may lead to escalation to senior management and the Investment Committee.

This framework is reviewed periodically and updated as necessary to reflect changes in firm strategy, market structure, or regulatory expectations.

2 Model Inventory and Classification

2.1 Model Registry

The firm shall maintain a centralized **Model Registry** that serves as the authoritative record of all quantitative models subject to this framework.

Each model entered into the registry must be assigned:

- a unique model identifier;
- a model name and brief description;
- a primary owner (research lead);
- a secondary owner (risk or governance contact);
- the portfolio, desk, or function the model supports;
- current model status; and
- the model's classification as defined in Section 2.3.

The Model Registry is the system of record for governance purposes. Models not listed in the registry may not be referenced in investment decisions or approval materials.

2.2 Model Lifecycle Status

Each model in the registry must have exactly one lifecycle status at any point in time.

Permissible statuses are:

2.2.1 Research

- Model is under development or evaluation.
- Not permitted to influence capital allocation or live trading.
- May be used for exploratory analysis and internal discussion.

2.2.2 Approved

- Model has satisfied applicable validation requirements.
- Approved for use within its declared operating context.
- Subject to monitoring and change controls.

2.2.3 Restricted

- Model use is temporarily limited due to:
 - assumption violations;
 - monitoring breaches;
 - unresolved review findings; or
 - pending re-validation.
- Capital exposure may be reduced or suspended.

2.2.4 Retired

- Model is no longer approved for use.
- Retained in the registry for audit, learning, and historical reference.
- Must not be reactivated without re-approval.

Lifecycle status changes must be logged with justification and approval authority.

2.3 Mandatory Model Classification

Each model must be classified into exactly one of the following categories. Classification is mandatory and determines validation requirements, permissible uses, and approval authority.

2.3.1 Diagnostic Models

Purpose

Diagnostic models are used to explore data, test hypotheses, or assess the presence of informational structure.

Characteristics

- Generate signals, rankings, or statistics for analysis.
- Evaluated using informational or statistical metrics.
- May exhibit performance under unconstrained or simplified assumptions.

Restrictions

- Must not be used to justify capital allocation.
- Must not be cited as evidence of deployable performance.
- Must not be connected directly to live trading systems.

Governance Implication

Diagnostic models are subject to documentation requirements but are exempt from deployment approval and live monitoring standards.

2.3.2 Translational Models

Purpose

Translational models are used to map research signals into implementable portfolios, trades, or execution instructions under explicit constraints.

Characteristics

- Incorporate portfolio construction rules, transaction costs, or risk limits.
- Used to assess feasibility, turnover, cost sensitivity, and stability.
- Bridge the gap between research outputs and deployable strategies.

Restrictions

- Do not independently justify capital allocation.
- Must not be presented as live trading recommendations.
- May only be used to inform deployment decisions, not replace them.

Governance Implication

Translational models require enhanced validation relative to diagnostic models and are reviewed jointly by research and risk management.

2.3.3 Deployable Models

Purpose

Deployable models directly or indirectly influence live trading decisions, portfolio allocations, risk controls, or execution behavior.

Characteristics

- Integrated into live or pre-trade decision workflows.
- Influence position sizing, trade timing, or capital allocation.
- Subject to operational, market, and behavioral risks.

Requirements

- Must undergo full validation and approval.
- Must include defined monitoring metrics and thresholds.
- Must have clearly documented failure modes and escalation procedures.

Governance Implication

Deployable models are subject to the highest level of governance, including formal approval, ongoing monitoring, and periodic re-review.

2.4 Classification Integrity

2.4.1 Prohibition on Implicit Promotion

A model may not be treated as belonging to a higher classification than the one assigned in the registry.

In particular:

- Diagnostic results may not be used to support deployable claims.
- Translational analyses may not substitute for deployable validation.

Any change in classification constitutes a change in intended use and requires re-approval.

2.4.2 Mixed-Use Models

If a model supports multiple functions (e.g., research and trading), each use must be explicitly documented and approved.

Absent such documentation, the model is governed under the **most restrictive applicable classification**.

2.5 Model Composition and Interaction Risk

Models are often used in combination, including stacked signals, ensembles, overrides, or conditional routing. Such combinations can create emergent behavior that is not captured by the validation of any individual component.

Accordingly:

- A material combination of approved models may constitute a **new model** and must be documented as such in the Model Registry.
- The combined system must have a declared Operating Context, classification, and validation evidence appropriate to its use.
- Interactions that change decision logic, risk exposure, or trading behavior require review and approval prior to use.

2.6 Ownership and Accountability

Each model must have:

- a **Model Owner**, responsible for:
 - documentation accuracy;
 - disclosure of assumptions and limitations; and

- initiating reviews when conditions change.
- a **Governance Reviewer**, responsible for:
 - independent challenge;
 - validation oversight; and
 - enforcement of scope and classification discipline.

Ownership must be current at all times. Unowned models may not remain active.

2.7 Relationship Between Classification and Evidence

The type of evidence required to support model use depends on classification:

- Diagnostic models require evidence of informational relevance.
- Translational models require evidence of implementability.
- Deployable models require evidence of stable behavior under realistic constraints.

Evidence generated under one classification does not automatically transfer to another.

3 Declared Operating Context

3.1 Requirement for a Declared Operating Context

Every model subject to this framework must include a formally declared **Operating Context**.

The Operating Context defines the specific conditions under which the model has been evaluated and approved for use. Model outputs are considered valid **only** within this declared context.

Models may not be used, referenced, or interpreted outside their declared Operating Context without formal re-evaluation and approval.

3.2 Components of the Operating Context

The Operating Context must be documented in a structured, reviewable format and must include, at a minimum, the following elements.

3.2.1 Asset Universe

- Instruments, asset classes, or markets covered
- Inclusion and exclusion criteria
- Treatment of corporate actions, listings, and delistings

3.2.2 Data Inputs

- Data sources and vendors
- Data frequency and aggregation
- Lookback windows and lags
- Preprocessing, filtering, and normalization procedures

3.2.3 Decision Horizon

- Prediction or decision horizon
- Relationship between signal horizon and trading horizon
- Alignment with portfolio or execution timing

3.2.4 Portfolio Construction and Execution

- Position sizing methodology
- Portfolio constraints (e.g., leverage, gross and net exposure)
- Rebalancing frequency and rules
- Execution assumptions (e.g., order types, participation rates)

3.2.5 Transaction Costs and Market Impact

- Cost model used in evaluation
- Assumptions regarding spreads, fees, and slippage
- Treatment of market impact and liquidity limits

3.2.6 Risk Constraints

- Exposure limits (factor, sector, asset-level)
- Risk metrics used (e.g., volatility, drawdown)
- Integration with firm risk policies

3.2.7 Capacity and Scale Assumptions

- Capital levels evaluated
- Scaling behavior assumptions
- Known capacity limits or degradation effects

3.2.8 Intended Decision Supported

- Specific decisions the model is intended to inform
- Decisions the model is explicitly **not** designed to support

3.3 Scope Boundaries and Exclusions

Each Operating Context must explicitly state:

- conditions under which model performance is expected to degrade;
- assumptions that, if violated, invalidate conclusions; and
- market environments or regimes for which the model has not been evaluated.

Implicit assumptions are not permitted. Undeclared assumptions are treated as **unapproved scope expansion**.

3.4 Context Consistency and Evidence Alignment

All validation, performance evaluation, and monitoring metrics must be consistent with the declared Operating Context.

Evidence generated under different assumptions—such as alternative cost models, rebalancing frequencies, or horizons—must be clearly labeled as **out-of-context** and may not be used to justify in-context deployment.

Where multiple contexts are evaluated, results must be presented separately and not aggregated without explicit justification.

3.5 Context Changes and Re-Approval

3.5.1 Definition of a Context Change

Any change to the components listed in Section 3.2 constitutes a change in Operating Context.

Examples include, but are not limited to:

- expanding or altering the asset universe;
- changing data sources or frequency;
- modifying portfolio construction rules;
- updating transaction cost or liquidity assumptions;
- altering rebalancing cadence or decision horizon.

3.5.2 Governance Requirements for Context Changes

- Context changes affecting diagnostic use require documentation update.
- Context changes affecting translational or deployable use require re-validation and approval prior to use.

Context changes may not be implemented retroactively.

3.6 Context Hierarchy and Conservative Interpretation

When uncertainty exists regarding applicable context, the model shall be governed under the **most restrictive interpretation**.

Evidence generated under relaxed assumptions does not supersede evidence generated under stricter assumptions unless explicitly approved.

3.7 Enforcement and Violations

Use of a model outside its declared Operating Context constitutes a governance violation.

Violations may result in:

- immediate restriction or suspension of model use;
- reduction of capital exposure;
- mandatory review by risk management; and
- escalation to senior management or the Investment Committee, as appropriate.

3.8 Operating Context Documentation

The declared Operating Context must be:

- stored alongside the model in the Model Registry;
- versioned and auditable;
- referenced in all approval and review materials; and
- reviewed whenever material market, operational, or strategic changes occur.

4 Research and Validation Standards

4.1 Alignment of Evaluation with Intended Use

Model evaluation must be aligned with the model's classification and declared Operating Context.

Evaluation designs, metrics, and conclusions must correspond directly to the decisions the model is intended to support. Evidence generated under one use case may not be used to justify a different use case without re-evaluation.

Specifically:

- **Diagnostic models** are evaluated for informational content and structural relevance.
- **Translational models** are evaluated for implementability under explicit constraints.
- **Deployable models** are evaluated for stability, risk, and net outcomes under realistic operating conditions.

Misalignment between evaluation design and intended use constitutes a governance failure.

4.2 Permissible Evaluation Metrics by Model Classification

4.2.1 Diagnostic Models

Permissible metrics include:

- correlation or ranking measures;
- classification or prediction diagnostics;
- explanatory or attribution statistics.

Diagnostic metrics are interpreted as evidence of *information presence*, not of tradable value.

Diagnostic results must not be presented as performance evidence.

4.2.2 Translational Models

Permissible metrics include:

- turnover and trading intensity;
- transaction-cost sensitivity;
- stability of signals or rankings;
- feasibility under portfolio and risk constraints.

Translational metrics are interpreted as evidence of *implementability*, not of allocative performance.

4.2.3 Deployable Models

Permissible metrics include:

- net returns after costs;
- drawdowns and tail behavior;
- exposure stability and risk utilization;
- performance under stress and adverse conditions.

Deployable metrics must reflect the declared Operating Context and realistic assumptions.

4.3 Evaluation Design Requirements

4.3.1 Temporal Integrity

Evaluation must respect time ordering consistent with the Operating Context.

- Training, validation, and testing must be separated appropriately.
- Lookahead bias and information leakage must be explicitly addressed.
- Evaluation windows must reflect deployment cadence.

4.3.2 Constraint Consistency

All evaluation must apply the same constraints assumed in deployment, including:

- portfolio construction rules;
- rebalancing frequency;
- transaction costs and liquidity limits;
- risk constraints.

Relaxing constraints for evaluation purposes must be explicitly labeled and may not support deployable claims.

4.3.3 Fixed Environment Discipline

For deployable and translational models, core elements of the evaluation environment—data definitions, features, portfolio rules, and cost assumptions—must be held fixed across comparisons unless a context change is declared.

Performance differences must be attributable to explicitly identified design choices.

4.4 Trade-Off Presentation and Frontier Analysis

Model results must be presented as trade-offs among economically relevant dimensions.

At a minimum, validation materials must illustrate:

- performance versus turnover or cost;
- responsiveness versus stability;
- scale versus market impact.

Single-metric optimization or “best model” selection is insufficient for approval.

Where applicable, results should be presented as feasible regions or frontiers rather than point estimates.

4.5 Robustness and Sensitivity Analysis

Validation must assess sensitivity to:

- reasonable variations in key assumptions;
- changes in transaction costs, liquidity, or scale;
- alternative but plausible operating conditions.

Robustness analysis is intended to identify:

- regions of stability;
- points of fragility; and
- assumptions that materially affect outcomes.

Fragility must be documented and treated as a model risk characteristic.

4.6 Interpretation and Claim Discipline

Validation materials must adhere to the following standards:

- Claims must be explicitly tied to evaluated conditions.
- Absence of evidence is not evidence of robustness.
- Performance improvements must be contextualized within observed trade-offs.

Language implying generality, optimality, or dominance is prohibited unless supported across declared operating conditions.

4.7 Independent Review and Challenge

Deployable and translational models are subject to independent review by risk management or a designated governance function.

Independent review includes:

- assessment of evaluation design integrity;
- challenge of assumptions and scope boundaries;
- verification of alignment with the declared Operating Context.

Unresolved review findings must be addressed prior to approval.

4.8 Documentation Requirements

Validation documentation must include:

- a description of evaluation design;
- metrics used and rationale for their selection;
- explicit mapping from evidence to claims;
- identified limitations and failure modes.

Documentation must be sufficient to allow an informed third party to understand:

- what was tested;
- under what conditions; and
- what conclusions are justified.

4.9 Consequences of Non-Compliance

Failure to adhere to research and validation standards may result in:

- rejection of approval requests;
- restriction or suspension of model use; or
- mandatory re-evaluation.

Repeated or material violations may be escalated to senior management or the Investment Committee.

5 Change Management and Version Control

5.1 Principle of Scope Preservation

Models are approved for use only within their declared Operating Context and validated configuration.

Any change that alters the data, assumptions, objectives, constraints, or usage of a model alters the question the model is answering and therefore constitutes a **change in model scope**.

Changes in scope must be governed explicitly. Undocumented or implicit changes are prohibited.

5.2 Definition of a Model Change

The following changes constitute a **new model version** and are subject to this section:

5.2.1 Data and Feature Changes

- addition, removal, or modification of data sources;
- changes in data frequency, aggregation, or preprocessing;
- changes to feature definitions, transformations, or lags.

5.2.2 Objective and Estimation Changes

- changes to training objectives or loss functions;
- changes to estimation methods or fitting procedures;
- changes to regularization, constraints, or optimization targets.

5.2.3 Portfolio and Execution Changes

- changes to portfolio construction rules;
- changes to rebalancing frequency or timing;
- changes to execution logic or order assumptions.

5.2.4 Assumption and Constraint Changes

- changes to transaction cost or market impact models;
- changes to liquidity or capacity assumptions;
- changes to risk constraints or exposure limits.

5.2.5 Usage and Decision Changes

- changes to the decisions the model informs;
- changes in capital allocation linked to the model;
- changes in integration with other models or systems.

Cosmetic, stylistic, or documentation-only changes do not constitute a model change but must still be logged.

5.3 Model Versioning Requirements

Each model version must be uniquely identified and recorded in the Model Registry.

For each version, the following must be retained:

- version identifier and timestamp;
- description of changes relative to the prior version;
- rationale for the change;
- updated Operating Context, if applicable;
- summary comparison of behavior relative to the prior version.

Prior versions may not be overwritten or deleted.

5.4 Classification of Changes

Model changes are classified based on their impact.

5.4.1 Non-Impacting Changes

- Documentation clarifications
- Code refactoring with no behavioral impact

Governance Requirement

Logging only. No re-validation required.

5.4.2 Diagnostic-Scope Changes

- Changes affecting exploratory or diagnostic use only
- No effect on implementability or capital allocation

Governance Requirement

Research owner signoff and documentation update.

5.4.3 Translational or Deployable Changes

- Any change affecting implementation behavior, risk, or performance
- Any change affecting live or potential capital allocation

Governance Requirement

Full re-validation and approval prior to use.

5.5 Prohibition on Retroactive Justification

Model changes may not be justified using performance observed prior to the change.

Evaluation of a new model version must be conducted prospectively relative to its declared Operating Context.

Backfilling or reinterpretation of historical results under modified assumptions is prohibited.

5.6 Approval Authority for Changes

Approval authority depends on model classification and change impact:

- **Diagnostic models:** research owner approval
- **Translational models:** research and risk management approval
- **Deployable models:** investment committee or delegated authority approval

Approval must be documented prior to use.

5.7 Emergency Changes

In exceptional circumstances (e.g., market structure changes, operational issues), temporary changes may be implemented to mitigate risk.

Emergency changes must:

- be clearly labeled as temporary;
- be documented within one business day; and
- undergo formal review and approval as soon as practicable.

Emergency status does not exempt the model from subsequent validation.

5.8 Audit Trail and Traceability

The firm must maintain an auditable trail linking:

- model versions;
- operating contexts;
- validation results;
- approvals; and
- deployment dates.

The audit trail must support reconstruction of:

- what model version was used;
- under what assumptions; and
- for what decisions at any point in time.

5.9 Consequences of Unauthorized Changes

Unauthorized or undocumented model changes constitute a governance breach.

Consequences may include:

- immediate suspension of model use;
- reduction or removal of capital allocation;
- mandatory re-validation; and
- escalation to senior management or the Investment Committee.

5.10 Guiding Rule

A model that has changed is a different model. Governance exists to ensure that this is recognized before capital is affected.

6 Deployment Approval and Capital Allocation Controls

6.1 Principle of Controlled Deployment

No quantitative model may influence live trading decisions or capital allocation unless it has been formally approved for deployment under this framework.

Deployment approval is **context-specific**. Approval to deploy a model under one Operating Context does not authorize its use under materially different conditions.

The burden of proof for deployment rests with the model owner.

6.2 Preconditions for Deployment Approval

A model may be considered for deployment only if all of the following conditions are met:

6.2.1 Classification Eligibility

- The model is classified as a **Deployable Model** in the Model Registry.
- Any prior use as a diagnostic or translational model has been explicitly closed or re-scaled.

6.2.2 Completed Validation

- Validation has been conducted in accordance with Section 4.
- Evaluation reflects the declared Operating Context.
- Trade-offs, sensitivities, and limitations are documented.

6.2.3 Documented Operating Context

- The Operating Context is complete, current, and approved.
- Scope boundaries and exclusions are explicit.
- Known failure modes are documented.

6.2.4 Independent Review

- Risk management or an independent governance function has reviewed the model.
- Material review findings have been resolved or formally accepted.

6.3 Deployment Approval Materials

Deployment requests must include, at a minimum:

- a summary of intended use and decision impact;
- the declared Operating Context;
- validation results and trade-off analysis;
- identified risks, fragilities, and failure modes;
- proposed capital limits and scaling plan;
- monitoring metrics and escalation triggers.

Approval materials must distinguish clearly between:

- evidence generated under approved assumptions; and
- exploratory or out-of-context analyses.

6.4 Approval Authority

Deployment approval authority depends on the model's impact and capital at risk:

- **Low-impact deployable models:** delegated authority (as defined by firm policy).
- **Material-impact deployable models:** Investment Committee approval.
- **Firm-wide or systemic models:** senior management or board-level oversight.

Approval authority must be documented in the Model Registry.

6.5 Capital Allocation Controls

6.5.1 Initial Capital Limits

All deployed models must begin with conservative capital limits.

Initial limits must reflect:

- uncertainty in model behavior;
- sensitivity to assumptions;
- liquidity and operational considerations.

Capital limits may not be increased automatically based on short-term performance.

6.5.2 Scaling Conditions

Any increase in capital allocation must be conditioned on:

- sustained behavior within expected ranges;
- stability of key monitoring metrics;
- absence of Operating Context violations.

Scaling decisions require review and approval proportional to the increase in exposure.

6.5.3 Prohibited Allocation Practices

The following practices are prohibited:

- allocating capital based solely on backtested performance;
- extrapolating performance beyond evaluated scale;
- inferring robustness from short-lived success.

6.6 Deployment Constraints and Controls

Deployed models must operate within predefined constraints, including:

- maximum turnover and trading intensity;
- exposure and concentration limits;
- drawdown or loss thresholds;
- operational and execution constraints.

Constraints must be enforceable via systems controls where feasible.

6.7 Conditional and Limited Deployment

Where appropriate, models may be approved for **conditional deployment**, including:

- paper trading with live monitoring;
- shadow capital allocations;
- partial or capped integration into existing strategies.

Conditional deployment must include:

- explicit success and failure criteria; and
- a defined review timeline.

6.8 Suspension and De-Escalation Authority

Risk management and designated governance functions have the authority to:

- reduce capital allocation;
- restrict model usage; or
- suspend deployment

in response to:

- Operating Context violations;
- monitoring breaches;
- unexplained behavioral changes; or
- external events invalidating assumptions.

Suspension actions must be documented and reviewed.

6.9 Post-Approval Obligations

Approval for deployment carries ongoing obligations:

- compliance with monitoring requirements (Section 7);
- prompt disclosure of assumption breaches;
- timely initiation of reviews when conditions change.

Failure to meet post-approval obligations may result in withdrawal of approval.

6.10 Governing Standard

Deployment approval reflects confidence in how a model behaves under defined conditions, not belief in its ability to perform under all conditions.

7 Ongoing Monitoring and Risk Controls

7.1 Purpose of Ongoing Monitoring

Ongoing monitoring is required to ensure that deployed models continue to behave in a manner consistent with their declared Operating Context and validated expectations.

Monitoring is not intended to evaluate whether a model is “working,” but to detect:

- deviations from expected behavior;
- violations of underlying assumptions; and
- emerging risks that may not be visible through performance alone.

Monitoring obligations apply to all deployable models for the duration of their use.

7.2 Monitoring Focus

Monitoring must emphasize **model behavior and context adherence**, not solely realized P&L.

At a minimum, the following dimensions must be monitored, where applicable.

7.2.1 Implementation Behavior

- turnover and trading intensity relative to expected ranges;
- transaction costs and slippage relative to assumptions;
- execution quality and operational performance.

7.2.2 Signal and Decision Stability

- stability of model outputs or rankings;
- frequency and magnitude of decision changes;
- divergence from historical behavior patterns.

7.2.3 Risk and Exposure Profile

- factor, sector, and asset-level exposures;
- concentration metrics;
- utilization of risk limits.

7.2.4 Sensitivity to Operating Conditions

- sensitivity to costs, liquidity, or volatility changes;
- degradation under stressed or adverse conditions;
- scale effects as capital changes.

7.3 Monitoring Metrics and Thresholds

For each deployable model, a set of **monitoring metrics and thresholds** must be defined at deployment.

Thresholds should reflect:

- validated operating ranges;
- known fragilities; and
- risk tolerance appropriate to the model's impact.

Thresholds must be:

- documented;
- reviewable; and
- enforceable through systems controls where feasible.

7.4 Detection of Operating Context Violations

Monitoring must explicitly identify **Operating Context violations**, including but not limited to:

- trading behavior inconsistent with declared assumptions;
- turnover or cost levels materially exceeding evaluated ranges;
- exposure patterns outside approved limits;
- use of the model for decisions beyond its intended scope.

Detection of an Operating Context violation requires immediate review.

7.5 Response to Monitoring Breaches

7.5.1 Initial Response

Upon breach of a monitoring threshold:

- the model owner must be notified promptly;
- risk management must assess severity and persistence; and
- interim controls (e.g., capital reduction) may be applied.

7.5.2 Escalation

If breaches are material, persistent, or unexplained:

- the model may be placed in **Restricted** status;
- capital allocation may be reduced or suspended; and
- a formal review must be initiated.

7.5.3 Documentation

All breaches, responses, and outcomes must be documented in the Model Registry.

7.6 Performance Monitoring and Interpretation

Realized performance is monitored as one input into governance, but is not sufficient on its own to determine model validity.

Performance deviations must be interpreted in conjunction with:

- changes in behavior metrics;

- assumption validity; and
- market or structural conditions.

Unexpected performance, positive or negative, triggers review when inconsistent with validated expectations.

7.7 Periodic Review Requirements

All deployable models must undergo periodic review at intervals no less frequent than quarterly.

Periodic reviews assess:

- continued alignment with the declared Operating Context;
- relevance of assumptions and constraints;
- adequacy of monitoring metrics and thresholds; and
- appropriateness of current capital allocation.

Reviews must be documented and retained.

7.8 Authority to Restrict or Suspend Models

Risk management and designated governance functions are authorized to:

- restrict model usage;
- reduce capital exposure; or
- suspend deployment

when monitoring indicates elevated risk, regardless of recent performance.

Such actions are preventative and do not require evidence of loss.

7.9 Learning and Feedback

Monitoring results should inform:

- future validation standards;
- updates to Operating Context declarations; and
- improvements in governance controls.

Failures and near-misses are treated as learning inputs and are reviewed without attribution of fault.

7.10 Governing Principle

A model remains approved only so long as its behavior remains consistent with the conditions under which it was approved.

8 Review, Escalation, and Model Retirement

8.1 Purpose of Review and Escalation

This section defines the processes by which models are:

- reviewed in light of new information;
- escalated when risks emerge; and
- restricted or retired when continued use is no longer justified.

The objective is to ensure that models are **reassessed deliberately**, rather than implicitly abandoned or defended through inertia.

8.2 Periodic Model Review

8.2.1 Review Frequency

All deployable models must undergo a formal review at least quarterly.

Additional reviews are required when:

- material market or structural changes occur;
- Operating Context assumptions are challenged;
- monitoring thresholds are breached; or
- capital allocation is materially increased.

8.2.2 Review Scope

Periodic reviews must assess:

- continued validity of the declared Operating Context;
- relevance of assumptions and constraints;
- consistency of observed behavior with validated expectations;
- adequacy of monitoring metrics and thresholds; and
- appropriateness of current model classification and capital allocation.

Reviews must be documented and logged in the Model Registry.

8.3 Escalation Triggers

Escalation is required when one or more of the following occur:

- repeated or unexplained monitoring breaches;
- persistent divergence between expected and observed behavior;
- assumption violations that materially affect model validity;
- operational or execution failures affecting model performance;
- external events that invalidate key elements of the Operating Context.

Escalation may be initiated by research, risk management, operations, or senior management.

8.4 Escalation Process

8.4.1 Initial Assessment

Upon escalation:

- risk management conducts an initial assessment of severity and scope;
- interim controls (e.g., capital reduction) may be applied; and
- the model may be placed in **Restricted** status.

8.4.2 Formal Review

If escalation persists or is material:

- a formal review is conducted involving research, risk, and relevant stakeholders;
- findings are documented, including root-cause analysis where appropriate; and
- recommendations are made regarding remediation, restriction, or retirement.

8.5 Model Restriction

A model may be restricted when:

- risk is elevated but potentially remediable; or
- further evidence is required to restore confidence.

Restrictions may include:

- reduced capital allocation;
- narrowed scope of use;
- increased monitoring intensity; or
- temporary suspension of deployment.

Restriction status and conditions for lifting restrictions must be documented.

8.6 Dormant Models and Archiving

Models that are no longer used to support decisions may not remain in active status without clear intent.

Accordingly:

- A model that is no longer referenced in decisions must be moved to **Research** status (if still under development) or **Retired** status (if no active development is planned).
- Dormant models must be clearly labeled in the Model Registry and are not eligible for decision use until re-validated and approved.
- Archiving is for audit and learning purposes only; archived models do not retain deployment rights.

8.7 Model Retirement

8.7.1 Retirement Criteria

A model must be retired when:

- its Operating Context assumptions no longer hold;
- performance or behavior degrades persistently outside acceptable bounds;
- remediation is impractical or ineffective; or
- strategic, operational, or regulatory considerations require withdrawal.

Retirement is a governance action and does not imply fault or error.

8.7.2 Retirement Process

Upon retirement:

- the model is removed from live systems;
- capital allocation is fully withdrawn;
- the model status is updated to **Retired** in the Model Registry; and
- final documentation is completed, including reasons for retirement.

8.8 Post-Retirement Review

Where appropriate, a post-retirement review is conducted to:

- document lessons learned;
- identify governance or validation improvements; and
- inform future model development.

Post-retirement reviews focus on process and assumptions, not individual attribution.

8.9 Re-Activation of Retired Models

Retired models may not be re-activated without:

- re-classification;
- re-validation under a current Operating Context; and
- formal re-approval.

Prior approval does not carry forward automatically.

8.10 Documentation and Auditability

All review, escalation, restriction, and retirement actions must be:

- documented;
- time-stamped;
- attributable to responsible parties; and
- retained for audit and learning purposes.

8.11 Governing Principle

Models should exit as deliberately as they enter. Governance exists to ensure that retirement is timely, reasoned, and unambiguous.

9 Roles, Responsibilities, and Accountability

9.1 Purpose of Role Definition

Effective model governance requires clear ownership, independent challenge, and defined decision authority.

This section assigns responsibilities to specific functions to ensure that:

- model assumptions are owned and maintained;
- governance decisions are independent of model development;
- accountability is preserved across the model lifecycle; and
- no model remains active without a responsible owner.

9.2 Model Owner

Each model must have a designated **Model Owner**, recorded in the Model Registry.

9.2.1 Responsibilities of the Model Owner

The Model Owner is responsible for:

- ensuring accuracy and completeness of model documentation;
- declaring and maintaining the Operating Context;
- disclosing assumptions, limitations, and known fragilities;
- initiating validation, review, or re-approval when conditions change;
- responding to monitoring breaches and review findings; and
- recommending restriction or retirement when appropriate.

The Model Owner must have sufficient technical understanding of the model to explain its behavior and limitations.

9.3 Governance Reviewer (Independent Oversight)

Each deployable and translational model must have an assigned **Governance Reviewer**, independent of model development.

9.3.1 Responsibilities of the Governance Reviewer

The Governance Reviewer is responsible for:

- independent challenge of model assumptions and scope;
- assessing alignment between evidence and claims;
- reviewing validation design and results;
- enforcing classification and Operating Context discipline; and
- recommending approval, restriction, or escalation actions.

The Governance Reviewer has authority to withhold approval pending resolution of material concerns.

9.4 Risk Management Function

The Risk Management function has primary responsibility for:

- defining validation and monitoring standards for deployable models;
- conducting or overseeing independent model reviews;
- monitoring live model behavior and context adherence;
- initiating escalation, restriction, or suspension actions; and
- reporting material model risks to senior management and the Investment Committee.

Risk Management authority to restrict or suspend model use is independent of research or portfolio management.

9.5 Investment Committee

The Investment Committee has ultimate authority over:

- approval of deployable models with material capital impact;
- determination of capital allocation limits and scaling conditions;
- acceptance of residual model risks; and
- resolution of escalated governance issues.

The Investment Committee must ensure that deployment decisions are supported by evidence consistent with the declared Operating Context.

9.6 Research Function

The Research function is responsible for:

- developing and testing models in accordance with this framework;
- producing evidence aligned with intended use;
- documenting trade-offs, sensitivities, and limitations; and
- engaging constructively with independent review and challenge.

Research is accountable for methodological rigor, not for deployment outcomes.

9.7 Operations and Technology

Operations and Technology functions are responsible for:

- implementing system controls that enforce approved model usage;
- ensuring operational feasibility and reliability;
- supporting monitoring, logging, and audit requirements; and
- flagging operational issues that may affect model behavior.

Operational constraints are treated as binding inputs to model governance.

9.8 Compliance and Legal (Where Applicable)

Compliance and Legal functions support this framework by:

- advising on regulatory or contractual obligations;
- ensuring adherence to applicable laws and policies; and
- reviewing documentation and processes for audit readiness.

Compliance does not substitute for governance but reinforces it.

9.9 Incentive Alignment and Cultural Safeguards

The framework recognizes that incentives and time pressure can distort judgment and encourage premature deployment or scope creep.

Accordingly:

- Governance exists to counteract short-term performance pressure and protect long-term capital integrity.
- Attempts to bypass, delay, or minimize governance requirements are treated as **risk signals** and must be escalated.
- Incentive conflicts should be disclosed and managed as part of review and approval processes.

9.10 Accountability and Escalation

Accountability for model-related decisions follows declared roles.

- Decisions to deploy, restrict, or retire models must be attributable to defined authorities.
- Failure to fulfill assigned responsibilities may result in restriction of model use or escalation to senior management.
- Disagreements between functions are resolved by escalation, not informal override.

9.11 Governing Principle

Clear ownership enables clear judgment. Governance fails when responsibility is diffuse or implicit.

10 Policy Review, Exceptions, and Amendments

10.1 Policy Review and Maintenance

This Model Governance Framework shall be reviewed periodically to ensure continued relevance and effectiveness.

10.1.1 Review Frequency

- The framework shall be reviewed at least annually.
- Additional reviews may be initiated in response to:
 - material changes in firm strategy;
 - significant market structure changes;
 - regulatory developments; or
 - identified governance failures.

10.1.2 Review Responsibility

The review is led by Risk Management in coordination with Research, Operations, and Compliance, as applicable.

Proposed updates must be documented and approved by senior management or the Investment Committee, as appropriate.

10.2 Policy Exceptions

10.2.1 Principle on Exceptions

Exceptions to this framework are discouraged and permitted only in exceptional circumstances.

No exception may be granted solely for reasons of performance, time pressure, or opportunity cost.

10.2.2 Exception Approval

Any exception must:

- be documented in writing;
- specify the exact provisions being excepted;

- define scope, duration, and rationale; and
- receive approval from the Investment Committee or delegated authority.

Temporary exceptions must include a defined expiration date.

10.2.3 Monitoring of Exceptions

Models operating under an exception:

- are subject to enhanced monitoring;
- may be subject to reduced capital limits; and
- must be reviewed upon expiration of the exception.

Exceptions may be withdrawn at any time if risk increases.

10.3 Amendments to the Framework

Amendments to this framework must:

- preserve the core principles outlined in Section 1;
- not weaken controls through redefinition or ambiguity; and
- be approved through the same governance process as the original policy.

Amendments must be communicated clearly to all affected functions.

10.4 Interpretation and Precedence

In the event of ambiguity:

- interpretations that impose **greater discipline** take precedence over permissive interpretations.
- where this framework conflicts with other firm policies, the more restrictive requirement applies.

10.5 Effective Date and Adoption

This framework becomes effective upon formal approval by senior management or the Investment Committee.

All models in use as of the effective date must be:

- entered into the Model Registry;
- classified under Section 2; and
- brought into compliance within a defined transition period.

10.6 Final Statement

This framework exists to ensure that judgment, not momentum, governs the use of quantitative models. It is designed to make limits explicit before markets do so implicitly.

A Appendix A: Model Context Summary (Mandatory)

This document is required for all models referenced in investment decisions, approval materials, or capital allocation discussions. Models without a completed and approved Model Context Summary may not be used.

A.1 Model Identification

- **Model ID:**
- **Model Name:**
- **Model Classification:** Diagnostic Translational Deployable
- **Lifecycle Status:** Research Approved Restricted Retired
- **Model Owner:**
- **Governance Reviewer:**
- **Associated Portfolio / Desk:**

A.2 Intended Use

Primary Decision Supported

(Describe the specific decision this model informs.)

Example: portfolio ranking for monthly rebalance within an equity factor sleeve.

Explicitly Excluded Uses

(List decisions this model must not support.)

Example: intraday execution timing; discretionary override justification.

A.3 Declared Operating Context

This section defines the conditions under which model outputs are considered valid.

Asset Universe

- Instruments / markets covered:

- Inclusion / exclusion criteria:

Data Inputs

- Data sources:
- Frequency and aggregation:
- Key preprocessing steps:

Decision Horizon

- Signal horizon:
- Trading / rebalancing horizon:

Portfolio Construction & Execution

- Position sizing rules:
- Rebalancing frequency:
- Execution assumptions:

Transaction Costs & Market Impact

- Cost model used:
- Slippage / impact assumptions:

Risk Constraints

- Exposure limits:
- Risk metrics enforced:

Capacity & Scale

- Capital levels evaluated:
- Known or expected capacity limits:

A.4 Evaluation and Evidence Summary

Evaluation Design

(Summarize how the model was evaluated in a manner consistent with the Operating Context.)

Key Metrics Reviewed

(List metrics actually used to support approval.)

Example: net returns after costs, turnover, drawdown, stability measures.

Trade-Offs Observed

(Describe the principal trade-offs identified.)

Example: improved ranking sharpness coincides with higher turnover.

A.5 Assumptions and Fragilities

Key Assumptions

(List assumptions that materially affect conclusions.)

Example: transaction costs \leq 10 bps one-way; monthly rebalance discipline.

Known Fragilities

(Describe where behavior degrades or becomes unstable.)

Example: performance deteriorates rapidly at higher turnover or shorter horizons.

A.6 Monitoring Expectations

Primary Monitoring Metrics

(List metrics used to assess ongoing behavior.)

Expected Ranges / Thresholds

(Provide validated ranges.)

Escalation Triggers

(Define conditions requiring review or restriction.)

A.7 Capital Allocation Controls (Deployable Models Only)

- Initial Capital Limit:
- Scaling Conditions:
- Reduction / Suspension Triggers:

A.8 Change and Re-Approval Triggers

Changes to any of the following require review and potential re-approval:

- Asset universe
- Data inputs
- Horizon or rebalance frequency
- Portfolio construction rules
- Cost or liquidity assumptions
- Risk constraints
- Intended use

A.9 Approvals

Model Owner Certification

I certify that this summary accurately reflects the model and its evaluated context.

- Name / Signature / Date:

Governance Review

- Reviewer Name / Signature / Date:

Deployment Approval (if applicable)

- Authority / Signature / Date:

A.10 Governing Statement

This model may be used only within the context described above. Use outside this context constitutes a governance violation.

B Appendix B: Deployment Approval Checklist (Mandatory)

This checklist must be completed and approved before any model is permitted to influence live trading or capital allocation.

Completion of this checklist does not guarantee approval; it establishes eligibility for approval.

B.1 A. Model Identification

- **Model ID:**
- **Model Name:**
- **Model Classification:** Deployable
- **Lifecycle Status Requested:** Approved for Deployment
- **Associated Portfolio / Desk:**
- **Requested Initial Capital Allocation:**

B.2 B. Context and Scope Verification

- A completed **Model Context Summary (Appendix A)** is attached
- Declared Operating Context is explicit and complete
- Intended use is clearly stated and decision-specific
- Explicit exclusions are documented
- No implicit or undeclared assumptions identified

If any box is unchecked -> STOP

B.3 C. Evaluation and Evidence Alignment

- Evaluation design matches intended use
- Time ordering and leakage controls are documented
- Portfolio construction and costs match declared context
- Evidence presented is net of realistic costs
- Results are presented as trade-offs, not single metrics

Notes on trade-offs observed:

B.4 D. Robustness and Fragility Assessment

- Sensitivity to key assumptions has been evaluated
- Fragility regions are identified and documented
- No claims rely on single-parameter or knife-edge results
- Known failure modes are explicitly described

Primary fragilities:

B.5 E. Implementation Feasibility

- Turnover and trading intensity are within feasible bounds
- Liquidity and capacity assumptions are credible
- Execution requirements are operationally feasible
- Systems controls can enforce constraints

Operational concerns (if any):

B.6 F. Monitoring and Risk Controls

- Monitoring metrics are defined and documented
- Expected ranges and thresholds are specified
- Escalation triggers are explicit and enforceable
- Authority to restrict or suspend is assigned

Key monitoring metrics:

B.7 G. Capital Allocation Controls

- Initial capital limits are conservative
- Scaling conditions are explicit and non-automatic
- Reduction or suspension triggers are defined
- No reliance on short-term performance for scaling

Initial capital limit: _____

B.8 H. Independent Review

- Independent governance review completed
- Material review findings resolved or accepted
- Residual risks are explicitly acknowledged

Residual risks accepted:

B.9 I. Compliance with Governance Standards

- Model registered and classified correctly
- Versioning and audit trail complete
- No unauthorized context or scope expansion identified
- No policy exceptions requested

If exceptions are requested, attach approved exception documentation.

B.10 J. Approval Determination

Recommendation

- Approve for deployment
- Approve with conditions
- Defer pending remediation
- Reject

Conditions or remediation required (if applicable):

B.11 K. Sign-Off

Model Owner

Name / Signature / Date:

Risk Management / Governance Reviewer

Name / Signature / Date:

Investment Committee / Approval Authority

Name / Signature / Date:

B.12 L. Governing Statement

Approval reflects confidence in how the model behaves under defined conditions, not belief in its universal validity. Capital remains contingent on continued adherence to those conditions.

C Appendix C: Worked Example

C.1 ML Cross-Sectional Equity Signal

C.1.1 High-level description

A researcher proposes a machine-learning model that predicts **next-month relative returns** across U.S. equities using factor and price-derived features.

Backtests show:

- higher IC than baseline factor models
- strong gross Sharpe in paper portfolios
- weaker net performance after costs

C.1.2 Step 1: Appendix A – Model Context Summary

A. Model Identification

- **Model ID:** EQ-ML-017
- **Model Name:** Nonlinear Cross-Sectional Ranker
- **Model Classification:** ✓ Translational (requested upgrade to Deployable)
- **Lifecycle Status:** Research
- **Model Owner:** Head of Equity Research
- **Governance Reviewer:** Equity Risk Lead
- **Associated Portfolio:** U.S. Equity Factor Sleeve

B. Intended Use

Primary Decision Supported

Rank stocks monthly to construct a dollar-neutral long–short equity factor portfolio.

Explicitly Excluded Uses

Intraday trading, execution timing, discretionary stock selection.

Good: intended use is narrow and concrete.

C. Declared Operating Context

Asset Universe

- Top 1,000 U.S. equities by market cap
- Monthly reconstitution

Data Inputs

- Daily returns
- Standard factor exposures
- 12-month rolling features

Decision Horizon

- Signal horizon: 1 month
- Rebalancing: monthly

Portfolio Construction

- Top/bottom decile, equal weight
- Gross exposure = 2x NAV

Transaction Costs

- Assumed: 10 bps one-way

Risk Constraints

- Sector neutral
- Beta neutral

Capacity

- Evaluated up to \$250MM gross

Red flag: turnover looks high relative to monthly cadence.

D. Evaluation and Evidence Summary

Evaluation Design

- Walk-forward backtest
- Monthly rebalance
- IC and long–short returns reported

Key Metrics

- IC: +0.035 (vs +0.025 baseline)
- Gross Sharpe: 0.85
- Net Sharpe (after costs): 0.20

Trade-Offs Observed

Higher IC coincides with materially higher turnover.

Good: trade-offs disclosed, not hidden.

E. Assumptions and Fragilities

Key Assumptions

- Transaction costs \leq 10 bps
- Monthly liquidity sufficient for turnover

Known Fragilities

Net performance deteriorates rapidly if costs exceed 15 bps or if rebalance frequency increases.

Warning: this will matter later.

F. Monitoring Expectations

Primary Metrics

- Monthly turnover
- Cost drag
- Rank stability

Expected Ranges

- Turnover: 80–120% annually

G. Capital Allocation Controls (Draft)

- Initial capital: \$25MM gross
- Scale-up conditional on stable turnover

H. Change Triggers

- ✓ Horizon
- ✓ Costs
- ✓ Portfolio rules

I. Approvals

- Model Owner: ✓
- Governance Reviewer: Pending

C.1.3 Verdict after Appendix A

- **OK:** context is clear
- **Warning:** fragility is explicit
- **Result:** eligible to proceed to deployment review

C.1.4 Step 2: Appendix B – Deployment Approval Checklist

Now the model faces the real test.

B. Context and Scope Verification

- ✓ Model Context Summary attached
- ✓ Intended use explicit
- ✓ Scope exclusions stated
- ✓ No undeclared assumptions

Pass

C. Evaluation and Evidence Alignment

- ✓ Evaluation matches monthly rebalance
- ✓ Costs applied
- ✓ Trade-offs shown
- □ Evidence net of conservative costs

Fail

Why: Risk team reruns net performance at 15–20 bps, consistent with live trading history. Net Sharpe drops to around zero or negative.

D. Robustness and Fragility Assessment

- ✓ Fragility documented
- □ Non-knife-edge behavior demonstrated

Fail

Why: Small cost changes erase deployable performance. This is not robustness; it is a narrow operating window.

E. Implementation Feasibility

- □ Turnover within feasible bounds at scale
- □ Liquidity assumptions stress-tested

Fail

Why: Turnover implies repeated trading in marginal names. Capacity estimates assume static liquidity, not impact-aware execution.

F. Monitoring and Risk Controls

- ✓ Metrics defined
- ✓ Thresholds specified

Conditional

Monitoring is adequate, but it would mostly detect failure after capital is at risk.

G. Capital Allocation Controls

- □ Capital limits conservative given fragility

Fail

Even \$25MM gross is non-trivial given cost sensitivity.

H. Independent Review

- ✓ Independent review completed
- ✓ Residual risks acknowledged

J. Approval Determination

- □ Approve
- □ Approve with conditions
- ✓ Defer pending remediation
- □ Reject

C.1.5 Final Outcome (This Is the Key)

What governance does not do

- It does not say the model is “bad”
- It does not suppress research
- It does not deny informational value

What governance does do

- Prevents capital deployment based on diagnostic strength
- Forces acknowledgment that:

“Higher IC does not survive discretization + costs under this mandate.”

Resulting actions

- Model remains **Translational**
- Research redirected to:
 - stability-aware objectives
 - lower-turnover variants
 - alternative rebalance horizons

No money lost. No reputational damage. No hero narratives required.

C.1.6 Why this example matters

This is exactly how most quant blowups begin:

- a real signal
- modest improvement
- fragile economics
- pressure to deploy

The framework does not ask:

“Is this smart?”

It asks:

“**Is this justified for this decision under these conditions?**”

And in this case, the correct answer is **not yet**.

D Appendix D: Worked Example (Passing Case)

D.1 Stability-Aware Equity Factor Overlay

D.1.1 High-level description

A researcher proposes a **stability-aware ranking overlay** for an existing U.S. equity factor sleeve.

Key difference from the failing case:

- the goal is **not higher raw IC**
- the goal is **reducing turnover without destroying signal expression**

This is a design-aligned proposal, not an “alpha grab.”

D.1.2 Step 1: Appendix A – Model Context Summary

A. Model Identification

- **Model ID:** EQ-STAB-004
- **Model Name:** Stability-Aware Rank Smoother
- **Model Classification:** ✓ Deployable
- **Lifecycle Status:** Research
- **Model Owner:** Equity Quant Research Lead
- **Governance Reviewer:** Equity Risk Lead
- **Associated Portfolio:** U.S. Equity Factor Sleeve

B. Intended Use

Primary Decision Supported

Modify cross-sectional rankings used in monthly factor portfolio rebalances to reduce unnecessary turnover near cutoff thresholds.

Explicitly Excluded Uses

Alpha forecasting, intraday timing, discretionary stock selection.

Good: this is an implementation control, not a return forecaster.

C. Declared Operating Context

Asset Universe

- U.S. equities, top 1,200 by liquidity
- Monthly reconstitution

Data Inputs

- Existing factor ranks
- Prior-month model scores
- No new predictive features

Decision Horizon

- Signal horizon: unchanged (monthly)
- Rebalancing: monthly

Portfolio Construction

- Same top/bottom decile construction
- Same gross exposure (2x NAV)

Transaction Costs

- Evaluated at 10, 15, and 20 bps one-way

Risk Constraints

- Identical to existing sleeve

Capacity

- Evaluated at current sleeve size (\$500MM gross)

Good: environment is inherited and frozen.

D. Evaluation and Evidence Summary

Evaluation Design

- Paired backtest vs baseline sleeve
- Identical holdings rules and costs
- Only ranking stability modified

Key Metrics

- IC: -3% relative to baseline
- Annualized turnover: -35%
- Net Sharpe: +0.10 to +0.15 improvement (cost-dependent)

Trade-Offs Observed

Small reduction in ranking sharpness is more than offset by lower cost drag.

Good: this is exactly the kind of trade-off the framework is built to evaluate.

E. Assumptions and Fragilities

Key Assumptions

- Benefit depends on monthly rebalance discipline
- No benefit under quarterly rebalance (turnover already low)

Known Fragilities

Over-smoothing degrades performance if stability penalty is too strong.

Good: fragility acknowledged and bounded.

F. Monitoring Expectations

Primary Metrics

- Rank stability
- Turnover vs baseline
- Cost drag

Expected Ranges

- Turnover reduction: 25–45%
- IC degradation: $\leq 5\%$

G. Capital Allocation Controls

- Initial deployment: full sleeve (overlay replaces baseline)
- No increase in gross exposure

- Rollback trigger if IC degradation > 10%

H. Change Triggers

- ✓ Costs
- ✓ Rebalance frequency
- ✓ Portfolio rules

I. Approvals

- Model Owner: ✓
- Governance Reviewer: ✓

D.1.3 Step 2: Appendix B – Deployment Approval Checklist

Now the crucial part.

B. Context and Scope Verification

- ✓ Model Context Summary attached
- ✓ Intended use narrow and explicit
- ✓ No scope creep or undeclared assumptions

Pass

C. Evaluation and Evidence Alignment

- ✓ Evaluation matches live sleeve mechanics
- ✓ Costs evaluated conservatively
- ✓ Results shown as trade-offs

Pass

D. Robustness and Fragility Assessment

- ✓ Sensitivity to penalty strength evaluated
- ✓ Non-knife-edge region identified
- ✓ Failure modes documented

Pass

E. Implementation Feasibility

- ✓ Turnover reduction consistent at scale
- ✓ No new liquidity assumptions
- ✓ No operational complexity added

Pass

F. Monitoring and Risk Controls

- ✓ Metrics directly tied to design intent
- ✓ Thresholds enforceable ex ante

Pass

G. Capital Allocation Controls

- ✓ No incremental capital risk
- ✓ No scale-up pressure
- ✓ Clear rollback conditions

Pass

H. Independent Review

- ✓ Independent review completed
- ✓ Residual risks acknowledged

J. Approval Determination

- ✓ Approve for deployment
- □ Approve with conditions
- □ Defer
- □ Reject

D.1.4 Why this model passes (this is the lesson)

1. The claim matches the evidence

The model does not claim:

- higher alpha
- better forecasting

- regime dominance

It claims:

“Under this mandate, smoother rankings reduce implementation loss.”

And the evidence supports exactly that.

2. The environment is respected

- Same universe
- Same rebalance
- Same costs
- Same capacity

Only *signal expression* changes.

That is governance gold.

3. Fragility is bounded, not hidden

Risk knows:

- where it works
- where it fails
- how to turn it off

This makes approval safe.

4. This is how real value is added

Not by:

- clever models
- heroic Sharpe ratios
- flashy diagnostics

But by:

making existing information survive implementation.

D.1.5 Final takeaway

A passing model under this framework:

- looks modest,
- solves a specific problem,
- respects constraints,
- and improves outcomes net of reality.

That is exactly the kind of model that survives both markets **and** governance.