SECOND-ORDER GOVERNANCE OF RISKS IN DIGITAL FINANCE

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Chinese financial law mainly governs digital risk models within individual firms, making cross-firm linkages and their systemic consequences harder to detect. Defining the object of risk assessment shapes what a model evaluates. Institutional approval and actual reliance make it a decision premise, while workflow design determines its influence on individual decisions. Persistently convergent assessments in comparable settings may produce overlapping actions that reinforce one another through financial relationships. When institutions record and classify the consequences and use them in later assessment, individually prudent controls may generate second-order dangers beyond their original calculative frames. Second-order governance connects existing financial-law procedures through scrutiny of how assessments are formed. Second-order observation identifies the distinctions used by firms and supervisors; reflexive law organizes the responsibilities and procedures through which those distinctions can be reconsidered. Effective challenge allows contrary information to influence model use. Macroprudential comparison preserves justified differences while identifying links among assessments, and system-wide stress testing examines the interaction of financial actions. Resolvability assessment addresses the separation and continuation of critical functions. Sector-specific law determines the authority and legal effect of each measure.

I. INTRODUCTION

The *Resolution of the Central Committee of the Communist Party of China on Further Deepening Reform Comprehensively to Advance Chinese Modernization* calls for the active development of sci-tech finance, green finance, inclusive finance, pension finance, and digital finance. The national agenda places digital finance within China's broader effort to improve

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financial services and modernize financial governance. Data, algorithms, and digital platforms are already reshaping lending, underwriting, pricing, and trading. They widen access and accelerate risk assessment, while making financial decisions increasingly dependent on models and technical infrastructures that can be replicated across institutions. Chinese law has developed rules for pre-use review, data governance, ongoing monitoring, human intervention, and exit arrangements at the level of the individual firm. Cross-firm linkages remain harder to detect. Research on artificial intelligence and financial stability identifies common technology and data dependencies as potential sources of cross-firm risk.[1] Individually prudent controls may then reinforce one another through funding, market, or contractual relations, affecting liquidity, insurance availability, and the conditions for transferring a failing firm's business. Microprudential and macroprudential analysis approach these problems at the levels of the individual institution and the financial system.[2] The inquiry follows those connections from ordinary operation and system-wide stability into recovery and resolution, asking how financial law should respond.

Existing scholarship approaches the problem from several directions. Research on digital finance examines data and algorithmic problems alongside platform concentration and cross-market transmission, including the implications of similar algorithms for correlated institutional behavior.[3] A second line moves inside the firm. Model risk management uses inventories, validation, and effective challenge to examine actual use. Meta-regulation brings firms' internal systems and processes within supervisory evaluation, and its success depends on regulators' knowledge and commitment as well as firms' motivation and capacity; inclusive and prudent regulation extends the inquiry to supervisory learning.[4] Macroprudential analysis widens the unit of inquiry. Chinese scholarship examines technology and infrastructure dependencies in systemically important fintech companies.[5] A further

1 *See* Georg Leitner, Jaspal Singh & Anton van der Kraaij et al., *The Rise of Artificial Intelligence: Benefits and Risks for Financial Stability*, 1 European Central Bank Financial Stability Review 104, 112-115 (2024).

2 *See* Claudio Borio, *Towards a Macroprudential Framework for Financial Supervision and Regulation?*, 49 CESifo Economic Studies 181, 181 (2003); Samuel G. Hanson, Anil K. Kashyap & Jeremy C. Stein, *A Macroprudential Approach to Financial Regulation*, 25 Journal of Economic Perspectives 3, 3 (2011).

3 *See* Han Long, *Financial Digitalization and Platformization: Challenges for Risk Governance Systems and Solutions*, 7 Jinan Journal (Philosophy & Social Sciences) 33, 36-39 (2024); Han Long & Liu Yuan, *Challenges Posed by Financial Digitalization to the Objectives of Financial Regulation and Legal Responses*, 4 Journal of Shanghai University of Finance and Economics 123, 123-129 (2025).

4 *See* David McNulty, Andrea Miglionico & Alistair Milne, *Data Access Technologies and the 'New Governance' Techniques of Financial Regulation*, 9 Journal of Financial Regulation 225, 230 (2023); Liu Quan, *The Rule-of-Law Logic of Inclusive and Prudent Regulation in the Digital Economy*, 4 Chinese Journal of Law 37, 39-41 (2022).

5 *See* Yuan Kang, *Legal Regulation of Systemically Important FinTech Companies*, 1 Modern Law Science 134, 144-148 (2024).

body of work examines how ratings shape market assessments and how financial actors observe one another's judgments.[6] Chinese systems theory scholarship extends that inquiry to information selection and organizational responsibility.[7] Together, these lines explain internal review, regulatory learning, and the systemic relevance of shared technology. They leave unresolved the path from firm-level records to cross-firm inference and, ultimately, to recovery and resolution.

Tracing that path requires a chain of evidence that crosses organizations and legal regimes. A common vendor, dataset, or methodology identifies a technological source. Firm-specific approval and later reliance provide the organizational basis for cross-firm comparison. The next step compares actual outputs across cases and over time, then traces correlated action through funding, trading, or contractual channels. Finally, the analysis connects later validation, calibration, or model updating to conditions created by earlier decisions. This sequence matters in China because sectoral rules already generate extensive institution-level records, while the authority to obtain and use those records remains tied to specific objects and purposes. Current law organizes model-related powers by sector; a routine procedure for comparing proprietary risk models across banking, insurance, and securities has yet to emerge. The central inquiry is how financial law can identify a shared blind spot, test its systemic consequences, and carry relevant findings into recovery and resolution while preserving legitimate differences among models.

II. RISK MODELS IN FINANCIAL DECISION-MAKING

A risk model acquires legal significance through a sequence of institutional choices. Technical performance shows what the model can predict; institutional adoption determines the business purpose it serves; workflow design determines how strongly its outputs influence individual cases. Identical technology can carry different organizational meanings across firms and processes. The issue is how those choices turn a technical system into a decision premise and why the same output produces different legal consequences across business settings.

6 *See* Elena Esposito, *Economic Circularities and Second-Order Observation: The Reality of Ratings*, 7 Sociologica 1, 4 (2013); David Stark, *Observing Finance as a Network of Observations*, 7 Sociologica 21, 24 (2013).

7 *See* Yu Chengfeng, *Systems Theory Reconstruction of the Regulatory Model of Digital Platforms*, 5 China Legal Science 84, 93-95 (2025).

A. How Financial Institutions Construct the Object of Risk Assessment

The object of financial risk assessment takes shape through choices about the adverse outcome, observation period, and relevant population. A credit model defines default, while an insurance model identifies losses relevant to underwriting and pricing. Transaction monitoring, by comparison, distinguishes ordinary activity from anomalous activity. In *Luhmann*'s theory, the distinctions used in observation shape what an observer can identify.[8] Observed losses and probability estimates provide an objective basis, while causal claims remain open to factual testing. Institutional choices determine how those facts become assessable. Business purpose determines which losses matter. Time horizon and sample composition then shape what the model can calculate. Different observation windows may assign different risk states to the same customer, while a sample confined to existing customers reflects the institution's earlier acceptance decisions. Later loss experience and statistical performance test the classification, with causal evidence guarding against a merely apparent fit.

Outcome labels do more than record what happened. Repayment, claims, and transaction records first document events and outcomes; labeling rules then classify selected results as default, fraud, severe loss, or anomalous trading. Credit approval adds a selection problem because approved applicants generate repayment outcomes, whereas denied applicants leave no realized loan performance. Reject-inference research addresses precisely this distortion in the observable sample.[9] The same selection also shapes evaluation and training. Performance measured on observable outcomes may overstate accuracy and conceal differences across groups.[10] Continued training on existing labels can then reduce both utility and fairness.[11] A model built on these records may learn how the institution previously screened customers and interpreted results, then present that pattern as customer risk. Sound labeling distinguishes among the underlying event, the institution's classification, and any prior business measure.

The choice of predictors determines which facts the model uses to

8 *See* CLAUDIO BARALDI, GIANCARLO CORSI & ELENA ESPOSITO, UNLOCKING LUHMANN: A KEYWORD INTRODUCTION TO SYSTEMS THEORY, at 158-159 (Katherine Walker trans., Bielefeld University Press, 2021).

9 *See* Adrien Ehrhardt, Christophe Biernacki & Vincent Vandewalle et al., *Reject Inference Methods in Credit Scoring*, 48 Journal of Applied Statistics 2734, 2734-2737 (2021).

10 *See* Amanda Coston, Ashesh Rambachan & Alexandra Chouldechova, *Characterizing Fairness over the Set of Good Models Under Selective Labels*, 139 Proceedings of Machine Learning Research 2144, 2150-2153 (2021).

11 *See* Niki Kilbertus, Manuel Gomez-Rodriguez & Bernhard Schölkopf et al., *Fair Decisions Despite Imperfect Predictions*, 108 Proceedings of Machine Learning Research 277, 277 (2020).

explain the labeled outcome and which differences among customers acquire risk significance. The relevance of income, previous losses, or transaction frequency depends on the target. A predictor belongs in the model when the institution can explain its connection to the risk being assessed. Age, occupation, financial habits, and consumption records warrant closer scrutiny when they operate chiefly as proxies for group membership. Data bias may otherwise reappear as differential treatment.[12] Statistical association begins the inquiry. Legal analysis then tests sample representativeness and data quality, as well as whether the predictor retains explanatory value in the setting where the model is deployed. Adding predictors expands the information available to a model and extends financial assessment into more areas of a customer's life. The resulting informational gain may then exceed the gain in explaining financial risk.

Legal review examines target definition, labeling, and predictor selection together. *EIOPA's Opinion on Artificial Intelligence Governance and Risk Management of 2025* places fairness, data governance, documentation, explainability, and human oversight within a risk-based and proportionate framework.[13] Article 24 of the *Personal Information Protection Law of the People's Republic of China* requires transparency in automated decision-making and fair and impartial results. To justify a predictor, the institution must explain why it bears on the business risk and why any differential outcome rests on risk-related facts. The output's role in the workflow determines the procedural consequences of a solely automated decision that significantly affects an individual. These requirements make the target definition, labels, and predictors open to scrutiny.

B. Organizational Conditions for a Risk Model to Become a Decision Premise

Once the object of assessment has been defined, institutional approval and later reliance turn a technically workable model into a decision premise. Vendor delivery, internal training, and testing establish technical capacity. Approval then identifies the relevant risk, defines the business setting and authorized scope, and assigns responsibilities for deployment, validation, material changes, and retirement. In *Luhmann*'s organizational account, a

12 *See* Liu Hui, *Legal Regulation of Big Data Financial Algorithms*, 2 The Theory and Practice of Finance and Economics 149, 149 (2021).

13 *See* EUROPEAN INSURANCE AND OCCUPATIONAL PENSIONS AUTHORITY, OPINION ON ARTIFICIAL INTELLIGENCE GOVERNANCE AND RISK MANAGEMENT (2025), at https://www.eiopa.europa.eu/publications/opinion-artificial-intelligence-governance-and-risk-management_en (Last visited on September 28, 2026).

decision premise operates within the organization that establishes it and acquires that status through actual reliance in later decisions.[14]

Operating records show how approved use is realized. Deployment ensures availability, while usage frequency, business coverage, overrides, and exception records reveal whether and where later decisions rely on the tool. A system consulted at the margins exerts less influence than one routinely used in core lending, underwriting, or trading. Internal responsibilities give these records their organizational meaning. Business functions define the use case; technical teams maintain the system; risk management and compliance verify consistency with risk appetite and applicable requirements; and senior management decides on material changes or retirement. Management-based regulation brings such internal processes within supervisory evaluation.[15] The same allocation links technology to accountability, allowing reviewers to trace responsibility through the owner, business users, and approving authority.[16] A single approval authorizes business use; logs and decision records show whether the tool actually serves as a decision premise and in which processes.

External models allow a financial institution to rely on outside expertise while retaining responsibility for business judgment. A vendor may possess greater knowledge of architecture, source data, and update cycles than the firm purchasing the service. Even when relying on vendor-supplied technical evidence, the institution remains responsible for business use, local calibration, human intervention, and exit terms. *Hardwig*'s account of epistemic dependence explains how reliance on another's knowledge can be rational without independent reconstruction of the underlying evidence.[17] Even firms purchasing the same product may run different versions, use different local data, set different permissions, or adopt different exception rules. A common vendor identifies a shared technological source. Cross-firm analysis follows that source into each institution's approval and actual use before drawing an inference about similar decision premises.

An approved model use remains subject to review throughout the model lifecycle. Articles 50-52 of the *Rules on Data Security of Banking and Insurance Institutions* require unified management of AI models and an admission mechanism for externally sourced model products. Before deployment, institutions must review the reasonableness, legitimacy, and

14 *See* NIKLAS LUHMANN, ORGANIZATION AND DECISION, at 181-185 (Dirk Baecker ed., Rhodes Barrett trans., Cambridge University Press, 2018).

15 *See* Cary Coglianese & David Lazer, *Management-Based Regulation: Prescribing Private Management to Achieve Public Goals*, 37 Law & Society Review 691, 691 (2003).

16 Yu Chengfeng, *supra* note 7, 99-100.

17 *See* John Hardwig, *Epistemic Dependence*, 82 The Journal of Philosophy 335, 336 (1985).

explainability of data and model use. Once an application is in operation, they must explain how data affect decision outcomes, conduct real-time monitoring of automated processing and system operation, and maintain exit alternatives and contingency plans. The *Guiding Opinions on the Safe Development and Application of Artificial Intelligence in the Banking and Insurance Industries* (hereinafter referred to as the Guiding Opinions) further require lifecycle management, application inventories and risk tiers, access approval for high-risk applications, human oversight, emergency suspension and exit conditions, development and change records, and regular algorithm audits. Together, these two instruments establish a general framework for reviewing approved use, operational results, and exit arrangements.

Regulatory-capital models are also subject to a specialized regime. Articles 19 and 20 of the *Provisions on the Application and Acceptance of Advanced Approach to Capital Measurement by Commercial Banks* require model materials, validation reports, and audit reports. Articles 38 and 40-44 place data quality, model structure, parameter estimation, performance, use of measurement results, and material adjustments under continuing supervision. The general framework and the specialized capital regime both keep approved use open to reconsideration after deployment. Deteriorating performance, a changed business context, or failure of an external dependency may lead the institution to adjust controls, narrow use, or activate an exit arrangement. Lifecycle governance determines whether the model continues to serve as a decision premise and defines the boundaries of its business application.

C. How Model Outputs Shape Business Decisions

Once a model serves as a decision premise, workflow design determines how its outputs enter and shape individual decisions. Risk scores, probabilities of default, and anomaly ratings constitute the initial assessment. Thresholds, exception rules, and execution settings connect that assessment to admission, pricing, credit limits, or trading restrictions. In *Luhmann*'s organizational theory, conditional programs specify in advance the conditions that must be fulfilled when decisions are made.[18] The consequences are visible across financial services. Credit scoring can screen high-risk borrowers and support more generous loan terms for lower-risk borrowers.[19]

18 CLAUDIO BARALDI, GIANCARLO CORSI & ELENA ESPOSITO, *supra* note 8, 163.

19 *See* Liran Einav, Mark Jenkins & Jonathan Levin, *The Impact of Credit Scoring on Consumer Lending*, 44 RAND Journal of Economics 249, 249 (2013).

Usage-based auto insurance links driving scores to premium discounts.[20] Depending on the workflow, an output may remain advisory, operate as a rebuttable default, or trigger an automated measure. Each role assigns a different degree of influence and produces different legal consequences. Automation shortens the path from assessment to action, while applicable law determines validity, responsibility, and available remedies.[21]

When an output is advisory, the business officer makes the final decision. A sound explanation identifies the case-specific facts and rules that controlled the outcome, then specifies what the technical assessment contributed. The officer verifies the inputs, supplements information the system could not process, and records the reasons for accepting or rejecting its recommendation. Responsibility for the result remains with the financial institution. Internal review examines whether the officer exercised judgment and whether surrounding supervisory arrangements operated in practice. In a dispute, the output is one item of evidence, and an invocation log shows that the tool participated in the process. The conclusion about risk must rest on case-specific facts. Allegations of erroneous data, misalignment with approved use, or omitted material facts call for a response in the final decision. An advisory role preserves individualized judgment, provided that the reasons for the human choice can later be reconstructed.

A rebuttable default occupies the middle position. The workflow proceeds on the basis of the model's output unless a reviewer finds a sufficient reason for departure. This design expedites the handling of routine cases but can reduce human sign-off to a mere formality. A defensible default begins with an explanation of the principal facts, the rule that makes the default applicable, and any exception relevant to the case. Meaningful review also depends on access to the relevant information and genuine authority to maintain or change the result. The reviewer must address the principal objections and provide reasons for the decision. Together, those conditions give the reviewer a genuine path away from the default.[22] Responsibility extends from the design of the default rule, through the allocation of override authority, to the approval of model use. The act of clicking to confirm the result remains within that chain. The model output records an initial institutional assessment, while customer risk remains grounded in case-specific facts. An objection triggers reconsideration of the input facts and applicable threshold, after which the

20 *See* Miremad Soleymanian, Charles B. Weinberg & Ting Zhu, *Sensor Data and Behavioral Tracking: Does Usage-Based Auto Insurance Benefit Drivers?*, 38 Marketing Science 21, 31-32 (2019).

21 *See* John Paterson, *Decentralised Finance, Regulation, and Systems Theory*, 14 Oñati Socio-Legal Series 1296, 1303 (2024).

22 *See* Chen Jingyuan, *Towards Procedural Justice: Human Oversight of Algorithmic Automated Decision-Making in Platform Employment Scenarios*, 1 Law and Social Development 180, 193-197 (2026).

reviewer considers any case-specific exception. The efficiency of a default rests on a workable route for departure.

Direct automation changes both the timing of the measure and the record needed to review it. Automation may affect eligibility and credit limits, change premiums or margin requirements, and restrict trading, all without a person deciding each case. Reviewability begins with an external explanation of the principal facts and the rule or threshold that produced the business consequence. The explanation must also open a path to review. The internal audit trail preserves the data source and model version, and then records the trigger threshold, execution time, and any manual override. The institution chose the threshold and authorized the workflow, so responsibility for the measure rests with the firm. System logs reconstruct what happened. Review first tests the inputs and the threshold, then addresses the legality of the measure. Article 24 of the *Personal Information Protection Law* requires transparency in automated decision-making and fair and impartial results. When an automated decision has a significant effect on an individual's rights and interests, the individual may request an explanation and refuse a decision made solely through automated means. Timing and urgency shape the procedure. Reversibility matters as well.

Admission, pricing, and real-time trading controls require different review arrangements because they take effect at different times and differ in reversibility. Credit approval and underwriting usually occur before contract formation. When a short delay poses no material risk, the application remains open, and the adverse decision takes effect only after the institution verifies the relevant facts. A maintained decision must rest on verified case-specific information. Pricing also depends on quotation periods, market conditions, and product terms. Before contract formation, the institution can correct the data, recalculate the price, and issue a new quotation. After contract formation, correction proceeds through the applicable rules on modification or rescission. Real-time controls may precede review when imminent credit, liquidity, or market risk justifies order rejection, margin changes, or trading restrictions. The institution preserves a record of the trigger and provides prompt review, while continuing measures require clear conditions for release and restoration. Ordinary access resumes once the immediate risk subsides, and irreversible effects are addressed through explanation, responsibility, and available remedies. Admission and pricing procedures prevent premature closure of a transaction, while real-time controls manage imminent risk and leave customer risk and final loss allocation to later proceedings. Records of intended and actual use help reviewers identify which review arrangements apply. The 2026 version of the *PRA's Supervisory Statement SS1/23* expects

model inventories to compare intended and actual use and to record model materiality. The inventory also records the model's operating boundaries and validation findings on whether it functions properly.[23] Together, the workflow role, timing, and reversibility determine the intensity of explanation, review, recordkeeping, and remedy.

III. HOW DIGITAL RISK MANAGEMENT GENERATES SECOND-ORDER DANGERS

Even when individual models pass internal validation, similar assessments can interact through funding, trading, and insurance relationships, allowing local prudence to accumulate into systemic pressure and second-order dangers.[24] Two transitions are decisive. The first concerns when technological similarity corresponds to convergence in assessment; the second follows convergent assessments into correlated action and later evaluation.

A. Conditions for Comparable Decision Premises Across Financial Institutions

The comparison begins with a narrow question: do different financial institutions rely on decision premises that share a technological source or a sufficiently similar structure? Those premises remain firm-specific because each tool acquires that role through approval and use within a particular organization. Model names and vendors provide the first clues. Algorithm families and underlying datasets add another layer of source information. Comparison then turns to versions and data lineage. Predictive objectives, local calibration, and validation benchmarks reveal whether the apparent similarity survives closer inspection. The same vendor may supply different versions, while a common design may draw different risk boundaries as institutions change variables, thresholds, or use cases. Source information identifies candidates for comparison. Approved use and actual reliance determine whether the tool serves as a decision premise.

Institutional similarity may arise through different mechanisms. Dependence on a common provider, dataset, cloud service, or technological

23 *See* BANK OF ENGLAND PRUDENTIAL REGULATION AUTHORITY, MODEL RISK MANAGEMENT PRINCIPLES FOR BANKS, SUPERVISORY STATEMENT SS1/23 (2026), at https://www.bankofengland.co.uk/-/media/boe/files/prudential-regulation/supervisory-statement/2026/liaf0126app5.pdf (Last visited on September 28, 2026).

24 *Holzer* and *Millo* use 'second-order dangers' to describe unintended effects that risk-management systems generate beyond their own concepts and calculative frames. *See* Boris Holzer & Yuval Millo, *From Risks to Second-Order Dangers in Financial Markets: Unintended Consequences of Risk Management Systems*, 10 New Political Economy 223, 223 (2005).

component falls within third-party concentration. The Financial Stability Board treats service criticality, substitutability, and market concentration as relevant to identifying systemic third-party dependencies.[25] When regulation, professional networks, or imitation bring practices together, institutional isomorphism supplies an explanation.[26] Algorithmic monoculture addresses a different problem: the aggregate consequences of many decision-makers relying on the same algorithm.[27] These concepts explain source dependence, organizational convergence, and algorithmic aggregation. The remaining question is how the technology enters decision-making within each firm. Purchase contracts show acquisition, registry and deployment records show availability, and approval records with operating logs reveal whether the technology entered later decisions. Taken together, those materials establish organizational comparability. Workflow position and timing then calibrate the business-level comparison. The same output may remain advisory in one firm and trigger an automated measure in another, while timing determines how quickly assessment becomes action. The resulting comparison concerns tools that occupy comparable organizational and workflow positions; actual outputs in comparable settings determine whether their assessments converge.

B. Standards for Identifying Convergence in Financial Risk Assessments

Cross-firm convergence appears as persistent similarity in outputs across comparable cases. A single match or one-period correlation is a preliminary clue. Shared data offer one possible explanation: the same credit-reporting system, loss database, fraud list, or market feed can align samples and observation windows, while carrying missing data and labeling choices into several models. Chinese financial-law scholarship connects this pattern to reduced institutional differentiation and digital procyclicality.[28] Common data support a convergence hypothesis. Persistent similarity in outputs across comparable cases and periods provides evidence of convergence.

Methodological similarity offers another route to convergence. Base models and objective functions set the direction of prediction; variable

25 *See* FINANCIAL STABILITY BOARD, ENHANCING THIRD-PARTY RISK MANAGEMENT AND OVERSIGHT: A TOOLKIT FOR FINANCIAL INSTITUTIONS AND FINANCIAL AUTHORITIES (2023), at https://www.fsb.org/uploads/P041223-1.pdf (Last visited on September 28, 2026).

26 *See* Paul J. DiMaggio & Walter W. Powell, *The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organizational Fields*, 48 American Sociological Review 147, 150-152 (1983).

27 *See* Jon Kleinberg & Manish Raghavan, *Algorithmic Monoculture and Social Welfare*, 118 Proceedings of the National Academy of Sciences e2018340118, 1-2 (2021).

28 Han Long & Liu Yuan, *supra* note 3, 126-127.

design and error metrics determine which information counts and which errors are tolerated. Several systems may consequently overlook the same facts. The *U.S. Supervisory Guidance on Model Risk Management of 2026* identifies common assumptions, data, and methodologies as a source of aggregate model risk within a banking organization.[29] A cross-firm inference requires evidence that each institution adopted the method and used it in business decisions. Supervisory standards can reinforce similarity by shaping objectives, validation criteria, and thresholds. Article 78(5) of the *Directive 2013/36/EU* limits corrective action after benchmarking. Such action may not lead to standardization or preferred methods, create improper incentives, or encourage herding.[30] Benchmarks supply a common scale and guide inquiry, while their evaluative force remains subject to differences in underlying risk and methodology. Common roots may nevertheless yield sharply different estimates, with dispersion widening during stress.[31] Methodological evidence explains how convergence may arise; actual outputs show whether it occurred.

Convergence concerns assessment content, while the workflow role determines how similar assessments become action. Firms may approve and regularly use similar models yet reach different results because their customers, calibrations, risk appetites, or override practices differ. Comparable cases provide the test. A comparison may hold borrower characteristics, asset features, or market conditions constant, then examine score distributions, classification cutoffs, directions of error, and business recommendations across samples and periods. Common shocks, similar holdings, or the same movement in market prices can create apparent convergence. Model source, threshold settings, and operating records help distinguish those explanations from model-related convergence. The systemic significance lies in the possible loss of independent cross-checks. Research on organizational diversity in banking suggests that heterogeneous institutions can moderate systemic risk, whereas homogenization may intensify common exposures and herding.[32] Different institutions would ordinarily test risk from different customer bases, business experience, and risk appetites. As those differences narrow, a shared error may appear to

29 *See* BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, FEDERAL DEPOSIT INSURANCE CORPORATION & OFFICE OF THE COMPTROLLER OF THE CURRENCY, SUPERVISORY GUIDANCE ON MODEL RISK MANAGEMENT (2026), at https://www.federalreserve.gov/supervisionreg/srletters/SR2602a1.pdf (Last visited on September 28, 2026).

30 *See* article 78(5) of the *Directive 2013/36/EU of the European Parliament and of the Council of 26 June 2013*, 2013 O.J. (L 176) 338 (consolidated version of July 11, 2026).

31 *See* Jon Danielsson, Kevin R. James & Marcela Valenzuela et al., *Model Risk of Risk Models*, 23 Journal of Financial Stability 79, 79 (2016).

32 *See* Olivier Butzbach, *Systemic Risk, Macroprudential Regulation and Organizational Diversity in Banking*, 35 Policy and Society 239, 242 (2016).

have been confirmed several times independently. Persistent convergence in material business uses may then deprive the system of independent checks, supplying the factual basis for macroprudential inquiry.

C. How Correlated Financial Actions Transmit Systemic Stress

Once convergent assessments enter business decisions, their influence within the workflow, the temporal overlap of resulting actions, and the transmission of those actions through financial relations determine whether systemic stress follows. Advice leaves room for case-specific judgment. A rebuttable default exerts greater pressure when exceptions are difficult to invoke, while automation shortens the interval between assessment and measure. Coverage, override rates, and the practical availability of exceptions affect that transition. A common shock can produce the same measures across institutions.[33] Attribution to shared technology depends on evidence of source, adoption, and output. The assessments become a transmission mechanism when they materially shape decisions, the resulting measures overlap in time, and one firm's action alters the conditions facing others. Combined actions supply the factual basis for institutional response when they materially contract credit or insurance supply, impair market liquidity, or narrow transfer capacity. A well-founded stress scenario may supply the same factual basis by showing that those effects would occur under stress. The scale, duration, and reversibility of the effects determine the level of response, from continued monitoring and testing to measures grounded in statutory authority.

The pace of aggregation depends on the cycle of the underlying business and on how long a measure remains in force. Lending decisions, underwriting, and insurance pricing often unfold through applications, quotations, and renewals. Similar assessments may then accumulate across successive transactions and gradually contract the supply of credit or insurance. Trading controls operate on a different clock. Price signals, margin requirements, and risk limits can prompt order rejection, margin calls, or asset sales within a narrow window. Digital systems shorten the interval between signal and execution, while similar thresholds reduce dispersion in the timing of responses. Mechanical reliance on the same risk-management benchmarks may consequently produce a cumulative

33 *See* Marvin B. Lieberman & Shigeru Asaba, *Why Do Firms Imitate Each Other?*, 31 Academy of Management Review 366, 376 (2006).

withdrawal of liquidity.[34] Some correlated actions build over repeated business cycles, while others cluster rapidly. Timing identifies the pattern of aggregation. Financial relations explain how one institution's action changes another's position.

Market transmission operates through funding conditions, prices, and collateral. In credit markets, the Bank of England's 2024 system-wide exploratory scenario exercise aggregated first-round credit tightening and asset sales into a new market state, then asked participants how the resulting prices, collateral demands, and liquidity conditions would affect later decisions.[35] The exercise reveals how actions interact, while model source, institutional adoption, and actual outputs establish whether common technology caused the interaction. When banks tighten credit at the same time, firms and households face higher refinancing costs, and deteriorating repayment capacity enters later credit assessments. A decision that appears prudent within one balance sheet can thereby tighten conditions elsewhere. In securities markets, concentrated sales depress prices, which can raise margin requirements, reduce borrowing capacity, and induce further sales. Funding liquidity and market liquidity then reinforce one another.[36] Value-at-risk limits and contractual triggers can amplify the cycle when combined with haircuts and initial margin.[37] No active imitation is required. Prices created by the first round of action become part of the environment for the next round, allowing a local risk limit to contribute to system-wide pressure.

In insurance, contractual coverage and balance-sheet effects transmit correlated responses. When insurers rely on similar loss information and underwriting methods, they may raise premiums, restrict renewals, or withdraw from the same risk class. Insurance then becomes less available, and the remaining risk may concentrate in the portfolios of the smaller group of firms still willing to provide cover. Separately, adverse changes in liability valuation and investment returns can weaken solvency. Governance failures and business deviations can allow asset-liability risks to accumulate until market stress

34 *See* COMMITTEE ON THE GLOBAL FINANCIAL SYSTEM, STRUCTURAL ASPECTS OF MARKET LIQUIDITY FROM A FINANCIAL STABILITY PERSPECTIVE, CGFS DISCUSSION NOTE NO. 1 (BANK FOR INTERNATIONAL SETTLEMENTS, 2001), at https://www.bis.org/publ/cgfs_note01.pdf (Last visited on September 28, 2026).

35 *See* BANK OF ENGLAND, THE BANK OF ENGLAND'S SYSTEM-WIDE EXPLORATORY SCENARIO EXERCISE: FINAL REPORT (2024), at https://www.bankofengland.co.uk/-/media/boe/files/financial-stability/system-wide-exploratory-scenario/boe-swes-final-report.pdf (Last visited on September 28, 2026).

36 *See* Markus K. Brunnermeier & Lasse Heje Pedersen, *Market Liquidity and Funding Liquidity*, 22 The Review of Financial Studies 2201, 2201-2204 (2009).

37 *See* COMMITTEE ON THE GLOBAL FINANCIAL SYSTEM, THE ROLE OF VALUATION AND LEVERAGE IN PROCYCLICALITY, CGFS PAPERS NO. 34 (2009), at https://www.bis.org/publications/cgfs-paper-34-role-valuation-and-leverage-procyclicality.pdf (Last visited on September 28, 2026).

exposes them.[38] These underwriting and pricing responses also matter once an insurer enters distress. If potential transferees withdraw from the same class of risk under the same pressure, a distressed insurer may find it harder to transfer an insurance portfolio. Underwriting contraction and repricing may reduce the availability of cover and complicate continuity after failure.

D. How Financial Actions Feed Back into Later Risk Assessment

Financial actions feed back into later assessment by changing market conditions, contractual arrangements, and solvency positions that models subsequently observe. Once a risk assessment affects access to credit, the price of insurance, or trading conditions, the next dataset no longer describes an environment untouched by the earlier decision. Performative prediction captures this interaction between prediction and the reality to which it is applied.[39] At this stage, market, contractual, and solvency conditions have changed. The new facts may expose an error in the earlier classification. They may also reinforce it when the earlier decision determines which results remain observable. The model both reads risk and helps shape the facts that will later be read as risk; the next question is how the institution records and classifies those facts.

Institutional feedback begins when the firm records and classifies what happened, assigning risk significance to the result. Credit approval both allocates financing and determines whose repayment performance becomes visible. Reject-inference methods address the sample distortion created when rejected applicants leave no observable repayment outcome.[40] Usage-based motor insurance follows another route. A driving score changes the discount, the price incentive may alter behavior, and telematics provide new observations on mileage and hard braking.[41] The credit example concerns selection of observable cases; the insurance example concerns behavior and data generation. The institution then chooses the observation period and recording convention and decides whether each result enters a labeled or validation dataset, or remains an operating record. Current-period repricing and routine records may leave the model unchanged.

Model updating begins when feedback data enter training or calibration

38 *See* Chen Haoze, *Japan's Framework for the Ongoing Prevention and Control of Insurance Business Crises and Its Implications*, 5 Insurance Studies 74, 74-75 (2026).

39 *See* Juan C. Perdomo, Tijana Zrnic & Celestine Mendler-Dünner et al., *Performative Prediction*, 119 Proceedings of Machine Learning Research 7599, 7599-7600 (2020).

40 Adrien Ehrhardt, Christophe Biernacki & Vincent Vandewalle et al., *supra* note 9.

41 Miremad Soleymanian, Charles B. Weinberg & Ting Zhu, *supra* note 20, 40-41.

and change parameters, specifications, or versions. If later training continues to rely on labels available only for approved applicants, the training population remains shaped by earlier approval decisions.[42] Research on deployed systems identifies a related risk: later versions may learn from data generated under an earlier model and amplify its initial error.[43] Repeated scoring, current-period repricing, or a trading algorithm's response to live prices shows operational responsiveness. Training records, parameter changes, and version history are what connect the later system to information produced by the earlier decision.

An internal feedback process becomes system-wide when the effects of model use cross organizational boundaries. If several institutions use similar labels or valuation methods to interpret the same market development, changes in asset prices, liquidity, or the availability of insurance may enter several later assessments at once. The first round of action then creates a common environment, which each institution reads through its own decision premises. Common adjustments across institutions can produce nonlinear feedback through prices and liquidity.[44] Feedback has two possible directions. Heterogeneous samples, exceptional outcomes, and counterfactual evidence open existing labels, thresholds, or model versions to revision. Continued reliance on the same evaluative scale instead turns the market state produced by earlier action into a common input for the next round of assessment. Second-order dangers persist when repeated cross-firm feedback narrows the facts visible to later decisions and the choices that remain available.

IV. SECOND-ORDER GOVERNANCE THROUGH FINANCIAL LAW

Second-order governance asks how existing financial regimes can address successive stages of the same risk process.[45] Model risk management, macroprudential regulation, and recovery and resolution each govern one segment, while all three may rely on the same data, assumptions, supervisory benchmarks, or market expectations. Coordination turns on whether heterogeneous information enters decisions about model use, whether firm-level records support cross-firm assessment, and whether system-wide findings

42 Adrien Ehrhardt, Christophe Biernacki & Vincent Vandewalle et al., *supra* note 9.

43 *See* George Alexandru Adam, Chun-Hao Kingsley Chang & Benjamin Haibe-Kains et al., *Error Amplification When Updating Deployed Machine Learning Models*, 182 Proceedings of Machine Learning Research 715, 715-716 (2022).

44 *See* Giuliano G. Castellano, *Don't Call It a Failure: Systemic Risk Governance for Complex Financial Systems*, 49 Law & Social Inquiry 2245, 2264-2265 (2024).

45 The term refers here to an evidentiary and procedural sequence linking model governance within firms, macroprudential assessment across firms, and recovery and resolution.

inform recovery and resolution. Reflexive law responds to complexity through legal self-restraint and the installation, correction, and redefinition of social self-regulatory mechanisms.[46] Applied here, that insight structures the roles, review procedures, and decision authority needed to connect the three regimes. Sector-specific financial law determines the authority and legal effect of each measure.

A. The Normative Function of Second-Order Observation in Financial Risk Assessment

In the framework developed here, the normative function of second-order observation is to expose the distinctions on which financial risk assessments depend.[47] It asks which facts entered the dataset, which outcomes received a risk label, where the threshold was drawn, and what possibilities disappeared from view. Since second-order observation also works through distinctions, it makes selections and omissions reviewable while retaining its own standpoint. Legal analysis can then move from aggregate predictive performance to the structure of the judgment itself. The institution's definition of risk, its reasons for treating particular facts as relevant, and the uncertainties suppressed by classification become visible. The inquiry also reconstructs the path from assessment to business consequence. Similar outcomes may rest on different data, thresholds, risk appetites, or override practices. A complete review covers assessment content, approved scope, actual use, and the ensuing measure, separating what the institution concluded about risk from the influence the model exerted over the decision. Both dimensions form the legal object of review.

Supervisory metrics structure observation as well. Reporting categories, peer benchmarks, and stress scenarios determine which facts enter the supervisory field and may influence how firms calibrate models or organize their business. Genuinely responsive risk-based regulation includes the regulatory regime's own performance and its changes over time within the scope of evaluation.[48] A common benchmark remains useful because it gives supervisors a shared language and flags results that require explanation. The difficulty begins when benchmark assumptions acquire the force of a

46 The term is used here in *Teubner*'s sense of legal self-restraint through the installation, correction, and redefinition of social self-regulatory mechanisms. *See* Gunther Teubner, *Substantive and Reflexive Elements in Modern Law*, 17 Law & Society Review 239, 239 (1983).

47 *Luhmann* uses the term for observation directed at the distinctions employed by another observer. *See* NIKLAS LUHMANN, RISK: A SOCIOLOGICAL THEORY, at 223 (Rhodes Barrett trans., Walter de Gruyter, 1993).

48 *See* Julia Black & Robert Baldwin, *Really Responsive Risk-Based Regulation*, 32 Law & Policy 181, 181 (2010).

conclusive standard, prompting institutions to move toward the benchmark while reproducing the same omission. A second-order inquiry asks which population and time horizon the benchmark assumes, which risk measure it privileges, and which transmission channels the scenario leaves aside. The inquiry keeps the grounds of supervisory judgment available for reasoned review.

Second-order observation redirects fact-finding and comparative assessment toward the structure of risk judgments. Fact-finding establishes the record, comparative assessment interprets institutional similarities and differences, and intervention changes rights, obligations, or conditions for business. The three activities occupy different legal positions. Chinese administrative-law scholarship ties the processing of model-related information to a statutory task and the matter under review, with necessity, confidentiality, and data protection addressed as separate constraints.[49] Work on penetrative regulation reaches a related conclusion: its primary function is to discover facts, while any further measure requires an independent legal basis.[50] The result is a reviewable object and a path of inference. Sector-specific law supplies the powers and procedures.

B. Organizing Effective Challenge in Model Risk Management

The organizational task of effective challenge is to bring new facts and dissenting views into the review of model use, where they can influence the final decision. Corrective feedback may unsettle an earlier classification, and the challenge process carries contrary evidence into a decision about use. Developers and business users know the tool and its commercial setting best. Their proximity to the application also exposes them to performance targets, sunk investments, and established responsibilities that may narrow what they question. A separate validation function creates distance from these pressures. If validators rely on the development team's data, assumptions, and evaluation methods, formal separation has little effect. The *U.S. Supervisory Guidance on Model Risk Management of 2026* defines effective challenge through expertise, independence, organizational standing, and the influence needed to effect change throughout the model lifecycle.[51]

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49 *See* Zhang Tao, *Typological Reconstruction of the Legitimacy Basis for Administrative Agencies to Process Personal Information*, 2 Law and Social Development 53, 59-63 (2026).

50 *See* Zheng Yu, *Application and Restriction of Penetrative Regulation: Financial Instrument, Systemic Risk, and Regulation Boundaries*, 4 Journal of Business Economics 94, 101-104 (2024).

51 BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, FEDERAL DEPOSIT INSURANCE CORPORATION & OFFICE OF THE COMPTROLLER OF THE CURRENCY, *supra* note 29.

Its effectiveness turns on whether the concern reaches the decision-maker responsible for model use and receives a substantive response. Effective challenge also depends on a genuine institutional choice to maintain, adjust, restrict, or discontinue the model. An actual change is strong evidence of influence. A reasoned decision to retain the tool may also follow an effective process when the principal objections are answered and a different outcome was genuinely available.

Effective challenge first maps the object of review and then subjects it to independent validation. A model inventory links approved use to actual use, identifies the responsible owner and materiality, and records known limitations, validation status, external dependencies, overrides, version changes, exceptions, and unresolved findings. The *Rules on Data Security of Banking and Insurance Institutions* and the aforementioned Guiding Opinions require unified management, pre-use review, traceable records, and arrangements for emergency suspension, model exit, and fallback processes. The resulting record gives validation, business, risk, and audit functions a common object and makes approved use comparable with actual use. Under the *U.S. Supervisory Guidance on Model Risk Management of 2026*, the inventory and supporting documents help institutions understand model risk and track recommendations, responses, exceptions, and remediation. Validation then seeks a judgment independent of the development process. Review begins with conceptual soundness and consistency between intended design and actual use, then turns to data and labels, key assumptions, developmental testing, and performance limits. Outcomes analysis compares outputs with real-world results, while ongoing monitoring asks whether changes in products, clients, data relevance, exposures, or market conditions have weakened performance.[52] Use beyond the original design and repeated reliance on a common benchmark or data source can create new blind spots. Alternative assumptions, sensitivity analysis, external benchmarks, and observed exceptions widen the inquiry.[53] Validation thus supplies the facts and reasons for retaining or changing approved use, leaving the final choice to the authority responsible for model use.

Pre-use validation estimates future performance; production experience tests those assumptions in operation. Advisory outputs, default recommendations, and automated actions leave different records: the output produced, a reviewer's reason for departing from it, the final business decision, and the outcome that followed. Automated action also calls for a

52 BOARD OF GOVERNORS OF THE FEDERAL RESERVE SYSTEM, FEDERAL DEPOSIT INSURANCE CORPORATION & OFFICE OF THE COMPTROLLER OF THE CURRENCY, *supra* note 29.

53 *See* Julia Black, *Paradoxes and Failures: 'New Governance' Techniques and the Financial Crisis*, 75 The Modern Law Review 1037, 1061-1062 (2012).

record of when the measure took effect, when the review occurred, and how any restriction was lifted or how normal service was restored. Outcomes analysis can then compare model assessments, human intervention, and business results. A recurring concentration of exceptions among particular clients, products, or market conditions may point back to the data, labels, parameters, or workflow. Customer-supplied information, override reasons, and records of failed restoration can reveal material or recurring problems. Submitting these findings for validation enables them to inform decisions about continued model use. Chinese scholarship on platform and algorithmic governance provides procedural analogies for returning reasons, complaints, and operating results to organizational review.[54] In model governance, internal audit assesses whether override authority, escalation routes, and documentation requirements operate as designed. The validation function conducts the substantive review of the model.

The authorized decision-maker ultimately resolves whether and how the tool will continue to be used. Closer monitoring or an overlay may suffice; more serious findings may call for recalibration, redevelopment, restrictions on use, reversion to an earlier version, or retirement. A decision to retain the tool also calls for reasons. Whatever the outcome, the record explains why the tool entered the business process, identifies the objections raised and the treatment of exceptions, and states why the institution maintained, altered, or discontinued that use. Successive procedural choices eliminate alternatives and absorb uncertainty in decision-making.[55] In model governance, recording objections, review reasons, and the final choice together makes it possible to trace how competing judgments entered the decision and where responsibility lay across validation, business use, and approval.

C. A Macroprudential Procedure for Examining Cross-Firm Risk Assessments

Persistent convergence across cases and periods in material business uses supplies the factual trigger for macroprudential examination. The evidence comes from individual firms. Inventories, validation opinions, and use decisions explain why an institution maintained, adjusted, or discontinued an application. Supervisors place those materials within a common business setting, compare approved and actual use, and connect outputs to resulting decisions. Cross-firm examination reveals how individually defensible

54 Yu Chengfeng, *supra* note 7, 99-102; Chen Jingyuan, *supra* note 22, 198-200.

55 *See* NIKLAS LUHMANN, LEGITIMATION DURCH VERFAHREN, at 40 (Suhrkamp, 1983).

strategies interact through asset prices and market liquidity.[56] The Financial Stability Board identifies model design, training foundations, use cases, and degrees of automation as relevant monitoring fields, while acknowledging the scarcity of direct measures and the difficulty of causal identification.[57] Those fields provide a starting point for comparison, while causal attribution depends on evidence of firm-specific use and actual outputs.

Cross-firm comparison should preserve differences grounded in risk and business purpose while identifying unexplained divergence or convergence. Supervisors compare risk scores, classifications, and pricing assessments within a common business setting. They first identify material departures that underlying risk cannot explain and unusually close outputs for which common risk factors provide no adequate account. Article 78(1)-(5) of the *Directive 2013/36/EU* offers a useful prototype. Competent authorities compare internal-model outcomes on common benchmark portfolios and investigate deviations not explained by risk differences. Corrective measures may not lead to standardization or preferred methods, create improper incentives, or encourage herding. The benchmark supplies a common scale, while peer distributions and simplified models direct inquiry. When a firm departs from its peers, supervisors examine customer mix, business purpose, risk appetite, data quality, and validation results. Near-identical outputs call for scrutiny of common data, methods, and actual use. A difference supported by those reasons remains within the permissible range; unexplained divergence or convergence proceeds to further investigation. The comparison ends in a reasoned factual assessment. Intervention requires its own legal basis and procedure.

After comparison identifies the relation among assessments, system-wide stress testing turns to combined action. Macroprudential analysis examines both cross-firm links and the accumulation of action over the financial cycle. The test places the assessments identified through comparison under a common shock and asks whether they produce overlapping, mutually reinforcing business responses. In a two-round design, institutions first report intended actions. The aggregate response becomes a revised market state, and participants then reconsider their positions. The Bank of England uses this structure for financial-stability monitoring, policy work, and contingency planning.[58] The normative function of the exercise is to reveal how actions

56 Giuliano G. Castellano, *supra* note 44, 2263-2268.

57 *See* FINANCIAL STABILITY BOARD, MONITORING ADOPTION OF ARTIFICIAL INTELLIGENCE AND RELATED VULNERABILITIES IN THE FINANCIAL SECTOR (2025), at https://www.fsb.org/uploads/P101025.pdf (Last visited on September 28, 2026).

58 BANK OF ENGLAND, *supra* note 35.

combine and what follows. Results showing a material contraction in credit or insurance supply, impaired market liquidity, or reduced transfer capacity can enter subsequent supervisory judgment. Within existing authority, supervisors may use them for ongoing monitoring, review of model use, and recovery-plan assessment. Restrictions on business or regulatory eligibility depend on their own statutory conditions and procedures. Attribution to a common model requires separate evidence of source, institutional adoption, and actual outputs. Scenario design must also preserve the distinct transmission channels of lending, securities trading, and insurance contracts.

Chinese law offers two limited entry points, each tied to a defined regulatory object and purpose. Under article 18 of the *Provisions on the Additional Regulation of Systemically Important Banks (Trial)*, the People's Bank of China and the former China Banking and Insurance Regulatory Commission may set stress scenarios and specify testing methods and models for systemically important banks. The test covers capital, liquidity, large exposures, and the feasibility of recovery and resolution plans. The *Provisions on the Application and Acceptance of Advanced Approach to Capital Measurement by Commercial Banks* separately govern regulatory-capital models used by specified commercial banks. Articles 19 and 20 require model materials, validation reports, and audit reports, while articles 38 and 40-44 govern continuing supervision, parameter adjustment, model optimization, withdrawal of eligibility, and reporting of material changes. The first regime tests institutional resilience under a common scenario; the second determines whether a particular regulatory-capital method remains eligible for recognition. Both powers remain tied to their statutory objects and purposes and generate evidence for the comparisons those schemes authorize.

Extending comparison to proprietary credit, underwriting, pricing, or trading tools across sectors calls for a more explicit legal architecture. The legal framework must first specify the records available to supervisors and the uses to which comparison results may be put. Participating institutions also need a procedure for checking and correcting the material. They should receive the benchmark and material scenario assumptions, and an adverse conclusion should state its reasons. Open procedures are central when both the underlying risk and the supervisory inference remain uncertain. Regulatory impact assessment and external oversight can further strengthen reviewability, while a comparison report supplies evidence within the decision-making process.[59] Legal effect arises from a separate supervisory

59 Liu Quan, *supra* note 4, 46-51.

decision. Access to model information raises one set of statutory and procedural questions; restrictions on business or withdrawal of approval for a modeling approach raise another. Keeping information gathering distinct from intervention preserves the value of macroprudential analysis while confining model measures to defined powers.

System-wide stress testing can also reveal when a stability problem has become a resolution problem. Simultaneous de-risking may raise funding costs, depress asset values, narrow the market for transferring business, and turn individually feasible recovery strategies into mutually defeating responses.[60] The findings inform recovery and resolution through plan review and resolvability assessment. Within existing powers to conduct those reviews, supervisors can update assumptions about the availability of transfer markets, the continuity of critical shared services, and the feasibility of technical migration. They can also use the findings to test fallback arrangements. Crisis intervention creates a second feedback channel. Repeated rescue or exemption can reshape expectations and weaken assumptions embedded in later recovery plans, making post-intervention review part of the analysis.[61] Statutory triggers continue to govern regulatory takeover, business transfer, and insolvency proceedings. When recovery measures cancel one another out, and no viable transferee remains, continued operation of critical business depends on its technical and legal separability.

D. Testing the Resolvability of Critical Financial Functions Under Digital Dependence

The resolvability of a critical financial function depends on whether the function can be separated from the failed institution, together with the resources and legal relationships that another entity needs to continue it. Operational resilience concerns continuity through disruption; resolvability extends the inquiry to transfer and continuation after exit. Article 3 of the *Provisions on the Additional Regulation of Systemically Important Banks (Trial)* places review of recovery and resolution plans and resolvability assessment within the additional regulatory framework. Articles 8-11 require systemically important banks to prepare recovery plans and proposed resolution plans and to identify critical functions, critical shared services, management information systems, and arrangements for business transfer.

60 Markus K. Brunnermeier & Lasse Heje Pedersen, *supra* note 36, 2204-2208.

61 *See* Cesare Pinelli, *Financial Markets and Societal Constitutionalism*, 45 Journal of Law and Society S204, S212-S216 (2018).

International resolution standards likewise focus on the continuity of critical functions and orderly exit. Macroprudential work on operational resilience has also brought common service providers and cross-firm dependencies into the same field of analysis.[62] Models, data interfaces, and third-party technology services matter to resolvability when these resources support a critical function or obstruct separation and transfer. The inquiry centers on functional continuity. Technology offers several routes to that end, including continued use of the original model.

Preparation begins before failure. Recovery planning identifies the models, data, and external dependencies on which core business relies, then tests fallback systems and manual processes against model failure or provider disruption. For an insurer subject to resolution planning, the plan should reflect the firm's scale, business profile, risk condition, substitutability, and the consequences of failure. An internationally active insurance group also maps critical management information systems to critical shared services and functions that must continue. A workable transfer requires accessible data and transferable interfaces. It also depends on licenses and outsourcing contracts that permit transitional use and on an incoming operator able to start the necessary processes. The original model may be replaced, provided the function continues on another workable basis. Pre-failure mapping identifies which digital dependencies would obstruct separation or transfer and where fallback arrangements are needed.

Digital records play different legal roles as a crisis moves from supervision to insolvency. Model alerts and validation reports may reveal deterioration, while stress-test results may show whether a recovery or resolution strategy remains feasible. For an insurer, article 2 of the *Enterprise Bankruptcy Law of the People's Republic of China* supplies the insolvency grounds, while article 90 of the *Insurance Law of the People's Republic of China* governs eligible applicants and the required regulatory consent. Article 134 of the *Enterprise Bankruptcy Law* separately authorizes the financial regulatory authority under the State Council to apply for reorganization or bankruptcy liquidation of a financial institution. During a lawful takeover or trusteeship of a financial institution at grave risk, the regulator may also seek suspension of civil proceedings or enforcement in which the institution is the defendant or judgment debtor. During administrative stabilization, the competent supervisor may use corrective, rectification, or takeover

62 *See* RACHEL ADENEY, ADRIAN HITCHINS & CLAUDIA LANE ET AL., OPERATIONAL RESILIENCE IN A MACROPRUDENTIAL FRAMEWORK, FINANCIAL STABILITY PAPER NO. 50 (BANK OF ENGLAND, 2024), at https://www.bankofengland.co.uk/-/media/boe/files/financial-stability-paper/2024/operational-resilience-in-a-macroprudential-framework.pdf (Last visited on September 28, 2026).

measures authorized by financial legislation to stabilize operations, contain contagion, and preserve later options. After the court accepts a bankruptcy application, it examines the statutory grounds, verifies claims, oversees estate administration and voting on a plan, and gives binding effect to reorganization, composition, or liquidation. Comparative experience with Japanese insurer failures similarly places supervisory identification and corporate arrangements in the service of risk containment, while judicial proceedings determine restructuring and loss allocation.[63] The same record may inform administrative stabilization and judicial proceedings, but its legal effect depends on the authority and procedure through which it is used.

For insurers, corporate exit, continuity of insurance cover, and allocation of residual losses follow different legal tracks. Article 92 of the *Insurance Law* requires an insurer operating life insurance business to transfer its life insurance contracts and corresponding liability reserves after regulatory revocation or bankruptcy. Article 91 governs the statutory order of payment for insurance claims. Article 21 of the *Measures for the Administration of the Insurance Security Fund* reiterates the mandatory transfer of life insurance contracts and directs the insurance regulator to designate a receiving insurer when no transfer agreement can be reached. Support arrangements for other long-term personal insurance contracts are governed by applicable laws, administrative regulations, and State Council provisions. Under article 22, the fund may support a receiving insurer when liquidation assets are insufficient to pay benefits under life insurance contracts, and the same rescue standards apply to other long-term personal insurance contracts. Contract transfer and fund support can preserve continuity of cover after the insurer exits, while losses outside the rescue arrangements remain subject to statutory priority.[64] Digital dependencies shape the operational feasibility of those legal tracks, including whether policy administration and claims handling can continue elsewhere. They also determine whether reserve data and the operational processes needed to perform the contracts can be separated from the failed insurer and transferred to a successor.

A transfer that is legally available may still fail without a viable transferee. Policy and claims records, together with liability-reserve data, are prerequisites for the receiving firm to assess the portfolio under its own risk appetite. Continued use of the original model depends on adequate

63 *See* Tan Qianyuan & Chen Haoze, *The Evolution of Japan's Responses to Insurance Company Insolvency and Its Implications*, 1 Contemporary Economy of Japan 20, 29-30 (2025).

64 *See* Chen Haoze, *Models for Breaking Implicit Guarantees Under Japanese Insurance Law and Their Implications*, 1 Insurance Studies 113, 116-118 (2025).

documentation, validation records, and the necessary rights of use. Rebuilding the process around a different model depends on accessible data, transferable interfaces, and license terms that permit reconstruction. A non-transferable license, a cloud-services contract without exit or resolution provisions, or restrictions on lawful data transfer may deprive the statutory mechanism of its operational basis. The Financial Stability Board toolkit includes reasonable transition assistance in exit planning.[65] Cross-firm evidence helps assess market capacity. Potential transferees relying on the same provider or similar systems may all retreat from the same class of business under stress. Resolvability ultimately depends on two conditions: the business can be separated from the failing institution, and a firm remains able to receive and operate it. Together, those facts allow the critical function to outlast the institution that originally performed it.

V. CONCLUSION

The governance problem in digital finance lies in the interaction of dispersed assessments. A model can help one firm control risk while similar judgments across firms may redirect that risk into the financial system. Second-order governance gives the reasons and operating records generated within firms a role in cross-firm comparison, then brings the systemic consequences of combined action into recovery and resolution assessment. As evidence passes between procedures, scrutiny extends from individual outputs to the assumptions, standards, and organizational arrangements that produced them. Second-order observation exposes these choices; reflexive law structures the responsibilities and procedures through which contrary information enters review. Firms can reconsider model use, supervisors can examine common responses, and crisis planning can assess the practical conditions for transferring critical functions.

Financial stability depends in part on institutions retaining the capacity to check one another's judgments. Law should accommodate differences grounded in risk and business purpose. Persistent convergence in material business uses calls for examination of the links among assessments and their consequences. A response has a factual basis when significant effects have already emerged or when a well-founded stress scenario shows a realistic prospect of such effects. Its timing and intensity depend on the scope, duration, and reversibility of the effects, with each measure grounded in the applicable authority and procedure. As the consequences of earlier action enter

65 FINANCIAL STABILITY BOARD, *supra* note 25.

later assessment, review should also return to the models and supervisory benchmarks that shaped them. Financial law should preserve room for justified difference and a route for correcting shared error. Second-order governance seeks to keep judgments open to revision before crisis and to preserve a lawful path for critical functions to continue after institutional exit.

(Edited by Zhai Yujia)

数字金融风险的二阶治理

内容提要 现行数字金融规范以单项模型和单家机构为主要治理单位，跨机构判断关联及其系统后果因而易被遗漏。风险评估对象的界定塑造判断内容，用途批准和后续实际使用使模型成为组织的决定前提，流程位置再确定输出对个案之限制程度。实际判断在可比情景中持续趋同后，可能经金融关系转为时间重叠且彼此强化的行动。行动后果经记录和分类返回后续评估，单体审慎遂可能生成原有计算框架难以吸收的二阶危险。二阶治理据此连接既有金融制度，使判断条件在不同程序中持续接受审查。二阶观察揭示机构和监管者所用的区分，反思型法将审查要求落实为组织职责与程序。有效挑战使异质信息影响模型用途，宏观审慎比较保留有据差异并识别判断联系，系统范围压力测试检验行动组合，可处置性评估则考察关键功能的分离与接续。各项措施依金融部门法确定权限和法律效果。