

Recorded contracting after university license termination: a disclosed clock and engineering amendment

Bolero

Abstract

Registered research design and conditional interpretation policy; no outcomes observed.

Keywords: Pre-registration, research design

Recorded contracting after university license termination: a disclosed clock and engineering amendment

Pre-registration: no experimental outcomes have been observed.

Research question

Among APTO disclosures with an eligible recorded early license termination in supported tenant snapshots, how often does a later commercial agreement with disjoint recorded parties have an effective date within three years after the selected index termination, how much survives a strict recorded-gap definition, and do these later agreements have positive classified receipts within one year of their effective dates?

Scope

Amended noncausal finite-record study of eligible dated APTO disclosure-agreement histories in the supported-index tenant scope frozen by Atom 1, with other documented namespaces explicitly excluded or unresolved; cohort and code semantics DC1–DC9; primary H3 with fixed N, selected strict-gap and H5 refinements, and distinct-agreement one-year receipts. Adaptive closed_graph; no confirmatory statistical tests.

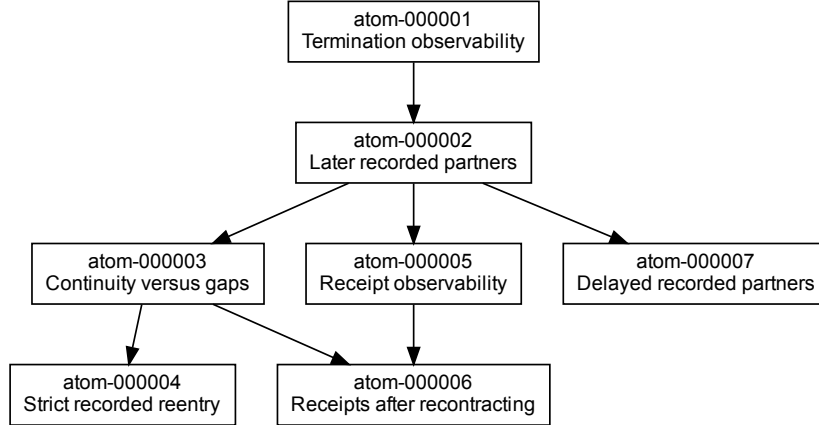


Fig. 1 Registered Atom dependencies

Graph overview

Dependency edges summarize the graph, not unconditional activation. Exact logical conditions and all local outcomes follow below; the separate graph atlas shows each Atom’s branches.

Registered storyline

A termination ends a recorded agreement but need not end the disclosure’s recorded transfer history. Termination can also follow knowledge transfer without another direct university contract. First establish the eligible dated cohort within deterministically supported tenants and show illustrative composition and observation limits. Time zero is the `termination_date` of the deterministically selected index agreement. A later agreement’s `effective_date` is its event timestamp, not the index origin; signatures are chronology flags and do not prove execution by the horizon. The primary three-year interval distinguishes witnessed later-party agreements from certified absence and unresolved follow-up. When witnesses exist, ask whether their histories contain strict recorded gaps or administrative/parallel continuity, and independently establish whether receipts can be measured. These streams reconverge in the one-year financial description, which does not require favorable continuity evidence. A stricter same-cohort interval is mandatory if continuity is mixed, absent or unknown; a five-year extension is mandatory when the primary horizon is low or unresolved. All these outcome-selected refinements are exploratory descriptive. No branch may make a causal rescue or product-use claim. The observation and institutional restrictions remain active even when every operational check passes.

V004 focused documentation and public-search record

This is an engineering repair of the user-selected question. On 2026-09-06 UTC (session began 2026-09-05 America/Chicago), the author read the normalized brief including `topic_prompt` directly, explicit fourteen-table boundary, complete `prereg_author` bundle, four specified skills and their package/granularity/paper/adaptive references, v003 World/review and named runtime-execution/figure interfaces. The small schema-only.md and dataset-README.md were read in full; DC2 retains exact six-table sections/lines. The underlying per-tenant files were not opened. Original SOURCE Atom protocols were compared directly with the current design and their differing passages read; its literature record and original identities were checked. Unchanged scientific passages are retained. All source/review/documentation bytes are identified in amendments/revision-identity.json and source-identity.json.

The initial oversized bibliography request was truncated and is not a full read. Narrow local query was `rg -n -i 'shane2002-selling|jensen2001-proofs|liang2022-systematic|caviggioli2020-licensing|Dechenaux|Elfenbein'`; the four returned entries at 15884–15891, 16938–16945, 17240–17247 and 18280–18287 were read. They establish registry identity only; linked local paper text was not accessed. No citekey or resource was modified. Runtime registered-templates.md/custom-rendering.md and the exact `validate_exports/load_reviewed_table` implementations were read; these establish an interface, not scientific availability.

Live web queries were `site.cos.io preregistration conditional decision trees deviations` and `site.tlo.mit.edu termination license technology commercialization`. Access was limited to the search tool's primary-page extracts, not full article reads. The [COS preregistration guidance](#) supports explicit documentation of deviations; [COS Registered Reports guidance](#) discusses specified contingencies. These are contextual motivations for transparent routing, not certification of this package. MIT TLO homepage, commercialization-guide and institutional-policy extracts supplied general context only; no new termination, financial or historical claim relies on them. Search also returned secondary/unrelated pages and a public annual report; none was opened or used. Exact request timestamps and total index counts were not exposed by the tool. No new OpenAlex/PMC API call was necessary for this bounded engineering repair; earlier access logs below remain inherited, not fresh access claims.

No scientific change, novelty upgrade, statistical or institutional default was selected from this search. All article-specific claims and full-text limits retain their inherited attribution below. Public searching does not establish runtime rows, overlap, counts, coverage or identifying variation. No confidential data, empirical manuscript, prior execution outputs or cached summaries were accessed.

Inherited v003 and earlier source-access record

Literature and retrieval record, revision v003

This focused amendment retains the user-selected question. On 2026-09-05 America/Chicago the author read the normalized brief's full `topic_prompt` directly,

explicit boundary, complete prereg_author resource manifest/standards, four named skills and required package-contract, atom-granularity, paper-scaffold and adaptive-foundations references. No hand, pool or new candidate search was required. The original SOURCE registrations/shared documents and the supplied pre-data v002 World/review were read, including unchanged SOURCE passages by exact comparison with the current sources. No review scratch files, prior empirical manuscript, prior execution outputs, confidential rows or cached profiles were accessed.

The complete small schema-only.md and dataset-README.md were read. Six exact projections and per-table section/line locators remain DC2; underlying per-tenant files were not opened. An initial oversized bibliography read was truncated and is not a complete read. Narrow `rg -n 'shane2002-selling|jensen2001-proofs|liang2022-systematic|caviggioli2020-licensing|Dechenaux2006-termination'` retrieved four existing entries; lines 15884–15891, 16938–16945, 17240–17247 and 18280–18287 were read. Local paper paths were not followed. Registry entries verify identity only, not article contents or absence of other literature. No governed citekeys or resources were changed.

The reviewer-named runtime-execution-interface.md and runtime-figure-interface.md were read completely, as were their registered-templates/custom-rendering references. The exact `validate_exports` and `load_reviewed_table` implementations and staged font paths were inspected. The explicit project custom-figure policy supersedes catalog/fixed-layout suggestions; it preserves export/evidence checks and manuscript class. These documents establish engineering interfaces, not runtime scientific feasibility.

Fresh v003 public verification

Exact web search queries were `site.comotion.uw.edu/licensing/licensing-faqs` "another" developer, `site.innovationpartnerships.umich.edu/industry/license-process` termination sublicensees, and "Appropriability and Commercialization" "MIT" inventions termination. Primary institutional and publisher pages below were then opened directly; follow-up finds were Abstract on Shane, 2006 on SIEPR and diligence on UW. Web tools expose access date but no exact individual timestamps or total index counts. Secondary RePEc results and unrelated legal/licensing search leads were not used as scientific support. No expansive new novelty claim or candidate choice was made.

- [Shane \(2002\), publisher article](#): bibliographic page and abstract, lines 202–207, read. Licensing, termination, commercialization and royalties are established research topics. Full article not read; comparable sequence analyses cannot be ruled out from the abstract.
- [Dechenaux et al., SIEPR June 2006 version](#): university abstract/authors/date read, lines 111–130. It motivates endogenous development and termination under uncertainty. SOURCE and the v002 reviewer report targeted first-event/knowledge-transfer passages from this version; no fresh PDF or final-journal full-text read is claimed here.

- [UW CoMotion licensing FAQs](#): targeted financial/maintenance and diligence sections read, especially lines 54–64 and 99–104. Seeking another developer is plausible and payments can precede sales. These current descriptions establish neither historical APTO policy assignment nor observed coverage or events.
- [Michigan license process](#): agreement types, financial terms and Term and Termination sections read, especially lines 88–92, 127–135 and 180–182. Options differ from commercial licenses; an existing sublicensee can obtain a direct license after termination. This supports the recorded-party/strict-gap claim ceiling, not a conclusion about APTO legal rights.
- [Liang et al. \(2022\), public full text](#): Europe PMC DOI metadata and fullTextXML returned HTTP 200. Targeted Overview and Stanford inventions data sections were read; broader Materials and methods extraction was capped, and no complete-paper read is claimed. Their methods select inventions prioritized for marketing, use invention/docket grain, and derive cumulative net income from revenue and expenses. This confirms a related financial-analysis precedent while distinguishing the registered distinct-agreement, dated receipt-existence measure. Published descriptive numbers in the overview were visible; none are APTO results, forecasts, threshold targets or inputs to this amendment. No supporting dataset or supplement was retrieved.

API requests at approximately 2026-09-05 23:55:24 UTC used OpenAlex `works?search=university license termination relicensing&per-page=5&select=id,doi,title,publication_year`, Europe PMC exact query `DOI:10.1016/j.patter.2022.100584` with `pageSize=1`, and `PMC9481953/fullTextXML`. OpenAlex returned HTTP 429 and supplied no records. Europe PMC returned the bibliographic record and XML; targeted methods access improves the prior full-text limitation for that paper only. Exact URLs, timestamps, statuses, response hashes and retrieved section titles are in `search/v003-live-api-access.json`. Full prose is not reproduced in the distributed access log. Unread text and incomplete search paging preclude exhaustive novelty certification.

No scientific choice changes because of this verification. The novelty judgment remains a plausible narrow sequence/measurement contribution; identification remains finite-record and noncausal; actual class separability and coverage remain unverified. V003's three engineering repairs follow the already registered predicates and independent synthetic review. Earlier search records below are retained as inherited access provenance, not fresh searches by this author.

Inherited v002 and v001 search record

Literature and retrieval record, revision v002

This is a focused amendment of the user-selected question, not a candidate search. On 2026-09-05 the revision author read the normalized brief's `topic_prompt` directly, explicit boundary, complete author-stage bundle, four named skills and required package/atom-granularity/paper-scaffold/adaptive references. The original

SOURCE's seven pending Atom registrations and Molecule, shared scientific documents and manifest were read; identical passages were also checked through exact source-to-draft comparisons. The supplied pre-data v001 World and independent review were read. No prior empirical manuscript, execution output, data row or cached profile was accessed. Broad tool output that truncated was not counted as a full read; narrower repeated retrievals resolved relevant passages.

The entire fourteen-table schema-only.md and dataset-README.md were read. The source per-tenant dictionary paths were not followed. Six requested projections and exact field/section locators remain DC2. The large references.bib was searched narrowly with `rg -n -i 'shane2002-selling|jensen2001-proofs|liang2022-systematic|caviggioli2020-licensing|Dechenaux2006-siepr'`; the four matched entries were read at 15884–15891, 16938–16945, 17240–17247 and 18280–18287. Local paper paths were not opened and unmatched terms are not evidence of absence. No citation registry was modified.

The reviewer-bundled runtime-execution-interface.md and runtime-figure-interface.md were read after the review identified them, together with named registered-templates/custom-rendering documentation, the exact validate_exports implementation and staged font provenance. They supply engineering interfaces, not empirical access or statistical variation. Revision-identity.json records these inputs by hash.

Fresh public checks in v002

Live web queries were "university" "license termination" "relicensing" and "Selling University Technology" "Patterns from MIT". This was a targeted check of institutional plausibility and closest-work boundaries. Search results included unrelated hydropower/licensing, secondary aggregators and citations in other papers; those were not used to support new science. The search tool did not expose exact per-request timestamps or total index counts. No exhaustive novelty census is claimed.

- [Shane \(2002\), publisher page](#): opened and searched Abstract; targeted lines 203–207 and citation identity read. Licensing, termination, commercialization and royalties are established objects. The abstract cannot establish absence of comparable later-history analyses. Full article not read in this revision.
- [Dechenaux et al., June 2006 SIEPR page](#): targeted abstract and authors/date, lines 111–130, read. It studies termination/commercialization under uncertainty; the first-event methods detail and knowledge-transfer caveat remain SOURCE/reviewer full-text accounts, not freshly verified final-journal claims.
- [UW CoMotion licensing FAQs](#): current financial and diligence sections read after finding diligence (43–74, 99–104). Seeking another developer is institutionally plausible; maintenance payments can precede sales. This is neither historical APTO policy exposure nor retention evidence.
- [Michigan license process](#): Term and Termination and agreement-type sections read after finding Termination (180–198). A direct license can follow a sublicense, reinforcing the recorded-continuity ceiling. This does not establish the contents or legal effect of any APTO contract.

The current OpenAlex API search `university license termination relicensing`, per-page 5 with selected bibliographic fields, returned HTTP 429. Europe PMC exact DOI search `DOI:10.1016/j.patter.2022.100584` and `PMC9481953/fullTextXML` each returned HTTP 503. Exact UTC times, URLs and access errors are in `search/v002-live-api-access.json`. No record or full text was obtained from these requests. The supplied independent review reports successful targeted Liang full-text access in its own turn; that is inherited review evidence only. No new claim relies on inaccessible text. The retained conservative novelty judgment and noncausal scope remain appropriate; neither these checks nor schema documentation demonstrate runtime feasibility.

Inherited v001 retrieval record

The following retained record describes the v001 author's access, not fresh searches by the v002 author. V002-specific access and limitations are above. It is a literature provenance record for the same selected question.

V001 literature and retrieval record

The question was selected by the user. This was a focused verification of the existing research question and measurement distinctions, not a candidate search. The author read the original SOURCE World's seven Atom registrations, Molecule, four shared source documents and manifest, then the normalized brief, explicit table boundary, stage manifest/standards and all four listed skills and their required references. No data, empirical manuscript, prior execution artifact or cached profile was opened. Retrieval date is 2026-09-05; API requests preserve UTC timestamps in `search/live-api-access.json`. Web tools supplied an access date but no exact per-request timestamp or search-index hit total.

Local documentation

The supplied `schema-only.md` (sections for all fourteen tables) and `dataset-README.md` were read completely. The exact requested six-table projections and section/line locators appear in `data-contract.md` DC2. The underlying per-university dictionary paths were not followed; they are provenance locators, not permission to read other materials. Source and documentation SHA-256 identities appear in `amendments/source-identity.json`. The normalized `topic_prompt` was read directly, and its exact text is preserved in `amendments/topic-prompt.md`.

The large governed `references.bib` was initially included in an overbroad documentation read; tool output was truncated. That is not a full bibliography review. Subsequent retrieval was narrow: `rg -n 'shane2002-selling|jensen2001-proofs|liang2022-systematic|caviggioli2020-licensing|Dechenaux|E` followed by lines 15884–15891, 16938–16945, 17240–17247 and 18280–18287. Those entries verify existing registry keys and bibliographic identities only. Local paper paths in the bibliography were not opened. No absence claim follows from unmatched search terms. No new citation key was added to the governed registry; this amendment uses DOI/URL citations.

Fresh live verification

Source	Access in this author turn	Design implication and limit
Scott Shane (2002), <i>Selling University Technology: Patterns from MIT</i> , Management Science 48(1), 122–137, DOI	Publisher abstract and bibliographic page read, including Abstract locator; full article not read.	Licensing, termination, commercialization and royalty outcomes are established topics. The abstract does not settle overlap with this post-termination linked-disclosure design. No first-ever claim.
Emmanuel Dechenaux, Brent Goldfarb, Scott Shane and Marie Thursby, <i>Appropriability and Commercialization: Evidence from MIT Inventions</i> , SIEPR working-paper page , 2006; final article 2008, DOI	University landing page opened; search metadata/abstract lead inspected. Search also retrieved the NBER version , but a direct PDF term lookup failed. No new full-text methods read.	Development/termination under uncertainty is a near-neighbor. The SOURCE registration reports a version-specific first-event design and knowledge-transfer caveat; those are inherited source-review observations, not newly verified final-journal facts.
University of Washington CoMotion, Licensing FAQs	Public page and diligence/financial sections read on 2026-09-05; web lines 43–58 and 99–104.	Renewed partner search is institutionally plausible. Current descriptions neither identify a historical treatment nor certify APTO retention.
University of Michigan Innovation Partnerships, The License Process	Public page and financial, agreement-type and termination sections read; web lines 127–135, 180–182 and 194–200.	Options differ from commercial licenses. A direct agreement can follow a sublicense, so distinct-party records are not sufficient evidence of a new developer.

Source	Access in this author turn	Design implication and limit
Liang, Elrod, McFarland and Zou (2022), <i>Systematic analysis of 50 years of Stanford University technology transfer and commercialization</i> , Patterns 3(9), 100584, DOI	Europe PMC DOI search returned the bibliographic record, PMID 36124300 / PMC9481953. PMC HTML returned a browser check; Europe PMC fullTextXML returned 404. Metadata only in this turn.	Existing technology-transfer/financial research limits broad novelty claims. The SOURCE reports targeted methods access; this author does not claim a fresh full-text comparison.
Jensen and Thursby (2001), <i>Proofs and Prototypes for Sale</i> , DOI; Caviggioli et al. (2020), <i>The licensing and selling of inventions by US universities</i> , DOI	Governed bibliography entries and SOURCE literature review read. No fresh full texts.	Retained theory/measurement context from the existing question, without attributing newly verified findings or claiming complete novelty coverage.

Fresh web search strings, in order, were "university" "license termination" "relicensing", "Selling University Technology" "Patterns from MIT", and "Appropriability and Commercialization" MIT inventions termination. Institutional and PMC URLs above were opened directly. Follow-ups searched the UW page for diligence, Michigan for Termination, Shane for Abstract, and SIEPR/NBER for first. The SIEPR term had no match; the NBER lookup failed. Neither is evidence that an analysis is absent. Web search returned unrelated hydropower/nuclear licensing and secondary aggregators; those were excluded as scientific evidence. A public critical review and other patent-use papers surfaced as leads, not as freshly read support for new claims.

OpenAlex requests attempted `works?search=university license termination relicensing&per-page=5&select=id,doi,title,publication_year` and the exact Shane DOI work lookup with the same metadata fields. Both returned HTTP 429; no OpenAlex result set was inspected in this amendment. Europe PMC used exact query `DOI:10.1016/j.patter.2022.100584` with JSON output; metadata succeeded, full text did not. These observed access limits qualify the user's general availability statement. The audit stores no credentials, paper full text or confidential data. There was no credential search or private network access.

What is inherited and what is new

The SOURCE registration contains a broader prior literature search, citation expansion and targeted full-text account. It remains preserved at its original location. This amendment does not relabel that history as searches performed by the current

author. The local SOURCE literature document itself was read, and inherited institutional/theoretical caveats were retained. New public access confirms the distinction between subsequent agreements, strict gaps and financial inflows; no new empirical result or identification strategy was introduced.

The contribution remains a finite-record account of later contracts after an eligible termination, with uncertainty about absence and continuity made explicit. A comparable prior disclosure-linked post-termination study would weaken novelty. Inaccessible full texts and noisy/incompletely paged searches prevent an exhaustive novelty claim. Further searching was not used to choose a new question or tune a threshold. The amendment's clock correction follows the user's explicit instruction, not an empirical pattern. No paper number is used as an expected APTO result.

APTO data contract: recorded second chances

This document freezes shared definitions DC1–DC9. Atom registrations explicitly incorporate the definitions they use. This is a disclosed schema-only amendment, informed by the operator's prior-run manuscript review. This author received no empirical values. No confidential records, empirical profiles, prior results, or confidential runtime were accessed. Every number describing APTO sample size, date coverage, missingness, variation, or outcomes remains unknown.

DC1. Boundary and provenance

The supplied `data-boundary.yaml` permits fourteen APTO tables. This study requests only `AGREEMENT`, `AGREEMENT_COUNTERPARTY`, `COUNTERPARTY`, `DISCLOSURE`, `DISCLOSURE_AGREEMENT`, and `AGREEMENT_REVENUE_EVENT`. Uppercase names are planning allowlist names; the supplied physical schema uses lowercase names. No other table, external corporate registry, patent database, or bibliometric linkage is authorized for this study. Public literature is contextual evidence, never additional observational units.

The author read the supplied `schema-only.md` completely, lines 1–280; `dataset-README.md` completely, lines 1–66; the normalized brief and explicit boundary completely; and the complete stage manifest and standards profile. Exact byte hashes are in `amendments/source-identity.json`; fresh and inherited retrieval are separated in `literature.md`. The underlying per-tenant Markdown files were not opened: their documented locators are provenance, not authorization to retrieve empirical content. The README's broader references do not expand this run's boundary.

The ten documented namespaces are `chicago`, `columbia`, `maryland`, `michigan`, `ucla`, `uflorida`, `unc`, `uw`, `vanderbilt`, and `washu`. These are documented partitions, not ten verified samples. Extract tenant from the prefix preceding the first colon in an entity ID; require exactly three colon-separated components: one of the ten documented tenant tokens, the matching entity token `disclosure/agreement/counterparty`, and a nonempty suffix. Preserve the suffix exactly; do not coerce it to a number or strip leading zeros. A malformed/mismatched token is a DC4 key/link fault. Never invent a university column. A governed planner must record physical table aliases, extraction

ID, snapshot date, reader permissions, codebook hashes, and any metadata-based coverage attestation under that action’s evidence directory. No design-lane access to that runtime is permitted.

DC2. Exact projection and schema locators

All locators below refer to the supplied `schema-only.md`; each section lists `<tenant>/<table>.md` for all ten namespaces. These locators distinguish documentation from access.

Physical table and grain	Requested fields, documented types	Exact locator and purpose
<code>disclosure: one disclosure</code>	<code>disclosure_id</code> string; <code>date</code> datetime64[ns]; <code>category_anzsrc</code> , <code>disclosure_type_cls</code> string	lines 113–133, ## Table: disclosure ; dates and illustrative composition only
<code>disclosure_agreement: one IP-in-deal pair</code>	<code>disclosure_id</code> , <code>agreement_id</code> , role string	lines 135–149; retrospective membership, no link timestamp
<code>agreement: one tracked agreement</code>	<code>agreement_id</code> , <code>agreement_local_id</code> , <code>type_cls</code> , <code>field_of_use_cls</code> string; <code>effective_date</code> , <code>expiration_date</code> , <code>termination_date</code> , <code>sign_date</code> datetime64[ns]	lines 9–33; identity and date sequence
<code>agreement_counterparty: one party link</code>	<code>agreement_id</code> , <code>counterparty_id</code> string	lines 35–51; complete recorded party sets; no lead-party selection
<code>counterparty: one recorded organization</code>	<code>counterparty_id</code> , <code>counterparty_local_id</code> string	lines 89–111; endpoint integrity and local-ID collision diagnostic only
<code>agreement_revenue_event: one ledger event</code>	<code>agreement_id</code> , <code>payment_type</code> string; <code>event_seq</code> , fy Int64; <code>event_date</code> datetime64[ns]; <code>amount</code> Float64 USD; <code>is_revenue</code> boolean	lines 69–87; event classification, date support and receipts

Do not retrieve names, titles, abstracts, managers, addresses, person identifiers, or external IDs. `agreement.status_cls` is not historical status and is

unused. `agreement.year` and `disclosure.year` are not substituted for dates. `agreement.total_revenue` is an unused hybrid cumulative scalar, neither a common-horizon outcome nor independent validation of the ledger. `univ_spinoff` and `organization` classes are not historical treatment assignments and are unused. The reference to sparse Chicago revenue classification in the supplied dictionary is a documentation warning only; runtime evidence must establish the actual disposition.

DC3. Frozen semantic coding, version second-chances-termination-v3

The dictionary gives macro class counts but not their enumerated values or coding-version hashes. Therefore no numerical or string value of `agreement.type_cls` is invented here. Before reading event outcomes, the runtime must bind a provider-defined, versioned codebook to this frozen predicate: **commercial license** means a class explicitly granting a party commercial use/development rights to university IP, whether exclusive or nonexclusive. Exclude classes defined as option-only, NDA, MTA, service/sponsored research, administrative amendment-only, or other/unknown. If a macro mixes qualifying and nonqualifying agreements and the allowed fields cannot separate them, classify the macro as unknown, never infer its meaning from title, payment size, or later outcome. Retain the codebook and exact mapping with hash and freeze before cohort construction. A missing dictionary is unresolved; an evidenced absence of a separable license class is a boundary. No arbitrary string/regex fallback is permitted.

For descriptive field and disclosure-kind panels, preserve source classes and a separate missing bucket; do not claim crosswalk equivalence beyond the provider's versioned definition. They never select a model. `disclosure_agreement.role` is retained for audit, but all structurally valid IP-in-deal links count regardless of role: this study describes retrospectively recorded membership. It does not identify what IP was in a contract at signature. A missing role is not missing pair membership. No inferential contrast by field, tenant, or disclosure kind is registered.

Local IDs use exact equality within a tenant; empty/NA remains unknown. No fuzzy names, parent-company inference, or cross-tenant merging. Even a disjoint set of counterparty IDs means only **different recorded parties**. A corporation can have multiple IDs and related corporations can be distinct parties. This unresolved measurement limitation always constrains claims.

DC4. Relational assertions and fault treatment

Project first. Assert `disclosure_id`, `agreement_id`, and `counterparty_id` each have one projected row per key. Collapse identical projected duplicates only and log their count; conflicting projected entity duplicates quarantine every affected key. Nonfinite/invalid dates become unknown, not imputed. Match prefixes on both sides of every pair. Cross-tenant or malformed links are invalid. Use pair sets for both link tables; repeated pairs do not create additional links. Preserve sets of `role` values for audit without multiplying rows. A missing counterpart entity or conflicting entity row prevents a definite claim involving that record; it is never a verified negative event.

Assertions: link-to-entity joins are many-to-one; distinct (`disclosure_id`, `agreement_id`) cardinality is invariant after joining agreement attributes; distinct (`agreement_id`, `counterparty_id`) cardinality is invariant after joining counterparty attributes. Reduce parties to one set plus completeness flag per agreement **before** joining disclosure histories. A disclosure may link to many agreements and an agreement to many disclosures. State both unit counts. Retain unresolved candidate links within eligible disclosure histories as unknown-event possibilities. Never silently use an inner join to turn an unresolved later agreement into absence.

Ledger events have no universally reliable unique key: `event_seq` explicitly is not unique at every school. Do not drop repeated ledger rows or aggregate on `event_seq` as a key. This design's receipt indicator is existential, so exact duplicate events do not change it; no sums of money are primary or supplementary estimands. Provider-identified corrupted transactions become unknown. No analyst-created refund pairing or cost-label inference is allowed.

DC5. Frozen cohort and clock

Dates are civil dates from documented APTO dates, not inferred timestamps. Preserve original parsing precision; normalize verified datetime fields to their calendar date without timezone shifting. Reject impossible dates, dates after a verified snapshot date, and year-only placeholders evidenced by metadata. A date's mere January 1 value is not proof of a placeholder. If no snapshot date is available after completed metadata inspection, do not manufacture one from a maximum observed date: Atom 1 labels that tenant unresolved-index and excludes it before freezing N. Outcome retention remains a separate support variable.

Atom 1 owns the first-match tenant-support decision table and global adjudication order. DC5 applies only in its frozen supported-index tenants. In particular, usable $N > 0$ may coexist with other unresolved-index tenants, which remain explicitly outside N; no bound covers their unknown populations. No data-quality percentage or discretionary corruption rule removes a tenant beyond that table.

For each disclosure, enumerate valid linked commercial agreements with known `disclosure.date <= effective_date < termination_date`. The documented `termination_date` is the early-termination field. If expiration is known, additionally require `termination_date < expiration_date`. Expiration equal to termination is not early termination; a later termination is incoherent for this target. Missing expiration is permitted and explicitly flagged. A known signature after termination is incoherent and excludes that potential index; a missing signature is flagged but allowed. Exclude invalid index endpoints, unresolved index types, and missing index/disclosure dates; tabulate all exclusions. These records are outside the explicitly dated eligible population, not presumed unlicensed or unterminated.

Select the earliest qualifying recorded termination for each disclosure, ties by lexicographic `agreement_id`; retain a simultaneous-index flag. This is the **first eligible recorded termination**, never first-ever failure. Define index agreement `a0`; retain `index_effective_date = a0.effective_date`; set `t0 = a0.termination_date`; and define old recorded party set P0. Index selection, termination origin and later event timestamp `s = a1.effective_date` are distinct. An agreement beginning on or

before t_0 cannot witness post-termination contracting. Do not exclude an otherwise eligible index because P_0 is missing: it creates unknown later-party outcomes. Eligible N is the count of distinct disclosures with a selected index. Once frozen, N and its members do not change across Atoms 2, 4 and 7. A bundle can supply several disclosures: the main estimand weights disclosed inventions equally, not contracts or dollars. Report the distinct index-agreement count as an additional scale descriptor.

Calendar anniversary `add_years(t,k)` replaces February 29 with February 28 in nonleap destination years. Main horizon $H_3 = \text{add_years}(t_0,3)$. Exploratory late horizon $H_5 = \text{add_years}(t_0,5)$. No duration-based cohort trimming, Kaplan–Meier extrapolation, or choice of a favorable common calendar period. All eligible dates in the verified snapshot are included; recent/left-truncated records remain visible. No lifetime or representative-university estimand is asserted.

DC6. New recorded party event and conservative logical bounds

For a later agreement a_1 currently linked to disclosure d , a **definite broad witness** within horizon h requires: known qualifying commercial type; $a_1 \neq a_0$; valid dates with $t_0 < a_1.\text{effective_date} \leq h$; no known expiration/termination at or before a_1 's effective date; known, nonempty and internally valid complete recorded party sets P_0 and P_1 with $P_0 \text{ intersect } P_1 = \text{empty}$. `Effective_date` is the sole broad-event clock at H_1 , H_2 , H_3 and H_5 , for cumulative indicators, witness selection and delay bins. Signature is not a broad necessary condition: both missing signatures and known signatures later than h leave broad event classification unchanged. Report fixed chronology flags: `signature_missing_or_invalid`; `signature_on_or_before_effective`; `signature_after_effective`; and known signature after each displayed anniversary (unknown when missing/invalid). The first three form a partition; anniversary flags are nonexclusive. They never select a broad witness or move its event time. Broad results do not establish execution by the horizon. DC7 separately requires a valid post- t_0 signature no later than `effective_date`. Completeness here means no broken link within the exported recorded set, not proof of all legal signatories. These rules measure chronologically later records; they do not establish corporate independence, legal continuity, exclusivity, or contemporaneous disclosure membership.

For each d and horizon h , set `lo_d=1` if any definite witness exists; otherwise 0. Select its earliest effective date (ties lexicographic agreement ID) for optional delay summaries, but preserve **all** witnesses for receipt and continuity analysis. Do not select a later agreement because it pays. Set `hi_d=0` only if `lo_d=0` AND a metadata attestation establishes historical retention and recording through h for agreements, disclosure links and party links AND the snapshot date is at/after h AND every potentially qualifying linked agreement can be decisively ruled out. A missing later-date field, unknown type, broken link, missing P_0/P_1 , unknown extraction completeness or follow-up prevents that negative conclusion whenever a qualifying event remains possible. A metadata-attested finite class of impossible records may be ruled out (e.g. a known NDA, known non-disjoint party set, or known start outside the horizon); use conjunction logic, not blanket complete-case dropping. Otherwise set `hi_d=1`. Always assert $0 \leq \text{lo_d} \leq \text{hi_d} \leq 1$.

A chronological contradiction in a later candidate, such as an end before its effective date, cannot supply a witness and is unresolved for a negative-history claim. It is not evidence that nothing happened. Only an independently known failed necessary condition, such as a noncommercial type or known shared party, can decisively rule out that candidate despite the contradiction. Likewise, do not certify absence of overlap from an internally contradictory interval in DC7; its interval support is unknown. The narrower DC5 index eligibility exclusions are reported separately and never disguised as outcome zeros.

Historical coverage can be attested only by existing governed source metadata, not by a distribution looking smooth, a last event date, or a website. Missing metadata means unknown coverage and potentially wide bounds. An access failure means no_result if the Atom cannot complete its registered inspection; it does not mean the table is empty. An uncompleted required attempt in any of the ten tenants makes Atom 1 no_result, regardless of readable subsets. Completed inspections may yield supported-index, unresolved-index, or evidenced-unsupported-index dispositions under Atom 1. Freeze the union of supported-index tenants before event computation; only this prespecified scope may receive a usable result. Atoms 2, 4 and 7 cannot shrink or expand that frozen scope. Downstream access failures give no_result; missing outcome-coverage metadata yields unknown indicators.

Marginal monotonic closure is deterministic. For sorted horizons $h_1 < \dots < h_J$, first compute raw binary intervals $[rlo_j, rhi_j]$ from the preceding predicate and all same-snapshot candidate facts. Coverage attestation through a later horizon also covers contained earlier intervals; a known candidate outside a later horizon is outside earlier ones. Set $lo_j = \max(rlo_i \text{ for } i \leq j)$ and $hi_j = \min(rhi_i \text{ for } i \geq j)$, simultaneously from the raw arrays. Assert $lo_j \leq hi_j$ for every j ; a contradiction is no_result, not a chosen endpoint. Atom 2 uses $J=3$ at H1,H2,H3. Atom 7 uses H3,H5 with frozen Atom 2 H3 as its raw H3 input, the same snapshot and already shared coverage facts; closure must preserve that H3 input, else stop for reproducibility correction. No joint identity/date optimization or iterative discretionary tightening is allowed.

Atom 7's authoritative per-disclosure late-increment OUTER interval is $\delta lo = \max(0, lo5 - hi3)$, $\delta hi = \min(1, hi5 - lo3)$, after that closure. Its optional pair mask enumerates only $\{(0,0), (0,1), (1,1)\}$ within those marginal intervals; it is marginally admissible, not fully candidate-feasible. All result regions use these exact formulas and their sums. Shared unknown party identities or dates can make this interval conservative. No additional candidate-level chronological constraint tightens the increment in this registration, even when an analyst could derive one. For example, one known early candidate with shared unresolved disjointness and complete H5 history can produce $[0,1]$ at both horizons and the registered increment $[0,1]$, although jointly resolving that candidate would yield only (0,0) or (1,1). A narrower optimization requires a separately specified registration.

Define $L_h = \sum(lo_d)/N$, $U_h = \sum(hi_d)/N$. These are conservative logical missing-information bounds for the finite eligible recorded cohort, assuming definite witnesses are correctly coded and any certified absences are valid. Shared agreements can couple missing dates or party identities across disclosures; summing marginal indicator bounds need not give jointly attainable endpoints. Do not call the aggregate

interval sharp. No joint optimization is selected after results. These are not confidence intervals. Unrecorded disclosures or undated terminations outside the cohort are not covered by these bounds. The absence of corporate lineage or link-effective dates is a separate construct limitation, not a quantity made harmless by [L,U]. No interval licenses a true relicensing or social-impact rate.

DC7. Strict recorded gap definition

For every broad witness (d,a0,a1), define the strict additional predicate. Require non-missing distinct `agreement_local_id` values for a0/a1; nonmissing signature with `t0 < sign_date <= effective_date`; a1 effective date at least 31 civil days after t0; no simultaneous qualifying index termination; and no known counterparty-local-ID collision across P0/P1. A known identical nonmissing local ID rules out strict distinctness; missing local IDs make it unknown.

Require no other commercial agreement for d overlapping any day strictly between t0 and a1.effective_date. An agreement active interval starts at effective_date and ends at min(nonmissing expiration_date, termination_date), end exclusive. If neither end is known, its upper end is unknown, not infinity known true. Classify overlap as definite if known facts force at least one overlapping day; possible if missing fields could allow overlap; absent only if all candidate intervals are ruled out and metadata attests retained histories/links across this gap. Unknown type can make an overlap possible. An earlier license with a missing end cannot prove dormancy. Use all linked agreement records, not only qualifying index records. Matching `field_of_use_cls` is a separate descriptive flag; same macro is not same contractual rights and missing macro is unknown. The strict definition deliberately concerns a clean **recorded gap**, not verified extinction and restoration of legal rights.

Strict predicate uses three-valued logic. Any definite failed requirement makes a witness non-strict. All requirements true makes it strict. Otherwise unknown. A different broad witness for the same disclosure may be strict; do not judge a disclosure only from its first broad witness. The 31-day separation is an author-set guard against immediate bookkeeping succession, not an institutional cutoff. No causal interpretation follows from passing it.

DC8. Receipt timing and classification

Use all distinct broad-witness a1 agreement IDs within three years, unioned across eligible disclosures. This agreement-level population M avoids multiplying ledger outcomes across disclosed inventions. Its origin time is the agreement's effective_date s. Endpoint is add_years(s,1). A **positive recorded receipt event** requires `is_revenue == True`, finite `amount > 0 USD`, and `s <= event_date <= add_years(s,1)`. Negative amounts remain negative ledger entries; they neither qualify nor cancel an earlier positive receipt. Thus the outcome is ever a positive classified inflow, not positive net revenue, profit, royalty income, or commercialization. Payment timing preceding effective_date is separately counted as a baseline/chronology flag, not included in this outcome.

Classification version is the frozen provider boolean-definition hash plus `second-chances-termination-v3`. Unknown `is_revenue` is never false. Do not infer revenue from `payment_type` or `total_revenue`. `fy` is retained as a missing-date diagnostic only: no fiscal calendar is supplied, so no fiscal-year or midpoint fallback is authorized. Any undated potentially positive revenue event can make the one-year outcome unknown. A fiscal-year extension would require new registration.

For each selected `a1`, receipt lower indicator is existence of a definite positive event. Upper indicator is zero only if no definite event exists, classified ledger coverage through the anniversary is certified, all potentially relevant amounts/classes/dates are resolved or decisively out of window, and the snapshot reaches the endpoint. Otherwise upper is one. Empty ledgers require explicit negative-observation support. Exact duplicated positive entries leave the existential indicator invariant; conflicting entries remain flagged. Never count the index agreement's later payments as receipts of the replacement agreement.

DC9. Estimation and reproducibility shared conventions

The estimands are finite populations of eligible APTO records and selected replacement agreements. There is no random sample of universities, randomized exposure, or identified superpopulation sampling mechanism. Report exact numerators/denominators, logical bounds, construct limitations, and scope; do not attach binomial standard errors, bootstrap p-values, or causal coefficients. Dependence from bundled inventions and shared agreements is handled by the stated estimand/unit, not a pretended independent-disclosure sampling model. No model fitting or confirmatory statistical tests are registered; multiplicity family size is zero. The three-year estimand is primary; one-year receipts, strict-gap bounds, and late-window extension are explicitly selected exploratory descriptive quantities. Report all activated branches and all horizons regardless of apparent direction. No holdout is used, and no downstream branch is promoted to confirmatory inference.

There is no justified welfare-based SESOI for this administrative outcome. The 10% rate and 5 percentage-point late increment used by Atoms are transparent author-set interpretation/attention thresholds, not economic-equivalence margins. Equality belongs to the higher region as specified. Bounds intersecting a threshold are unresolved; zero witnesses with $U > 0$ is unknown, not no transition. Logical width equals unresolved indicator share; report this design sensitivity and the number of unresolved indicators required to cross each threshold. More records do not resolve systematic recording gaps. An exact observed zero with certified support may be described only as zero in the eligible recorded cohort.

Adjudicate thresholds with integer arithmetic before formatting fractions: $L \geq 0.10$ means $10 * \text{lower_count} \geq N$; $U < 0.10$ means $10 * \text{upper_count} < N$; the 0.05 increment uses 20 in place of 10. Compute plotted decimals only after adjudication. This avoids floating-point ties changing activation. Never round an interval before applying its local region.

Each Atom's runtime output root is the current governed action's `evidence/<atom-id>/`, never this design directory. Common files: `provenance.json` (schema/code/extraction hashes, software versions, scope), `diagnostics.csv`

(check, order, numerator, denominator, status, reason), `disposition.json` (local state or operational terminal, trigger trace, no fabricated estimates), and `synthetic-checks.json` (case, expected, actual, pass). Necessary row-level derived artifacts stay under `restricted/` in that evidence root. Proposed public tables/figures stay under `release-candidate/` until disclosure review. No identifiers, free-text labels, individual transaction dates, or raw records enter World prose. Invalid arithmetic, failed synthetic assertions, and incomplete extraction produce `no_result` until governed resolution; an evidenced unsupported construct is a boundary with a cited inspection record.

DC10. Amended executable interface

The Atom protocols contain the current exact output rosters and incorporate `execution/input-interface.md` for governed metadata/field bindings. Semantic version is `second-chances-termination-v3`. Scientific amendment 2 uses native schema format version 1. The executable `t0` is always the selected index `termination_date`; `index_effective_date` and later `s` remain distinct. Boolean existence uses `unknown` for missing potentially relevant dates, never `false` merely because a value is absent. Coverage status objects are evidence bindings, not analyst declarations of empirical success. Public-candidate CSV columns are indexed in `execution/output-contract.yaml`; all physical data access remains unverified. Author code does not access runtime data.

DC11. V002 provenance, empty schemas and disclosure dependencies

The scientific rules DC1–DC9 and termination semantic version remain unchanged. V002 repairs code and presentation after independent synthetic review; it is not a new outcome-blind registration. `Execution/output` interface version 2 adds fixed restricted headers and the Atom 3 assessment column. Input binding remains version 1. The separate `executing-source` and `read-only World` roots, complete test certificate, predecessor checks and closeout policy are in `execution/README.md` and each Atom protocol.

Raw provenance hashing encodes numeric NaN, positive infinity and negative infinity as distinct tagged scalar values; it does not normalize them to zero or conflate them with a string or null. DC8 subsequently treats every nonfinite/unparseable amount as `unknown`. Equivalent memory/CSV/Parquet representations must yield equivalent indicators/states, though their raw provenance hashes can differ. Existing rows remain for duplicate/conflict auditing. Definite irrelevant facts or a definite positive witness retain their registered conjunction/existence precedence.

`continuity-reasons.csv` assessment distinguishes the first-reason combined bucket (`failed_or_unknown`, or `passes` for `strict`) from nonexclusive flag `passes/fails/unknown` and field comparisons. First reasons retain their existing totals and neutral predicate labels. Table 2 carries the separate flag counts; no possible overlap is asserted to be observed overlap.

`Output-contract.yaml` declares fixed headers for every restricted and public-candidate CSV, including empty completed scientific tables. It also

declares atom-000003 as the source-state dependency for atom-000006 receipt-bounds.csv:continuity_state and its metrics copy. Disclosure-approved assembly suppresses this direct copy whenever the source is protected. Remaining quantities still need the host’s complementary-suppression assessment. No additional sampling or estimator is introduced.

DC12. V003 fidelity repairs

Atom 1 now explicitly implements unresolved license_separability as unresolved-index even when a tentative mapping has a true value. Omitted/null support is unresolved; contradictory definitive status/mapping bindings fail operationally before any table read. All prior first-match support and frozen-scope rules remain. Its missing-identity exclusion count unifies equivalent missing representations while retaining every raw faulty row and projection hash in restricted audit.

Atom 6 now applies its existing evidenced source-contract boundary to a separate ledger fingerprint mismatch before receipt recomputation. Completed, cited evidence establishing that reproduction is impossible yields boundary; unexplained mismatch or failed inspection yields no_result. Frozen M and predecessor results are preserved. This does not convert incomplete coverage into a boundary. The input/output interfaces record citation and fingerprint provenance without emitting replacement receipt estimates. Scientific coding second-chances-termination-v3, all estimands and DC1–DC9 remain unchanged.

What follows a recorded license termination?

Among APTO disclosures with an eligible recorded early license termination in supported tenant snapshots, how often does a later commercial agreement with disjoint recorded parties have an effective date within three years after the selected index termination, how much survives a strict recorded-gap definition, and do these later agreements have positive classified receipts within one year of their effective dates?

The study is a disclosed amendment of the same noncausal longitudinal description. The operator reviewed a prior-run manuscript, while this author received no empirical results. The primary object is a sequence through a currently recorded invention–agreement network, not the effect of terminating a license. Its potential contribution is to distinguish ending one agreement from ending the disclosure’s recorded transfer history, while separating later contracting from receipts. The institutional rationale for seeking a new partner is real; neither its frequency nor its success is known in APTO.

Theory and competing accounts

Early inventions often require further development and cooperation. Jensen and Thursby’s *Proofs and Prototypes for Sale* (2001), DOI [10.1257/aer.91.1.240](https://doi.org/10.1257/aer.91.1.240), motivates inventor effort and licensing incentives (the SOURCE registration reports abstract access through OpenAlex; not newly read in this amendment). Dechenaux, Goldfarb, Shane and Thursby’s [2008 article](#) motivates uncertainty and the option value

of delaying commercialization. The SOURCE registration’s targeted reading of their [June 2006 SIEPR manuscript](#), physical page 19 (printed 18), follows a license attempt until the first event. Physical pages 27–28 (printed 26–27) explain that firms may end licenses after learning knowledge that is not protectable. Termination can therefore coexist with technology transfer without another direct contract. This is a version-specific reading, not a claim that the final journal article omits all repeat attempts. Dechenaux, Thursby and Thursby’s [2009 contract theory paper](#) distinguishes incentive and shelving problems. These mechanisms motivate competing possible patterns, not sign predictions.

An invention can remain useful after its first partner changes priorities; a different developer could obtain rights later. Alternatively, termination can reflect low value or prohibitive development costs, producing little observed subsequent contracting. A rapid new record can also be an amendment, transfer within a corporate group, or a parallel license. A later direct license may formalize an existing sublicensee’s involvement: Michigan’s current Term and Termination section describes possible direct licenses to sublicensees after termination. Thus even a disjoint-party record need not identify a newly recruited developer. Payments can reflect upfront or maintenance fees without a product sale. APTO does not observe development effort, termination reasons, bargaining costs, corporate ownership histories, products, users or welfare. No branch adjudicates those mechanisms causally.

[UW CoMotion’s Licensing FAQs](#) discuss finding another developer when a licensee stops development (diligence section; freshly checked 2026-09-05). This establishes institutional plausibility for a subsequent license. [Michigan’s License Process](#) distinguishes options from licenses and describes several forms of financial consideration. Both are current institutional descriptions, not historical policy exposure for all APTO universities. Their statements do not establish specific APTO events or a universal rule of rights reversion. The conceptual DAG in `diagrams/study-dag.dot` depicts these possible mechanisms and recording paths; it is not the activation graph.

Why there is no quasi-experiment

Termination depends on latent invention quality, partner capabilities, development progress, market demand and contracting choices. Scheduled expiration is distinct from early termination and supplies no verified random cutoff. Officer assignment is undocumented, policy exposure is absent, and no verified instrument or discontinuity separates comparable inventions. Conditioning on termination can induce selection between otherwise unrelated determinants. Conditioning again on later contracting selects a survivor population. Calendar ordering, fixed effects, a survival estimator, or clean recorded gaps would not remove these problems. A DiD/IV/RDD label is therefore not justified.

Identifying variation for the descriptive estimand is variation in dated, linked commercial agreements and recorded party sets within the eligible finite cohort. The minimal assumptions are reliable record identity and dates, valid semantic codes, correct links for a retrospective-record interpretation, and valid metadata wherever absence is certified. No observed diagnostic can prove corporate independence or contemporaneous IP scope. Selection into university disclosure, termination recording,

APTO participation, and receipt-classified partitions restricts generalization. The logical bounds address unresolved indicators within the selected cohort; they do not bound selection into that cohort or mismeasured witnesses.

Scope is determined before event computation by Atom 1's ordered tenant-support table. A supported positive-size cohort may coexist with unresolved excluded tenants; its bounds never represent those excluded populations. Incomplete outcome coverage instead stays within N as indicator uncertainty.

The primary result is a three-year effective-date logical interval, with a descriptive cumulative lower/upper envelope at one, two and three anniversaries. Strict-gap and later-window branches retain the original denominator. Receipts instead use distinct later agreements, not disclosures or duplicated payments. Neither unit produces an estimate of dollars recovered per invention. Post-termination horizons originate at index `termination_date`; later event timing uses `a1.effective_date`; a late or missing signature cannot shift the event into a later year. Execution by a horizon is unproven. The strict path additionally requires a post-termination signature no later than `effective_date`. The H5 extension uses fixed interval-only paired outer bounds after explicit marginal monotonic closure; shared unknown candidates may couple horizons, so no sharpness claim or optional tightening is permitted. There is no success/failure classification based on statistical significance.

Design appraisal

Novelty **B+**: following disclosure-linked histories beyond termination is a narrower contribution than established licensing, contract and monetization research. Closest-paper full-text coverage is incomplete; no first-ever claim is made. Feasibility **B—**: appropriate dates and relational fields are documented, but codebooks, extraction access, longitudinal retention, party completeness and classified receipt coverage remain unverified. Credibility **B+** for the explicitly finite, retrospective and noncausal question, conditional on data checks; actual legal relicensing would merit a substantially lower assessment because the necessary rights and corporate-lineage information is absent. Social impact **B+**: the distinction could inform portfolio stewardship and evaluation of terminated agreements, but no jobs, monetary recovery, diffusion or welfare effect is observed. These four judgments are independent reasoning, not an averaged score. Native numeric design ratings express intended priority only and are not evidence scores.

Amendment clock identity

Index selection is the minimum eligible `termination_date`, with exact agreement-ID tie breaking. Retain `index_effective_date` separately. Set `t0 = a0.termination_date`; define `Hh = add_years(t0,h)`; and define `s = a1.effective_date`. Require `t0 < s <= Hh` for post-termination witnesses. Broad-event timestamps, index origins and signature dates are different. The SOURCE methods caveats above are inherited literature-review evidence; fresh source access and failures are distinguished in `literature.md`. No prior execution code or empirical manuscript was accessed.

Execution, uncertainty and complete reporting

The explicit mode is adaptive, `closed_graph`. Shared operational coding is `second-chances-termination-v3`; native contract `version: 1` is a format version, not an assertion that scientific payloads never underwent pre-access revision. The seven retained Atom IDs, local regions, activations and roster are specified for this amendment before this author’s APTO access (none authorized). The project is not retrospectively outcome-blind: the operator inspected a prior-run manuscript. See `amendments/provenance.md`. Atom registration owns protocol, activation and local results. Molecule membership owns all Atoms from birth; its registration alone owns storyline and interpretation. The manifest is an index. The conceptual DAG is not a second experiment graph. The host compiler, after review/transcription, may derive reader views and the epistemic graph; this author does not write those authorities or seal/accept the package.

All Atoms are pending at birth with `atom_result: prereg`, null evidence scores and empty evidence paths. No observed results exist. Retained IDs must survive revisions. An activated Atom is mandatory unless its registered scientific boundary is evidenced or an operational failure prevents execution. Do not drop a branch because its result is disappointing.

Resolution and activation

Evaluate each Atom’s verdicts in listed order; the first satisfied region wins, then the explicit `otherwise` catch-all. Resolve scientific states only after protocol completion and supporting evidence. `otherwise` means a completed inspection did not resolve the judgment. A query failure, access denial, timeout, unresolved software error, or synthetic-check failure is `terminal == "no_result"` with no local state. Never map those to `insignificant`, a null, zero, or a data gap. Verified absent or unusable structure may support a boundary; missing documentation alone is not proof of missing data.

Activation uses strong three-valued Boolean logic. Unknown is not false and NOT unknown is unknown. `done` requires a scientific resolution, including an evidenced boundary; an operational failure does not satisfy it. Untriggered branches retain `not_activated` and the triggering trace; expressions still unknown because a predecessor failed retain `not_activated` with `blocked_by_no_result` or `unresolved_predecessor` as the reason, not negative evidence. Pending applies while evidence could still arrive. No fallback re-executes a failed Atom under a new ID. All operational-terminal combinations stop dependent work; their unresolved scope is covered by the Molecule’s residual and `no_result` restriction. Unaffected branches may finish.

At closeout the governed host records, for every roster member: Atom ID, registration version/digest, activation expression/value, predecessor-state/terminal trace, start/end time, runtime evidence locator, local state if realized, scientific classification, terminal if operationally failed, deviation IDs and disclosure status. A local

interpretation threshold is not Bolero's global `atom_result`; the reviewer maps supported scientific classifications separately. A valid negative recorded event or low finite-population rate is not an economic-equivalence claim.

Adaptive inference and deviations

There are no confirmatory statistical tests and no sampling p-values. The primary three-year finite-cohort interval is registered descriptive evidence. Its thresholds are an author-set attention rule, not a null hypothesis. Every outcome-selected successor is labeled exploratory descriptive: strict-gap refinement, receipt feasibility/realization and the five-year extension. The graph does not create a holdout or erase selection. Branches cannot be reported as independent confirmation, compared using significance labels, or pooled into a selective headline. Report the primary interval even when a selected branch is easier to interpret. Report the full registered set of local outcomes/fates; no multiplicity denominator is reduced by skipping branches.

Tenant support follows Atom 1's fixed decision table: any uncompleted required attempt is `no_result`; completed unresolved index metadata excludes a tenant before N is frozen and does not veto a positive supported cohort. Later-event coverage unknowns remain inside N. No discretionary tenant corruption threshold or post-outcome scope repair is permitted. Signature flags never alter the broad effective-date event clock. Cross-horizon increment bounds cannot be tightened using optional shared-candidate constraints.

A type/codebook binding meeting the already frozen semantic predicates is an implementation mapping, recorded before cohort outcomes. A new mixed-code interpretation, fiscal-year calendar, historical snapshot, new field, alternate cohort, revised horizon, model, threshold, causal claim, or data-dependent exclusion is not routine equivalence. It requires a timestamped versioned extension recording what evidence was already seen; it cannot be represented as original confirmatory work. No such extension is authorized in this author lane. The runtime records each deviation with registered item, trigger, timestamp, alternatives, decision, evidence already viewed and effect on claim scope.

Disclosure and reproducibility

The author writes only this package. No resource, controller, prior revision, external system, confidential data, commit, push or release is changed. Runtime analysis occurs only in the sealed governed environment. Keep necessary internal IDs and record extracts under the current action's governed `evidence/` directory. World prose and reader figures contain no direct person identifiers, free-text record descriptions, individual transaction material or private runtime paths. Public source citations and university names are acceptable when relevant; university identity alone is not a reason for anonymization.

Every proposed release table undergoes the existing governed disclosure review. As a conservative design rule, do not propose cells based on fewer than 10 disclosures or 10 agreements, as appropriate; apply complementary suppression to totals, rates, bounds and differences that would reconstruct protected cells. This threshold is an author-set

minimum, not a claim about the provider’s policy. A stricter host rule prevails. Even larger cells require a person-disclosure and transaction-disclosure assessment. Figures obey the same rules. If exact local-state labels would reveal a protected small cell, retain detailed adjudication inside governed evidence and publish only a disclosure-limited disposition; never substitute a numerical null. All hypothetical examples must be marked synthetic and use artificial entities.

Pin code/environment versions and hashes at runtime before analysis, record date parsing, deterministic sorting, table projections, codebook binding and program-to-output map. Run Atom-specific synthetic assertions before rows are analyzed; examples are algorithm checks, not projected APTO results. Common tests include row-order invariance, duplicated link invariance, bundle-unit reconciliation, false-vs-unknown logic, leap-day anniversaries, missing follow-up, and inability of receipts to multiply through joins. No confidential logs or unreviewed figures enter this package.

Funding, author affiliations, provider assistance and publication review rights have not been supplied for this study. They are unresolved disclosure items to complete before execution/publication; this document does not assert no conflicts. Provider assistance cannot override a frozen estimand or suppress an unfavorable result. This design draft has not undergone independent scientific acceptance. Structural validation is distinct from scientific feasibility and disclosure approval.

Amendment engineering and publication boundary

Prior-run awareness is disclosed in amendments/provenance.md; the author received no empirical results. Semantic coding second-chances-termination-v3 sets t0 to the selected index termination_date and retains the later effective-date timestamp separately. The complete manuscript, result-slot map, output interfaces and custom renderers are authored sources. The legacy chart catalog and render-package layout templates are disabled under paper/visualization-policy.md; the original manuscript class and compiler-owned TeX/PDF/provenance checks are retained. CSV/PDF interfaces replace old packaging names. All synthetic artifacts stay in project scratch outside the World. This draft is ready for technical review, not independently accepted or empirically validated.

V002 engineering enforcement

V002 responds to the supplied independent schema/synthetic review, with no empirical result access. Mandatory execution uses explicit World and executing-source roots, source-code/World/registration identity checks and a complete synthetic certificate. Partial or unit-only certificates are insufficient. Fixed restricted CSV headers preserve empty scientific tables. Code provenance describes the files actually executed after copying; World protocol identity is bound separately. A changed executing file invalidates the previous certificate and predecessor compatibility. Binding failures are operational no_result, never invented local states.

The presentation adapter reads Molecule membership and each Atom’s activation. A partial preview lists all seven members and labels itself partial_preview. Final close-out rejects a missing activated member, constructs only warranted inactive routes from

resolved predecessor closure, and lists all seven with exact pending/failure/boundary distinctions. A no_result predecessor leaves dependent state comparisons unknown. This enforcement derives the graph; it does not author another graph.

Direct source-state dependencies are enforced before tables, slots and clauses are assembled. Atom 3 protection also removes its copied continuity_state from Atom 6's table and metric presentation and the receipt_continuity_scope slot. Protected route traces are withheld. Separately releasable receipts can remain, subject to the same host approval and complementary suppression for their joint release. The partial/complete flags and code certificates are engineering dispositions, not empirical validation or disclosure approval.

V003 review response

The v002 independent review supplied three synthetic protocol-to-code discrepancies. V003 repairs them within the existing Atom 1 support/identity and Atom 6 source-boundary rules. Neither the current author nor these tests accessed prior empirical results. SOURCE and all prior drafts remain unchanged. Current v003 tests and review are required; inherited v002 engineering success is not acceptance of v003. The original source question, seven-Atom coverage and termination-origin correction remain. See amendments/provenance.md and engineering-audit.md for scope and actual check status.

V004 explicit engineering amendment

The supplied v003 review identifies a final-mode source-dependent slot bug. V004 implements the registered disclosure/consumer-disposition precedence, preserving true partial previews and all seven scientific identities. The user additionally authorizes two dispatch policies: activation_respecting (standalone default) and explicit direct dispatch of the first B Molecule members. The final paragraphs of every Atom protocol specify local construction, retained scientific gating and disposition provenance. Those paragraphs qualify earlier activation-only operational wording for explicit direct calls; they do not change activation strings or create a second graph. Missing selected work is not a final result, while budget-unselected members are reported honestly. Local calculations never impersonate accepted predecessors or relax composite claim conditions. Test success is engineering evidence only. See amendments/provenance.md for prior-run awareness and engineering-audit.md for current synthetic checks.

Registered interpretation rules

Restrictions take precedence over permissions; residual reporting does not invent a finding.

1. restriction

Condition: TRUE

All statements concern finite eligible retrospective APTO records, documented party IDs and classified receipts. They do not identify causal effects, legal rights reversion, corporate independence, first-ever failure, product commercialization, social value or representative-university rates. Logical intervals address unresolved indicators within the cohort, not selection into it or misclassified witnesses. Restrictions take precedence over any broader reading of primary or supplementary clauses. Termination or no later direct contract need not mean failure of technology transfer. Broad horizons and delays concern recorded effective dates; execution by that horizon is not established. One-year receipt windows also start at agreement effective dates. The strict path alone imposes its separate signature guard. In every post-termination statement `t0` is index `termination_date`, while `s` is the later agreement `effective_date`. This is a disclosed amendment informed by an operator's prior-run manuscript review, not an untouched original registration.

```
kind: restriction
condition: 'TRUE'
says: All statements concern finite eligible retrospective APTO records,
    ↪ documented
    party IDs and classified receipts. They do not identify causal effects,
    legal rights reversion, corporate independence, first-ever failure, product
    commercialization, social value or representative-university rates. Logical
    intervals address unresolved indicators within the cohort, not selection
    into it or misclassified witnesses. Restrictions take precedence over any
    broader reading of primary or supplementary clauses. Termination or no later
    direct contract need not mean failure of technology transfer. Broad horizons
    and delays concern recorded effective dates; execution by that horizon is
    not established. One-year receipt windows also start at agreement effective
    dates. The strict path alone imposes its separate signature guard. In every
    post-termination statement t0 is index termination_date, while s is the
    later agreement effective_date. This is a disclosed amendment informed by
    an operator's prior-run manuscript review, not an untouched original
    ↪ registration.
```

2. restriction

Condition: `state(atom-000001) == "usable"`

All cohort fractions and bounds apply only to the frozen supported-index tenant union. Explicitly list unresolved-index and evidenced-unsupported-index tenant scope; a usable subset does not resolve excluded populations. Outcome-coverage uncertainty is retained inside `N`, while unresolved index support is outside it.

```
kind: restriction
condition: state(atom-000001) == "usable"
says: All cohort fractions and bounds apply only to the frozen supported-index
    tenant union. Explicitly list unresolved-index and
    ↪ evidenced-unsupported-index
    tenant scope; a usable subset does not resolve excluded populations.
    ↪ Outcome-coverage
    uncertainty is retained inside N, while unresolved index support is outside
    it.
```

3. restriction

Condition: state(atom-000001) == “empty” OR state(atom-000001) == “boundary”
OR state(atom-000001) == “otherwise”

No later-agreement population-rate claim is licensed: distinguish an empty eligible snapshot population, evidenced construct boundary and unresolved cohort support. Do not translate any of them into no relicensing.

```
kind: restriction
condition: state(atom-000001) == "empty" OR state(atom-000001) == "boundary"
          OR state(atom-000001) == "otherwise"
says: 'No later-agreement population-rate claim is licensed: distinguish an
      empty eligible snapshot population, evidenced construct boundary and
      ↪ unresolved
      cohort support. Do not translate any of them into no relicensing.'
```

4. restriction

Condition: state(atom-000002) == “boundary” OR state(atom-000002) == “other-
wise”

The primary rate remains unavailable or unresolved under the registered contract. No downstream quantity can substitute for it.

```
kind: restriction
condition: state(atom-000002) == "boundary" OR state(atom-000002) ==
          ↪ "otherwise"
says: The primary rate remains unavailable or unresolved under the registered
      contract. No downstream quantity can substitute for it.
```

5. restriction

Condition: state(atom-000003) == “none_strict” OR state(atom-000003) ==
“mixed” OR state(atom-000003) == “unresolved” OR state(atom-000003) ==
“boundary” OR state(atom-000003) == “otherwise”

Broad later-party agreements cannot receive an unqualified recorded-gap storyline. Use the precise all/some/none/unknown diagnostic and, when run, Atom 4 bounds. A receipt never removes this restriction.

```
kind: restriction
condition: state(atom-000003) == "none_strict" OR state(atom-000003) ==
          ↪ "mixed"
          OR state(atom-000003) == "unresolved" OR state(atom-000003) == "boundary"
          OR state(atom-000003) == "otherwise"
says: Broad later-party agreements cannot receive an unqualified recorded-gap
      storyline. Use the precise all/some/none/unknown diagnostic and, when run,
      Atom 4 bounds. A receipt never removes this restriction.
```

6. restriction

Condition: state(atom-000005) == “boundary” OR state(atom-000005) == “other-
wise”

Financial realization is unsupported or unresolved; receipt absence cannot be inferred from this measurement limitation.

```
kind: restriction
condition: state(atom-000005) == "boundary" OR state(atom-000005) ==
  ↳ "otherwise"
says: Financial realization is unsupported or unresolved; receipt absence
  cannot be inferred from this measurement limitation.
```

7. restriction

Condition: terminal(atom-000001) == "no_result" OR terminal(atom-000002) == "no_result" OR terminal(atom-000003) == "no_result" OR terminal(atom-000004) == "no_result" OR terminal(atom-000005) == "no_result" OR terminal(atom-000006) == "no_result" OR terminal(atom-000007) == "no_result"

An operational failure leaves its own judgment and any dependent branch unresolved. Retain independently completed results only within their scopes. A failure is not a statistical null or a scientific boundary without evidence; no_result does not satisfy done.

```
kind: restriction
condition: terminal(atom-000001) == "no_result" OR terminal(atom-000002) ==
  "no_result" OR terminal(atom-000003) == "no_result" OR terminal(atom-000004)
  == "no_result" OR terminal(atom-000005) == "no_result" OR
  ↳ terminal(atom-000006)
  == "no_result" OR terminal(atom-000007) == "no_result"
says: An operational failure leaves its own judgment and any dependent branch
  unresolved. Retain independently completed results only within their scopes.
  A failure is not a statistical null or a scientific boundary without
  ↳ evidence;
  no_result does not satisfy done.
```

8. restriction

Condition: TRUE

Dispatch policy is reported separately from scientific activation. Direct dispatch may compute registered shared prerequisites locally from genuine inputs; those calculations are not accepted predecessor World Atoms. Retain all input, scope, clock, validity and conditional claim requirements. Local result slots identify their producing Atom and local evidence; they do not substitute for absent member results in composite interpretation. Primary and supplementary composite clauses involving a direct result require its registered activation to be supported by actual member evidence. Restrictions apply regardless of dispatch policy. Report budget_unselected members as unselected by budget, and explicitly bypassed attempts by their real disposition, never as never activated. Direct dispatch adds no causal or confirmatory interpretation.

```
kind: restriction
condition: 'TRUE'
says: Dispatch policy is reported separately from scientific activation.
  ↳ Direct
```

dispatch may compute registered shared prerequisites locally from genuine inputs; those calculations are not accepted predecessor World Atoms. Retain all input, scope, clock, validity and conditional claim requirements. Local result slots identify their producing Atom and local evidence; they do not substitute for absent member results in composite interpretation. Primary and supplementary composite clauses involving a direct result require its registered activation to be supported by actual member evidence.

↪ Restrictions
 apply regardless of dispatch policy. Report budget_unselected members as unselected by budget, and explicitly bypassed attempts by their real
 ↪ disposition,
 never as never activated. Direct dispatch adds no causal or confirmatory interpretation.

9. primary

Condition: state(atom-000001) == "usable"

A reproducible finite dated-record cohort is supported in the reported scope; publish its eligible/excluded composition and unknown coverage without extending to all university inventions.

kind: primary
 condition: state(atom-000001) == "usable"
 says: A reproducible finite dated-record cohort is supported in the reported scope; publish its eligible/excluded composition and unknown coverage
 ↪ without
 extending to all university inventions.

10. primary

Condition: state(atom-000002) == "material"

The three-year lower bound reaches one in ten for later agreements with disjoint recorded party sets; report the entire logical interval and all record-level claim limits.

kind: primary
 condition: state(atom-000002) == "material"
 says: The three-year lower bound reaches one in ten for later agreements with disjoint recorded party sets; report the entire logical interval and all record-level claim limits.

11. primary

Condition: state(atom-000002) == "low_with_witness" OR state(atom-000002) == "low_no_witness"

The three-year upper bound is below one in ten. Distinguish witnessed low incidence, certified recorded zero and unresolved nonwitnesses; this author-set threshold is not equivalence or policy failure.

kind: primary
 condition: state(atom-000002) == "low_with_witness" OR state(atom-000002) == "low_no_witness"
 says: The three-year upper bound is below one in ten. Distinguish witnessed low incidence, certified recorded zero and unresolved nonwitnesses; this author-set threshold is not equivalence or policy failure.

12. primary

Condition: `state(atom-000002) == "witnessed_uncertain"`

Definite later-party paths exist, but the three-year range straddles the attention threshold. Report witnessed timing with the unknown share, not a chosen endpoint.

```
kind: primary
condition: state(atom-000002) == "witnessed_uncertain"
says: Definite later-party paths exist, but the three-year range straddles
      the attention threshold. Report witnessed timing with the unknown share,
      not a chosen endpoint.
```

13. primary

Condition: `state(atom-000002) == "unresolved_no_witness"`

No definite three-year witness was established and the range permits at least one in ten; report unresolved evidence, not no second chances.

```
kind: primary
condition: state(atom-000002) == "unresolved_no_witness"
says: No definite three-year witness was established and the range permits
      at least one in ten; report unresolved evidence, not no second chances.
```

14. supplementary

Condition: `state(atom-000003) == "all_strict"`

Every witnessed disclosure has at least one strict recorded-gap path under the frozen guard. This is conditional on witnessed records and does not equate the full broad and strict bounds or establish restored legal rights.

```
kind: supplementary
condition: state(atom-000003) == "all_strict"
says: Every witnessed disclosure has at least one strict recorded-gap path
      under the frozen guard. This is conditional on witnessed records and does
      not equate the full broad and strict bounds or establish restored legal
      rights.
```

15. supplementary

Condition: `state(atom-000004) == "material_strict" OR state(atom-000004) == "below_strict" OR state(atom-000004) == "strict_uncertain"`

Compose the selected strict-gap interval with the primary broad interval on the same denominator. State whether it is above, below or unresolved relative to one in ten. It refines the construct and never replaces the primary estimand.

```
kind: supplementary
condition: state(atom-000004) == "material_strict" OR state(atom-000004) ==
      "below_strict" OR state(atom-000004) == "strict_uncertain"
says: Compose the selected strict-gap interval with the primary broad interval
      on the same denominator. State whether it is above, below or unresolved
      relative to one in ten. It refines the construct and never replaces the
      primary estimand.
```

16. supplementary

Condition: `state(atom-000005) == "full_support" OR state(atom-000005) == "partial_support"`

Receipt support is full or partial for the fixed distinct-agreement population. This is a measurement statement, not a financial outcome; partial support requires bounds retaining all agreements.

```
kind: supplementary
condition: state(atom-000005) == "full_support" OR state(atom-000005) ==
  ↳ "partial_support"
says: Receipt support is full or partial for the fixed distinct-agreement
  population. This is a measurement statement, not a financial outcome;
  ↳ partial
  support requires bounds retaining all agreements.
```

17. supplementary

Condition: `state(atom-000006) == "receipts_witnessed"`

Some selected later agreements have positive classified one-year receipts. Report their agreement-level logical interval and earliest-known timing, constrained by continuity scope. Receipts can be fees and are not net profit, sales or rescue effects.

```
kind: supplementary
condition: state(atom-000006) == "receipts_witnessed"
says: Some selected later agreements have positive classified one-year
  ↳ receipts.
  Report their agreement-level logical interval and earliest-known timing,
  constrained by continuity scope. Receipts can be fees and are not net
  ↳ profit,
  sales or rescue effects.
```

18. supplementary

Condition: `state(atom-000006) == "recorded_zero"`

The selected recorded ledgers support zero positive classified receipts during the defined first year; this does not imply no lifetime revenue, development or unrecorded financial transfer.

```
kind: supplementary
condition: state(atom-000006) == "recorded_zero"
says: The selected recorded ledgers support zero positive classified receipts
  during the defined first year; this does not imply no lifetime revenue,
  development or unrecorded financial transfer.
```

19. supplementary

Condition: `state(atom-000006) == "receipts_unresolved"`

No definite receipt was established but receipts remain possible; compose this uncertainty with later-agreement evidence without asserting a financial failure.

```

kind: supplementary
condition: state(atom-000006) == "receipts_unresolved"
says: No definite receipt was established but receipts remain possible;
  ↪ compose
    this uncertainty with later-agreement evidence without asserting a financial
    failure.

```

20. supplementary

Condition: state(atom-000007) == "delayed_material" OR state(atom-000007) == "delayed_below" OR state(atom-000007) == "delayed_unresolved"

Report the selected same-cohort five-year effective-date interval and fixed paired outer-bound increment as exploratory descriptive evidence, preserving the primary three-year conclusion. Adjudicate only DC6/Atom 7 interval formulas; shared unresolved candidates may make the outer range conservative. Late signatures do not constitute late events, and an unknown early history prevents proof of late first transition. The five-point threshold is not economic equivalence.

```

kind: supplementary
condition: state(atom-000007) == "delayed_material" OR state(atom-000007)
  == "delayed_below" OR state(atom-000007) == "delayed_unresolved"
says: Report the selected same-cohort five-year effective-date interval and
  fixed paired outer-bound increment as exploratory descriptive evidence,
  preserving the primary three-year conclusion. Adjudicate only DC6/Atom 7
  interval formulas; shared unresolved candidates may make the outer range
  conservative. Late signatures do not constitute late events, and an unknown
  early history prevents proof of late first transition. The five-point
  ↪ threshold
  is not economic equivalence.

```

21. residual

Condition: TRUE

After restrictions and compatible specific claims, list every Atom still pending, not_activated, budget_unselected, no_result, otherwise or in a scientific boundary, including trigger traces and disclosure-limited states. Explain any unclassified scope without inventing a finding. All substantive Atoms are pending at registration; no combination here is a prediction of realized results. Final paper closeout must account for every roster member; partial previews are explicitly labeled and cannot certify completion. Direct source-state copies inherit disclosure restrictions, including Atom 3 continuity copied into Atom 6.

```

kind: residual
condition: 'TRUE'
says: After restrictions and compatible specific claims, list every Atom still
  pending, not_activated, budget_unselected, no_result, otherwise or in a
  scientific boundary, including trigger traces and disclosure-limited states.
  Explain any unclassified scope without inventing a finding. All substantive
  Atoms are pending at registration; no combination here is a prediction of
  realized results. Final paper closeout must account for every roster member;
  partial previews are explicitly labeled and cannot certify completion.
  ↪ Direct

```

source-state copies inherit disclosure restrictions, including Atom 3
↪ continuity
copied into Atom 6.

Preregistered epistemic graph

Each Atom is an interpretable question or diagnostic judgment. Local result states determine registered activation.

atom-000001

Can APTO support a reproducible finite cohort of disclosures with a dated recorded early license termination?

Activation: **TRUE**

- **usable**: All ten tenant inspections are complete under the decision table below, no required access/read attempt is operationally incomplete, and $N > 0$ in the union of supported-index tenants. Other tenants may be evidenced-unsupported-index or unresolved-index; they are explicitly outside frozen N . — A finite dated-record cohort is reproducible in the frozen supported-index scope. Report excluded and unresolved tenant scope separately; this result does not resolve their populations or establish complete termination histories.
- **empty**: All inspections complete; $N = 0$; at least one tenant is supported-index; and no tenant is unresolved-index. Remaining tenants, if any, are evidenced-unsupported-index. — The supported-index snapshot has no eligible dated record. This is an empty target within supported scope; excluded tenants remain a boundary, and no later-agreement rate or real-world absence follows.
- **boundary**: All inspections complete and every one of the ten tenants is evidenced-unsupported-index because an indispensable index structure or separable commercial-license class is demonstrably absent or semantically incompatible. — The registered termination-cohort construct cannot be evaluated in this evidenced scope. No later-agreement rate is licensed.
- **otherwise**: otherwise — Completed evidence leaves this judgment unresolved. Report the unresolved scope; no negative or equivalent-effect claim is licensed.

atom-000002

What fraction of eligible disclosures has a documented commercial agreement with disjoint recorded parties within three years of its index termination?

Activation: `state(atom-000001) == "usable"`

- **boundary**: Reproduction proves the frozen cohort or essential event fields no longer meet the registered schema/identity contract; this is an evidenced source-contract change, not a transient query error. — The primary estimand cannot be adjudicated under the frozen input contract; report source mismatch, not a zero.
- **material**: $N > 0$, computation/assertions complete and $L3 \geq 0.10$ (including equality). — At least one in ten eligible recorded disclosures has a qualifying later-party

record within three years, under the recorded-ID definition; report [L3,U3] and no causal claim.

- **low_with_witness:** $N > 0$, computation/assertions complete, $U3 < 0.10$ and $W3 > 0$. — The full logical range is below the author-set one-in-ten attention threshold within this cohort. This is not an equivalence or welfare-null result. Definite witnesses permit the registered continuity and receipt follow-ups.
- **low_no_witness:** $N > 0$, computation/assertions complete, $U3 < 0.10$ and $W3 = 0$. — The full logical range is below the author-set one-in-ten attention threshold within this cohort. This is not an equivalence or welfare-null result. No definite witness is established; distinguish certified $U3 = 0$ from unresolved $U3 > 0$.
- **witnessed_uncertain:** $N > 0$, $L3 < 0.10 \leq U3$ and the count of three-year definite witnesses $W3 > 0$. — Later-party records exist, but incomplete information prevents classification relative to the attention threshold.
- **unresolved_no_witness:** $N > 0$, $L3 = 0$ and $U3 \geq 0.10$. — No definite later-party record has been established; the supported range still allows a material share. This is unresolved evidence, not absence.
- **otherwise:** otherwise — Completed evidence leaves this judgment unresolved. Report the unresolved scope; no negative or equivalent-effect claim is licensed.

atom-000003

Do the witnessed later-party sequences contain a clean recorded gap, or are they compatible with overlapping licenses and administrative succession?

Activation: `(state(atom-000002) == "material" OR state(atom-000002) == "low_with_witness" OR state(atom-000002) == "witnessed_uncertain")`

- **boundary:** The completed inspection proves indispensable history/identity fields changed or became unavailable relative to the registered input contract. — Continuity cannot be judged; the primary broad interval remains a recorded-sequence result only.
- **all_strict:** $W3 > 0$, all computations complete, and every witnessed disclosure has at least one definite DC7 strict witness ($S = W3$). — All witnessed disclosure sequences have at least one strict recorded-gap path. This does not prove legal relicensing or corporate independence.
- **none_strict:** $W3 > 0$, $S = 0$ and unknown-strict disclosure count $V = 0$. — Every observed broad-witness disclosure fails the strict path definition. Broad later agreements cannot be portrayed as clean recorded re-entry.
- **mixed:** $W3 > 0$, $0 < S < W3$ and $V = 0$. — Some witnessed disclosures have strict paths and some do not. A single unqualified gap/re-entry storyline is unsupported.
- **unresolved:** $W3 > 0$, $S = 0$. — Incomplete interval or identity evidence prevents classifying at least one witnessed disclosure; known strict paths may coexist with this limitation.
- **otherwise:** otherwise — Completed evidence leaves this judgment unresolved. Report the unresolved scope; no negative or equivalent-effect claim is licensed.

atom-000004

How frequent is strict recorded re-entry within three years in the original cohort, once the continuity diagnostic shows ambiguity or non-strict paths?

Activation: `(state(atom-000003) == "none_strict" OR state(atom-000003) == "mixed" OR state(atom-000003) == "unresolved")`

- **boundary:** Completed inspection proves the frozen denominator or essential fields cannot be reproduced under the original contract. — No stricter rate can be supplied; retain the primary broad estimate and the evidenced limitation.
- **material_strict:** $N > 0$, all computations complete, and $Ls \geq 0.10$. — At least one in ten eligible recorded disclosures has a strict recorded-gap path; this selected descriptive result does not identify rescue or restoration of rights.
- **below_strict:** $N > 0$, all computations complete, and $Us < 0.10$. — Strict recorded-gap paths have a logical upper bound below one in ten. The broad sequence result and this narrower definition may convey different portfolio histories.
- **strict_uncertain:** $N > 0$, all computations complete, and $Ls < 0.10 \leq Us$. — The stricter three-year fraction straddles the attention threshold after preserving unresolved paths.
- **otherwise:** otherwise — Completed evidence leaves this judgment unresolved. Report the unresolved scope; no negative or equivalent-effect claim is licensed.

atom-000005

Can one-year positive classified receipt outcomes be adjudicated for the distinct witnessed later agreements?

Activation: `(state(atom-000002) == "material" OR state(atom-000002) == "low_with_witness" OR state(atom-000002) == "witnessed_uncertain")`

- **full_support:** $M > 0$, complete inspection performed, and all M selected agreements have decidable DC8 one-year receipt indicators ($K=M$). — The registered binary receipt status is observable for every selected agreement, conditional on the recorded classification definition; no commercialization claim follows.
- **partial_support:** $M > 0$, complete inspection performed, and $0 < K < M$. — Some selected receipt indicators are decidable and others remain unknown; full-population logical bounds are required.
- **boundary:** $M > 0$, $K=0$, and completed inspection proves every selected agreement lacks required ledger structure or classified/date support and no certified zero is available. — One-year receipt realization cannot be measured in the selected agreement population under this contract; this is not zero receipts.
- **otherwise:** otherwise — Completed evidence leaves this judgment unresolved. Report the unresolved scope; no negative or equivalent-effect claim is licensed.

atom-000006

Among distinct witnessed later agreements, what fraction has a positive classified receipt within one year of its effective date?

Activation: `(state(atom-000005) == "full_support" OR state(atom-000005) == "partial_support") AND done(atom-000003)`

- **boundary:** Completed reproduction proves the frozen M or required ledger contract differs from the registered input, so DC8 indicators cannot be reproduced. — Receipt realization is not available under the registered contract; no replacement-cohort financial rate is licensed.
- **receipts_witnessed:** $M > 0$, all computations complete and receipt lower bound $L_r > 0$. — At least one selected agreement has a positive classified receipt within one year. Report $[L_r, U_r]$; the selected financial sequence is not commercialization or a causal return.
- **recorded_zero:** $M > 0$, all computations complete and $U_r = 0$. — No positive classified one-year receipt occurred in the certified recorded ledgers for this selected agreement population. This is neither no lifetime revenue nor no product development.
- **receipts_unresolved:** $M > 0$, all computations complete, $L_r = 0$ and $U_r > 0$. — No definite one-year receipt is established, but missing information permits receipts. Absence is unresolved.
- **otherwise:** otherwise — Completed evidence leaves this judgment unresolved. Report the unresolved scope; no negative or equivalent-effect claim is licensed.

atom-000007

When the three-year range is low or unresolved, does extending the same histories to five years reveal additional later-party agreements?

Activation: `(state(atom-000002) == "low_with_witness" OR state(atom-000002) == "low_no_witness" OR state(atom-000002) == "witnessed_uncertain" OR state(atom-000002) == "unresolved_no_witness")`

- **boundary:** Completed inspection proves frozen N or the required five-year event contract cannot be reproduced, rather than merely having incomplete follow-up. — No extension result can be adjudicated under this contract. Recent right censoring by itself is uncertainty, not a boundary.
- **delayed_material:** $N > 0$, computations complete, and paired increment lower bound $L_{\Delta} \geq 0.05$, including equality. — At least five additional percentage points of the same eligible cohort have their first qualifying recorded effective-date event after H3 and by H5 under the registered outer bound. This selected descriptive claim concerns effective timing, not signature, legal execution or technology use.
- **delayed_below:** $N > 0$, computations complete and paired increment upper bound $U_{\Delta} < 0.05$. — The logical increment is below five percentage points through year five in this cohort. This is not evidence of no eventual transition or an economic null.
- **delayed_unresolved:** $N > 0$, computations complete and $L_{\Delta} < 0.05 \leq U_{\Delta}$. — The additional five-year information cannot classify the delayed-transition share relative to the author-set increment threshold.
- **otherwise:** otherwise — Completed evidence leaves this judgment unresolved. Report the unresolved scope; no negative or equivalent-effect claim is licensed.

Final technical review

- Verdict: accept

V005 corrects the realization-unsafe World identity found after V004 review without changing the seven registered experiments or Molecule. Independent synthetic testing against a copied action source and separate World confirms that a native-shaped Atom realization and Molecule current-interpretation update change the informational full-file snapshot but preserve the immutable provenance identity, predecessor validity, and version-3 certificate. Protocol, membership, policy, permanent mode, shared input contract, manifest science, code, record, certificate, and realized-canonical-state corruption all fail closed. All 107 package tests, all five certificate groups, 104 standard and 16 amendment render checks, and both ordinary and direct certified copied-CLI paths pass independently. The seven Atom files and Molecule file are byte-exact to accepted V004. No blocking defect remains; this is synthetic engineering evidence, not empirical feasibility or a scientific result.

Checks

- data_feasibility: pass
- identification: pass
- pseudocode_specificity: pass
- epistemic_graph: pass
- interpretation: pass
- literature_and_novelty: pass
- standards_and_governance: pass

Issues

Independent checks

```
reviewer: independent_techbridge_provenance_audit
review_date_local: '2026-09-06'
timezone: America/Chicago
scope: Read and tested schema, documentation, registered source, synthetic
↳ fixtures, and the
   canonical native runtime contract only. No APT0 rows, empirical summaries,
   ↳ governed execution
   outputs, or publication results were read. Writes were confined to this
   ↳ review and
   ↳ .prereg-inputs/techbridge-frontier-20260905/provenance-audit/.
source_identity:
  code_hash: 64418896a380739aee359435506b190a44cdb43f8e55ec1e7cdbfc75b01c224c
  world_hash: a604b3e7bde29afc9d30eaa0239a8e65d4fd869369703a284490b9dfa7f9e991
  provenance_py_sha256:
    ↳ 7cfe488c51a2121f7d14222531cc2e138b346fb09c67d0836344e10d5c3972f2
  test_provenance_py_sha256:
    ↳ b14efa156be9b6d2b1fc4233c2420a596c3c8c7e7d65f1ac3c39892d10179237
  input_interface_sha256:
    ↳ c4b6620c0280a162b3daa3e1f5c390ef9b465daa96d5e2e4e6ce50f2be60e461
  stable_after_tests: true
registration_preservation:
  atom_files_compared: 7
```

```

atom_full_bytes_equal_v004: true
molecule_full_bytes_equal_v004: true
scientific_change: none
lifecycle_counterexample:
  command: /home/shaoerzhuo/anaconda3/envs/bolero/bin/python
    ↪ .prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-review/
    ↪ w/independent_v005.py
  exit_code: 0
  report: .prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-review/
    ↪ independent-report.json
  checks: 26
  result: passed
  immutable_identity_preserved_across_realization: true
  informational_snapshot_changed: true
  version_3_certificate_survived_realization: true
  predecessor_survived_realization: true
  native_live_bundle_validation: passed
  registration_marker_preserved: true
  corruptions_rejected:
    - atom registration
    - Molecule membership
    - Molecule registration policy
    - permanent molecule_mode
    - shared input interface
    - scientific manifest metadata
    - missing shared material
    - saved result versus realized canonical state
    - operational record versus realized canonical state
    - realized Atom without registered state
    - prereg Atom with realized state
    - unknown canonical local state
    - predecessor record digest
    - certificate version
    - executing code
  derived_manifest_seals_allowed: true
complete_copied_layout_suite:
  command: PYTHONDONTWRITEBYTECODE=1 MPLCONFIGDIR=.prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-review/mplconfig-base
    ↪ /home/shaoerzhuo/anaconda3/bin/python
    ↪ .prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-review/
    ↪ case-pzfs0i30/action/src/execution/test_synthetic.py
  --world .prereg-inputs/techbridge-frontier-engineered-20260905/design/v005/
    ↪ world
    ↪ --source-root
    ↪ .prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-review/
    ↪ case-pzfs0i30/action/src
  --style-dir .prereg-inputs/techbridge-frontier-20260905/runtime-style
    ↪ --output-root .prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-review/full-suite-base
  exit_code: 0
  report: .prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-review/
    ↪ full-suite-base/report.json
  certificate_version: 3
  status: passed
  tests_run: 107
  failures: 0
  errors: 0
  certificate_groups:
    unit_semantics: passed
    file_formats: passed

```

```

copied_cli: passed
runtime_figures: passed
amendment_routes: passed
standard_synthetic_renderers: 104
amendment_synthetic_renderers: 16
certified_cli_smoke: passed
ordinary_atoms_done: 7
direct_atoms_done_without_predecessors: 7
direct_missing_input: no_result
stale_incomplete_and_changed_code_certificates_rejected: true
preserved_environment_mismatch:
command_interpreter: /home/shaoerzhuo/anaconda3/envs/bolero/bin/python
result: 'Incomplete attempt: all 107 unit tests passed with zero
↳ failures/errors, then integration
  stopped because that interpreter lacks pandas. It is not treated as a
  ↳ complete certificate;
  the rich-interpreter rerun above is the complete independent result.'
report: .prereg-inputs/techbridge-frontier-20260905/provenance-audit/v005-r
↳ eview/full-suite/report.json
package_validation:
native_birth_read: passed
validation_errors: []
require_paper: true
operational_nuance: The V004 defect was a genuine package/runtime contract
↳ failure, although
  the configured direct all-Atom single wave was not guaranteed to trigger it
  ↳ in initial D3
  execution because World integration follows wave completion. V005 now
  ↳ supports both pre-realization
  same-wave evidence and post-realization verification without weakening
  ↳ immutable science
  or accepting disagreement with canonical realized state.

```

Execution supplement

Executable reference package, V005

V005 fixes realization-safe provenance only. `world_hash` now binds immutable Atom registrations, Molecule membership/policy, shared material and scientific manifest metadata. It excludes mutable evidence/current interpretation and derived packaging seals/status. `world_snapshot_hash` and the recorded full file roster remain informational audit snapshots. A valid realized World must retain its immutable identity; altered scientific protocols or code remain rejected. Complete synthetic certificates now require version 3. See `docs/amendments/provenance-v005.md`; the V004 analysis and dispatch behavior described below is unchanged.

All seven retained Atoms have implemented empirical modules, exact input and output contracts, and artificial semantic tests. Scientific coding remains second-chances-termination-v3. This revision repairs final source-dependent slot disposition and adds explicit direct dispatch; it changes no clock, estimator, scientific threshold, Atom identity or graph edge. Actual APTO availability, dictionaries and coverage remain governed planner bindings.

Deployment and complete tests

The immutable World and executing code are separate. Copy docs/execution/.py to ACTION/src/execution/ and docs/paper/figures/.py to ACTION/src/paper/figures/. Supply `--world` pointing to the read-only World and `--source-root` pointing to ACTION/src. Never copy confidential data into the design workspace. Python 3.11-compatible sources need pandas/PyYAML; Parquet needs pyarrow; synthetic figures also need Matplotlib, PyMuPDF and the supplied font/PDF validator resources. All tests use artificial data, persisted files and copied sources.

```
PYTHONDONTWRITEBYTECODE=1 python /action/src/execution/test_synthetic.py
↪ --world /workspace/world_model --source-root /action/src --style-dir
↪ /workspace/style --output-root /action/synthetic-checks/full
```

The full suite includes all prior semantic, CSV/Parquet, saved-header, copied-CLI and 104 figure export cases, plus V004 slot/direct/budget counterexamples and affected route figures. Both 130.7 mm and 180 mm exports use the supplied Helvetica Neue fonts and `validate_exports`. `--unit-only` is diagnostic and cannot authorize input access. The production CLI requires a complete current source/World-bound `report.json`; it rejects stale sources, incomplete certificates and corrupted predecessor payloads before table access. Test proof is not empirical feasibility or disclosure approval. Output directories must be new and outside both roots.

Per-Atom reference index

For these exact commands bind `TECH_WORLD` to the read-only World, `TECH_SRC` to the copied source root, `TECH_BINDINGS` to the `input-interface.md` JSON, `TECH_PROOF` to the complete `report.json` and `TECH_EVIDENCE` to the writable action evidence root. Append repeatable `--prior` PATH for the actual predecessors named in the `inputs` column. Each command defaults to `activation_respecting`. Append `--dispatch-policy direct` explicitly when selected under the declared `direct` policy; absent predecessor constructions then follow the rules below. The callables are for implementation reuse/artificial tests; governed execution uses the certificate-gated CLI. No wrapper replaces an unimplemented analysis.

Atom	Runnable command	Callable and actual source	Required scientific inputs	release- candidate CSVs	Atom- specific restricted CSVs	Synthetic checks
atom-000003	python run_atom.run("atom-000003",continuity-plat.csv, "\$TECH_SRC/evaluation/atoms.py",continuity-reasoning-basis-closures.csv --world prior, cohort "\$TECH_WORLD"ld=...,and broad --source-root #nenses "\$TECH_SRC"dispatch_p(d,by=...) --atom → atom-000003analysis.py:atom3 --inputs using "\$TECH_BINDINGS"Records --test-proof "\$TECH_PROOF" --output "\$TECH_EVIDENCE/atom-000003"					Semantics Atom 3 semantic cases and Amendment.test_all_seven_direct
atom-000004	python run_atom.run("atom-000004",bounds-csv,indicators.csv, "\$TECH_SRC/evaluation/atoms.py" strict-path-csv --world prior, cohort, "\$TECH_WORLD"ld=...,broad --source-root indicators "\$TECH_SRC"dispatch_policy=...) --atom → continuity atom-000004analysis.py:atom4 --inputs using "\$TECH_BINDINGS"Records --test-proof "\$TECH_PROOF" --output "\$TECH_EVIDENCE/atom-000004"					Semantics Atom 4 semantic cases and Amendment.test_all_seven_direct

Atom	Runnable command	Callable and actual source	Required scientific inputs	release- candidate CSVs	Atom- specific restricted CSVs	Synthetic checks
atom-000005	python "\$TECH_SRC/vendor/ --world prior, "\$TECH_WORLD="ld=... --source-root "\$TECH_SRCDispatch_ --atom → atom-000005analysis. --inputs using "\$TECH_BINDINGS' --test-proof "\$TECH_PROOF" --output "\$TECH_EVIDENCE/atom-	run_atom.py (atom-000005t, supportcs, Fullstitesv, reception/atom-receipt-support-evidence.csv, including receipt-on-Semantics.csv ledger; Atom 5 cohort, semantic policyread.) witnesses Amendment.test_all_seven_direct_wit py; atom5 DINGS' Records proof PROOF" output EVIDENCE/atom-000005"				
atom-000006	python "\$TECH_SRC/vendor/ --world prior, cohort, "\$TECH_WORLD="ld=... --source-root "\$TECH_SRCDispatch_ --atom → atom-000006analysis. --inputs using "\$TECH_BINDINGS' --test-proof "\$TECH_PROOF" --output "\$TECH_EVIDENCE/atom-	run_atom.py (atom-000006t, bounds.cs, vindicators.csv, reception/atom-pywn-receipt-evidence.csv, Semantics Atom 6 witnesses, semantic policycity.) and Amendment.test_all_seven_direct_wit py; atom6 ds 2, 3, 5) proof PROOF" output EVIDENCE/atom-000006"				

	Runnable command	Callable and actual source	Required scientific inputs	release- candidate CSVs	Atom- specific restricted CSVs	Synthetic checks
Atom						
atom-000007	python "\$TECH_SRC/activation/run_atom.py" --world prior, projec- "\$TECH_WORLD=...tions; --source-root cohort, "\$TECH_SRC/dispatch_policy=...) --atom → frozen H3 atom-000007/analysis.py/data/atoms --inputs using (1, 2) "\$TECH_BINDINGS/records --test-proof "\$TECH_PROOF" --output "\$TECH_EVIDENCE/atom-000007"	run_atom.py activation/run_atom.py prior, projec- "\$TECH_WORLD=...tions; source-root cohort, dispatch_policy=...) → frozen H3 analysis.py/data/atoms using (1, 2) bindings/records test-proof PROOF" output EVIDENCE/atom-000007"	five (atom-000007, undiscovered, indicators.csv below; Semantics Atom 7 semantic cases and Amendment.test_all_seven_direct			

Every completed Atom additionally writes restricted/field-missingness.csv, source-metadata.csv and result.json; metrics.json accompanies numerical candidate tables. Every attempt writes disposition.json, provenance.json, diagnostics.csv and synthetic-checks.json. Direct local reuse additionally writes restricted/local-construction.json and local_evidence metadata. Fixed columns are output-contract.yaml; exact fields and semantics are input-interface.md and data-contract.md DC1–DC9. Atoms 1–4/7 do not read ledger data. Atoms 5–6 require source classification, date and coverage bindings and a separate ledger fingerprint. No result emits invented numerical tables.

The source tree shares core.py (projections, cohort, dates, strict and receipt predicates), analysis.py (actual seven modules), dispatch.py (local prerequisite reuse), routing.py (reads Atom/Molecule Boolean conditions), run_atom.py (input/output adapter), provenance.py (code/World/certificate/payload binding), and result_slots.py (disclosure-aware presentation). fixtures.py and test_synthetic.py/test_amendment.py/integration_checks.py/figure_checks.py/amendment_checks.py are artificial-data checks. All required production metadata stays unresolved until the governed planner verifies it: actual mappings, snapshot/retention evidence, aliases, access, release dispositions and any completed source-change citation. No supplied schema proves these facts.

Two registered dispatch policies

activation_respecting is the default. –closeout records a warranted inactive/unresolved activation with its trace; without it an unresolved predecessor remains pending. Supply scientific predecessors from restricted/result.json and other dispositions from disposition.json. Their hashes and frozen inputs must match.

direct is explicit and bypasses only the outer scheduling wait. The runtime selects the first B members in Molecule membership order, recording B before execution, then invokes the same command for each with `-dispatch-policy direct`. No activation wait means each selected Atom can be attempted even without predecessor records. `dispatch.local_inputs` executes the actual shared registered constructions from genuine bound inputs and stores them as local evidence. It neither adds World Atoms nor pretends local calculations are accepted predecessors. Existing required `no_result` predecessors cannot be retried silently; unavailable inputs remain `no_result`. Existing `source/cohort/ledger` freezes remain binding. Local-only runs freeze the same deterministic cohort construction within the producing Atom and cite that local freeze, never an accepted Atom 1.

Scientific branch conditions still apply: the registered expression is checked using supplied or explicitly local evidence before a numerical claim. Atom 4 with all `_strict` continuity, Atom 7 with a material primary judgment, or Atom 6 without supported receipt indicators cannot produce the mutually exclusive selected claim; a completed such attempt is otherwise with a scope explanation and no rate. An evidenced existing boundary retains its exact registered meaning. There is no new null, fallback estimand, or relaxed validity check.

Manuscript closeout

```
from result_slots import assemble
# Default policy: activation-respecting completed graph.
slots = assemble(world, results, release_approved=True, final=True)
# Explicit direct run, selecting the first B registered members.
slots = assemble(world, results, release_approved=True, final=True,
                 dispatch_policy='direct', budget=B)
```

Direct closeout requires an explicit direct attempt for every selected member and reports every other member `budget_unselected`. It retains `activation_bypassed` provenance and never calls those results never activated. `final=False` is a real partial preview; it does not certify completion. Local continuity is presented as `local_construction`, not a claimed predecessor result. Composite positive Molecule clauses still need actual member evidence satisfying the relevant activation; no local calculation fills an absent World member. Restrictions apply in either policy.

Source-dependent slots apply disclosure protection first, then the consumer's terminal/completed boundary/otherwise disposition, before any missing-source logic. Only incomplete previews may be pending. Inactive final receipt paths retain `not_activated` and budget exclusions retain `budget_unselected`. Protected Atom 3 suppresses actual and local continuity copies in Atom 6, direct source slots, protected clauses and route details. Separate receipt release remains subject to complementary suppression. The author does not fill any empirical manuscript slot.

Legacy chart catalog and render-package layouts remain disabled. The seven figure sources implement independent reviewed geometry and consume only registered plot-ready quantities. The runtime table-authorization and PDF export helpers remain; the manuscript `sn-jnl` class and prepared template assets are preserved. Final

manuscript/registration compilation, scientific acceptance and sealing belong to the repository compiler/reviewer, not this reference runner.

V004 direct closeout cross-checks independently bound source/cohort fingerprints and local-versus-actual applicable ledger freezes. An independent synthetic counterexample found that separately successful direct calls could otherwise be composed across different snapshots; the assembly now rejects that mismatch. No estimate is recomputed or predecessor refreshed by this check. The dedicated snapshot and local-ledger counterexamples are part of the full final suite.

Governed input binding, interface 1

The entry point takes a JSON object with `interface_version: 1`, `tenants`, and `table_files`. Paths are supplied by the governed planner; none are guessed here. CSV/Parquet files must contain the exact projected fields in DC2, with no title, person-name, address, abstract or other extraneous columns retrieved. `load_bundle` supplies `usecols/columns` to the reader. Uppercase boundary names map to physical lowercase table names; the only allowed input names are `disclosure`, `disclosure_agreement`, `agreement`, `agreement_counterparty`, `counterparty`, `agreement_revenue_event`. These are the six-table subset of the fourteen-table allowlist. No secondary dataset is requested.

`table_files` maps tenant tokens to table-name/path objects. The internal pure-function API uses `tables[tenant][table] = {columns: [...], rows: [projected row objects]}` instead of file paths. This is the interface used by synthetic tests. Missingness is JSON null, an empty CSV field, or a genuine dataframe missing value; string IDs and local IDs preserve case, spaces and leading zeros. The input adapter accepts true/false Boolean strings for CSV revenue classification only; it never treats an arbitrary nonempty string, 1, or missing classification as true. Integer `event_seq` and `fy` are retained for diagnostics, never treated as unique keys or imputed dates. Nominal amount is a finite number in documented USD; nonfinite/unparseable amounts become unknown. Empty files must still carry their projected column headers. A present but unreadable or omitted table is operational failure, not an empty table.

`tenants` contains exactly `chicago`, `columbia`, `maryland`, `michigan`, `ucla`, `uflorida`, `unc`, `uw`, `vanderbilt`, `washu`, even if some prove unsupported. Each tenant metadata object has these fields:

Field	Meaning and allowed values
<code>inspection_complete</code> , <code>inspection_evidence</code>	Boolean completion and a nonempty governed inspection locator. Incomplete or uncited required inspection stops Atom 1 as <code>no_result</code> .
<code>access_failure</code>	Optional true only for an operationally incomplete necessary attempt.

Field	Meaning and allowed values
<code>tables</code>	Per-table present , absent , unresolved , or access_failure , backed by the inspection record.
<code>fields</code>	Per-table/per-field same statuses, recording each projected field's disposition. Missing entries are unresolved. Declared-present columns absent from supplied projections are operational errors.
<code>semantics</code>	grain , identity , civil_dates each supported , incompatible , or unresolved ; these concern the indispensable index structures. Individual cast failures do not change tenant structural support.
<code>snapshot_id</code> , <code>snapshot_date</code>	Verified immutable extraction identity and ISO civil-date cutoff. Never a maximum observed date.
<code>license_separability</code>	present , absent , or unresolved from a definitive class dictionary. Absent is an evidenced structural boundary; unresolved remains unknown.
<code>license_codes</code>	Exact versioned source class to JSON true (qualifying), false (definitely nonqualifying), or null (mixed/unknown), using DC3's frozen semantic rule. No production codes are supplied by this draft.
<code>codebook_version</code> , <code>codebook_hash</code>	Nonempty identity/hash of the provider dictionary and frozen mapping. Missing support yields unresolved index scope.
<code>year_only_fields</code>	Optional per-table list of fields documented to contain year-only placeholders throughout the supplied projection; those fields are not valid dates. Mixed precision needs a documented mechanical adapter that masks only provider-evidenced placeholders before the projection, with its provenance. No January 1 heuristic.

Field	Meaning and allowed values
<code>revenue_boolean_version</code>	Verified provider Boolean definition/hash. Absent definition masks revenue classification to unknown. Not inferred from payment labels.
<code>ledger_support_absent_evidence</code>	Optional cited inspection that required classification/date support is demonstrably unavailable for that entire tenant ledger. Never inferred from a failed fetch or missing documentation. It affects Atom 5's boundary explanation, not indicator coding.
<code>coverage</code>	Maps each construct <code>agreements</code> , <code>disclosure_links</code> , <code>party_links</code> , <code>ledger</code> to zero or more attestation objects defined below.
<code>reason</code>	Safe metadata scope explanation. Private locators remain only in restricted provenance.

A coverage object has `start`, `end` (inclusive ISO civil dates), `status` (`supported`, `disproven`, `unknown`), `retained_history` (Boolean), `evidence` (dated source-metadata locator), and optional `reason`. A supported interval certifies recording/retention for the named construct across the whole interval, including preexisting records needed to assess activity. Bounds require one attestation containing the entire requested interval for each required construct, with `retained_history=true` and a snapshot reaching the endpoint. Split certificates must be mechanically consolidated only when metadata certifies continuous equivalent coverage; the analysis itself never fills gaps. Coverage not proved is unknown, including disproven completeness. A partial interval can certify an earlier horizon without certifying a later one. Dates and reasons stay in `restricted/source-metadata.csv`; the public support map reports assessed scope only.

The minimum index structures are `disclosure(disclosure_id,date)`, `disclosure_agreement(disclosure_id,agreement_id)`, `agreement(agreement_id,type_cls,effective_date,termination)`. Optional unavailable signature/expiration/local-ID/descriptive/party fields become typed unknowns with their metadata dispositions; they do not independently exclude a supported tenant. Unknown party support stays inside the frozen N. Structural tables needed to define the index cannot be null-filled into a supported index scope. The code derives tenant support using Atom 1's ordered table, rather than accepting a user-entered `usable` verdict.

Dates must already have documented civil-date semantics. ISO dates and timezone-naive verified datetimes are accepted; timezone-aware values require a recorded source adapter, never silent shifting. Year-only strings are invalid. The inherited DC5 rule masks dates later than the snapshot, including prospective expiration

values, to unknown and flags them; this conservative rule can reduce known expiration support. It does not use future dates to infer observed follow-up. Parsing failures remain key-level uncertainty. The chronology fixture verifies that effective dates years before termination do not change the index origin.

Metadata for all six projections is supplied before the frozen cohort, while ledger rows are read only for Atoms 5–6. Metadata inspection can establish structure/class meanings without reading receipt outcomes. All downstream runs use the identical non-ledger fingerprint and cohort hash; ledger equality is additionally required between Atoms 5 and 6. `verified_source_change_evidence` is an optional top-level cited source-contract inspection. A changed frozen source without that evidence is `no_result`; with it, Atoms 2, 3, 4, 6 or 7 can resolve their source-boundary region. Atom 5's frozen-population mismatch remains operational, because its boundary region concerns receipt observability. This flag cannot turn ordinary incomplete follow-up into a boundary or change a denominator.

No runtime completeness, cell count, sample size, coverage interval, class label, effect, or release permission is implied by this interface. Unknown provider semantics require the registered unresolved disposition, not an analyst-designed repair. Scientific changes return for an amendment; a planner may bind an equivalent mechanical adapter with its source/code hash.

Revision v002 deployment and output versions

Input bindings remain interface 1. The dispatcher requires explicit `-world` and `-source-root` plus a complete version-3 synthetic certificate before bound input reads (V005 supersedes the former version-2 certificate). Execution source-root contains execution/ and paper/figures/ and may be a copied action src separate from the read-only World. The output contract is interface 2, including fixed empty restricted CSV schemas and first-reason assessment metadata. Saved predecessor payloads and dispositions have `record_hash`; the CLI verifies these along with code, immutable World authority and Atom registration hashes. If an Atom is already realized, its canonical `registered_state` must agree with the supplied predecessor; pending same-wave Atoms may still supply genuinely produced evidence. Full mutable World snapshots are retained for audit, not equality across realization waves. CSV/Parquet numeric nonfinite values retain raw provenance distinctions and normalize to unknown, never zero; representational differences cannot choose a different scientific state. No new scientific mapping or runtime access is implied.

V003 support and source-change binding clarification

`license_separability` omitted or JSON null means unresolved. A tentative positive `license_codes` mapping cannot promote unresolved support; supported-index requires `separability=present` plus all the preexisting dictionary/structure/snapshot requirements. A definitive absent assessment with a true code, or present assessment with a supplied mapping having no true code, is contradictory metadata and is rejected as `no_result` before reading any table. Missing mapping/version/hash remains unresolved. Mapping values must be actual JSON true/false/null, never integers. The

original first-match structural-boundary/unresolved/supported order applies after this consistency check. A supported tenant can coexist with excluded unresolved tenants without reading their bindings.

verified_source_change_evidence remains the interface-1 nonempty string citation to a completed, governed source-contract inspection establishing the consuming Atom’s precise boundary predicate. For Atom 6 it also applies to the separate ledger hash: the inspection must establish that the frozen ledger contract changed and the registered DC8 indicators cannot be reproduced. It is not a Boolean permission flag, a failed-inspection object, a request to refresh, or evidence supplied merely because coverage is incomplete. Null/empty means no verified boundary evidence; an invalid binding fails operationally. The dispatcher records evidenced change citation and old/new hashes in its restricted disposition/payload source_change object, never replacing Atom 5’s M or estimates. The author cannot verify runtime citations.

Missing identity count groups unify null, empty text and numeric NaN. Original representation/projection hashes remain in the restricted audit. Distinct malformed nonmissing values, literal nan/None strings and valid tenant-prefixed IDs retain separate meanings. This engineering rule changes neither cohort membership nor evidence eligibility. Input interface 1 and CSV output interface 2 remain compatible.

V004 caller-selected dispatch

The CLI adds `-dispatch-policy {activation_respecting,direct}`; the default remains `activation_respecting`. This does not change the binding JSON, six allowed projections, all-ten-tenant metadata, source-change inspection requirement or certificate gate. Direct calls require the same genuine input tables even without `-prior`. Known failed required predecessors remain `no_result`; they are never regenerated as successful World results. Missing/pending/inactive/budget-unselected predecessors may be replaced only as local registered constructions, with a locally frozen cohort and documented fingerprints, never fictional accepted records. Supplied scientific predecessor freezes cannot be overridden. The local constructions and their source-protocol IDs are retained in `restricted/local-construction.json`. The runtime selects the first B Molecule members for direct dispatch and must give the same declared policy/budget to `result_slots.assemble` at closeout. B is recorded before results and cannot be adjusted to select a favorable branch.

Complete registered Molecule

```
id: molecule-000001
molecule_mode: prereg
molecule_shape: boundary_map
topic: Recorded second chances
rating: B+
draft: false
membership:
- atom: atom-000001
  role: primary
  description: Establish the eligible recorded cohort and its measurement
  scope.
- atom: atom-000002
```

```

    role: primary
    description: Estimate the primary three-year later-party interval.
- atom: atom-000003
  role: secondary
  description: Judge whether witnessed sequences contain strict recorded gaps.
- atom: atom-000004
  role: supplementary
  description: Quantify stricter re-entry when the continuity diagnostic
    ↪ warrants
    it.
- atom: atom-000005
  role: secondary
  description: Establish receipt-indicator observability for distinct later
    agreements.
- atom: atom-000006
  role: supplementary
  description: Describe one-year positive receipt bounds in that selected
    population.
- atom: atom-000007
  role: supplementary
  description: Describe the paired five-year increment when the primary
    ↪ horizon
    is low or unresolved.
literature: []
frontier:
  rule: Among APTO disclosures with an eligible recorded early license
    ↪ termination
    in supported tenant snapshots, how often does a later commercial agreement
    with disjoint recorded parties have an effective date within three years
    after the selected index termination, how much survives a strict
    ↪ recorded-gap
    definition, and do these later agreements have positive classified
    ↪ receipts
    within one year of their effective dates?
  avoid: No causal rescue effects, legal-rights or corporate-lineage claims,
    university rankings, new fiscal-year repair, or product/welfare
    ↪ conclusions.
  No unused design history is part of this World.
  directions: []
preregistration:
  mode: adaptive
  question: Among APTO disclosures with an eligible recorded early license
    termination in supported tenant snapshots, how often does a later
    ↪ commercial
    agreement with disjoint recorded parties have an effective date within
    three years after the selected index termination, how much survives a
    strict recorded-gap definition, and do these later agreements have
    ↪ positive
    classified receipts within one year of their effective dates?
  scope: Amended noncausal finite-record study of eligible dated APTO
    ↪ disclosure-agreement
    histories in the supported-index tenant scope frozen by Atom 1, with other
    documented namespaces explicitly excluded or unresolved; cohort and code
    semantics DC1-DC9; primary H3 with fixed N, selected strict-gap and H5
    refinements, and distinct-agreement one-year receipts. Adaptive
    ↪ closed_graph;
    no confirmatory statistical tests.
  storyline: A termination ends a recorded agreement but need not end the
    disclosure's recorded transfer history. Termination can also follow
    ↪ knowledge

```

transfer without another direct university contract. First establish the eligible dated cohort within deterministically supported tenants and show illustrative composition and observation limits. Time zero is the

- ↪ termination_date

of the deterministically selected index agreement. A later agreement's effective_date is its event timestamp, not the index origin; signatures are chronology flags and do not prove execution by the horizon. The

- ↪ primary

three-year interval distinguishes witnessed later-party agreements from certified absence and unresolved follow-up. When witnesses exist, ask whether their histories contain strict recorded gaps or

- ↪ administrative/parallel

continuity, and independently establish whether receipts can be measured. These streams reconverge in the one-year financial description, which does not require favorable continuity evidence. A stricter same-cohort interval is mandatory if continuity is mixed, absent or unknown; a

- ↪ five-year

extension is mandatory when the primary horizon is low or unresolved. All these outcome-selected refinements are exploratory descriptive. No branch may make a causal rescue or product-use claim. The observation and institutional restrictions remain active even when every operational check passes.

interpretation:

- kind: restriction
 - condition: 'TRUE'
 - says: All statements concern finite eligible retrospective APT0 records, documented party IDs and classified receipts. They do not identify
 - ↪ causal
 effects, legal rights reversion, corporate independence, first-ever failure, product commercialization, social value or
 - ↪ representative-university
 rates. Logical intervals address unresolved indicators within the
 - ↪ cohort,
 not selection into it or misclassified witnesses. Restrictions take precedence over any broader reading of primary or supplementary clauses. Termination or no later direct contract need not mean failure of
 - ↪ technology
 transfer. Broad horizons and delays concern recorded effective dates; execution by that horizon is not established. One-year receipt windows also start at agreement effective dates. The strict path alone imposes its separate signature guard. In every post-termination statement t0 is index termination_date, while s is the later agreement
 - ↪ effective_date.
 This is a disclosed amendment informed by an operator's prior-run
 - ↪ manuscript
 review, not an untouched original registration.
- kind: restriction
 - condition: state(atom-000001) == "usable"
 - says: All cohort fractions and bounds apply only to the frozen
 - ↪ supported-index
 tenant union. Explicitly list unresolved-index and
 - ↪ evidenced-unsupported-index
 tenant scope; a usable subset does not resolve excluded populations. Outcome-coverage uncertainty is retained inside N, while unresolved index support is outside it.
- kind: restriction
 - condition: state(atom-000001) == "empty" OR state(atom-000001) ==
 - ↪ "boundary"
 OR state(atom-000001) == "otherwise"
 - says: 'No later-agreement population-rate claim is licensed: distinguish

an empty eligible snapshot population, evidenced construct boundary and unresolved cohort support. Do not translate any of them into no relicensing.'

- kind: restriction
 - condition: state(atom-000002) == "boundary" OR state(atom-000002) ==
 - ↪ "otherwise"
 - says: The primary rate remains unavailable or unresolved under the
 - ↪ registered
 - contract. No downstream quantity can substitute for it.
- kind: restriction
 - condition: state(atom-000003) == "none_strict" OR state(atom-000003) ==
 - "mixed" OR state(atom-000003) == "unresolved" OR state(atom-000003) == "boundary" OR state(atom-000003) == "otherwise"
 - says: Broad later-party agreements cannot receive an unqualified
 - ↪ recorded-gap
 - storyline. Use the precise all/some/none/unknown diagnostic and, when run, Atom 4 bounds. A receipt never removes this restriction.
- kind: restriction
 - condition: state(atom-000005) == "boundary" OR state(atom-000005) ==
 - ↪ "otherwise"
 - says: Financial realization is unsupported or unresolved; receipt absence cannot be inferred from this measurement limitation.
- kind: restriction
 - condition: terminal(atom-000001) == "no_result" OR terminal(atom-000002) == "no_result" OR terminal(atom-000003) == "no_result" OR
 - ↪ terminal(atom-000004)
 - == "no_result" OR terminal(atom-000005) == "no_result" OR
 - ↪ terminal(atom-000006)
 - == "no_result" OR terminal(atom-000007) == "no_result"
 - says: An operational failure leaves its own judgment and any dependent branch unresolved. Retain independently completed results only within their scopes. A failure is not a statistical null or a scientific
 - ↪ boundary
 - without evidence; no_result does not satisfy done.
- kind: restriction
 - condition: 'TRUE'
 - says: Dispatch policy is reported separately from scientific activation. Direct dispatch may compute registered shared prerequisites locally from genuine inputs; those calculations are not accepted predecessor World Atoms. Retain all input, scope, clock, validity and conditional claim requirements. Local result slots identify their producing Atom and local evidence; they do not substitute for absent member results in composite interpretation. Primary and supplementary composite clauses involving a direct result require its registered activation to be
 - ↪ supported
 - by actual member evidence. Restrictions apply regardless of dispatch policy. Report budget_unselected members as unselected by budget, and explicitly bypassed attempts by their real disposition, never as never activated. Direct dispatch adds no causal or confirmatory
 - ↪ interpretation.
- kind: primary
 - condition: state(atom-000001) == "usable"
 - says: A reproducible finite dated-record cohort is supported in the
 - ↪ reported
 - scope; publish its eligible/excluded composition and unknown coverage without extending to all university inventions.
- kind: primary
 - condition: state(atom-000002) == "material"
 - says: The three-year lower bound reaches one in ten for later agreements with disjoint recorded party sets; report the entire logical interval

and all record-level claim limits.

- kind: primary
condition: state(atom-000002) == "low_with_witness" OR state(atom-000002) == "low_no_witness"
says: The three-year upper bound is below one in ten. Distinguish
↪ witnessed
low incidence, certified recorded zero and unresolved nonwitnesses;
this author-set threshold is not equivalence or policy failure.
- kind: primary
condition: state(atom-000002) == "witnessed_uncertain"
says: Definite later-party paths exist, but the three-year range straddles the attention threshold. Report witnessed timing with the unknown share, not a chosen endpoint.
- kind: primary
condition: state(atom-000002) == "unresolved_no_witness"
says: No definite three-year witness was established and the range permits at least one in ten; report unresolved evidence, not no second chances.
- kind: supplementary
condition: state(atom-000003) == "all_strict"
says: Every witnessed disclosure has at least one strict recorded-gap path under the frozen guard. This is conditional on witnessed records and does not equate the full broad and strict bounds or establish
↪ restored
legal rights.
- kind: supplementary
condition: state(atom-000004) == "material_strict" OR state(atom-000004) == "below_strict" OR state(atom-000004) == "strict_uncertain"
says: Compose the selected strict-gap interval with the primary broad interval on the same denominator. State whether it is above, below or unresolved relative to one in ten. It refines the construct and never replaces the primary estimand.
- kind: supplementary
condition: state(atom-000005) == "full_support" OR state(atom-000005) == "partial_support"
says: Receipt support is full or partial for the fixed distinct-agreement population. This is a measurement statement, not a financial outcome; partial support requires bounds retaining all agreements.
- kind: supplementary
condition: state(atom-000006) == "receipts_witnessed"
says: Some selected later agreements have positive classified one-year receipts. Report their agreement-level logical interval and
↪ earliest-known
timing, constrained by continuity scope. Receipts can be fees and are not net profit, sales or rescue effects.
- kind: supplementary
condition: state(atom-000006) == "recorded_zero"
says: The selected recorded ledgers support zero positive classified
↪ receipts
during the defined first year; this does not imply no lifetime revenue, development or unrecorded financial transfer.
- kind: supplementary
condition: state(atom-000006) == "receipts_unresolved"
says: No definite receipt was established but receipts remain possible; compose this uncertainty with later-agreement evidence without asserting a financial failure.
- kind: supplementary
condition: state(atom-000007) == "delayed_material" OR state(atom-000007) == "delayed_below" OR state(atom-000007) == "delayed_unresolved"
says: Report the selected same-cohort five-year effective-date interval

```

and fixed paired outer-bound increment as exploratory descriptive
→ evidence,
preserving the primary three-year conclusion. Adjudicate only DC6/Atom
7 interval formulas; shared unresolved candidates may make the outer
range conservative. Late signatures do not constitute late events, and
an unknown early history prevents proof of late first transition. The
five-point threshold is not economic equivalence.
- kind: residual
condition: 'TRUE'
says: After restrictions and compatible specific claims, list every Atom
still pending, not_activated, budget_unselected, no_result, otherwise
or in a scientific boundary, including trigger traces and
→ disclosure-limited
states. Explain any unclassified scope without inventing a finding.
All substantive Atoms are pending at registration; no combination here
is a prediction of realized results. Final paper closeout must account
for every roster member; partial previews are explicitly labeled and
cannot certify completion. Direct source-state copies inherit disclosure
restrictions, including Atom 3 continuity copied into Atom 6.

```

The registration payload above owns storyline and composable interpretation. The member Atom registrations own protocol, activation and local results. Membership contains all seven Atoms from birth; no separate graph or interpretation authority is supplied.

Current interpretation

All seven Atoms are registered and pending. No experimental findings exist yet. There are no realized Atom evidence citations.

atom-000001: Termination observability

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible termination_date, breaking ties by exact lexicographic agreement_id. Set index_effective_date = a0.effective_date and t0 = a0.termination_date. Never set t0 from index_effective_date. A candidate event timestamp s = a1.effective_date must satisfy t0 < s; signature is a separate strict-only requirement. H1/H2/H3/H5 and the 31-day guard are measured from termination t0. Receipts alone use s as their one-year origin. All examples whose t0 was implicit use this explicit termination definition.

Status: registered measurement/descriptive. Population is all structurally documented tenant partitions, then the finite DC5 eligible recorded disclosures in supported partitions. Unit of the cohort is one disclosure with one deterministic index agreement; unit of the support map is tenant × required construct. Time zero and windows are DC5. No APTO outcomes have been read.

Execute in order: 1. Inspect authorized table metadata, aliases, snapshot/extraction identity, provider dictionary version and retention documentation. Bind only DC3's frozen commercial-license predicate before counting outcomes. Record known present, evidenced absent, unresolved metadata, and access failure separately. Do not open forbidden profiles, title fields or external registries. If any

required attempt is interrupted operationally, issue `no_result` for this planned inspection; do not choose readable tenants because their later outcomes look favorable.

2. Apply the tenant-support table below, then read available exact projections in supported-index tenants and execute DC4 key-level exclusions. Quarantine all conflicting entity keys, reject malformed/cross-tenant links, preserve their implications for later-event uncertainty, and count these defects. There is no corruption-rate cutoff or discretionary tenant removal. Even if every index key is excluded, a structurally supported tenant remains supported-index with zero eligible records. Missing or evidenced absent party fields produce unknown P0 rather than cohort exclusion. Access failures remain operational, not null-filled structure.
3. Execute DC5 eligibility and deterministic index selection. Compute a sequential exclusion waterfall with non-overlapping first exclusion reasons: invalid/conflicting disclosure ID; missing/invalid disclosure date; no structurally linked agreement; no type-resolved commercial agreement; missing/incoherent effective or termination date; known termination $\geq$ expiration; known signature after termination; eligible. Also report overlapping defect flags separately so the waterfall does not hide co-occurrence. Missing type/date/unsupported partitions are not a count of true nonterminations.
4. Freeze and hash the supported-index tenant roster, all ten support dispositions, sorted N disclosure/index pairs and schema/code versions before later-event computation. Freeze N only in supported-index tenants; do not append newly resolved tenants later in this graph. Excluded unresolved-index tenants are not part of the bound denominator. Freeze scope solely by the table and key-level rules, never by later agreements or receipts. Tabulate N and distinct a0 count by tenant, termination calendar year, source field class, missing field, disclosure-kind class and missing kind, subject to disclosure limits. No group comparisons or rankings. Produce Figure 1 for the eligible/excluded waterfall; retain every composition dimension in Table 1 and `composition.csv`, rather than an unreadably dense composition graphic.
5. For each tenant and calendar interval, record retention/coverage attestations for agreement, disclosure links and party links as supported, disproven, or unknown, with dated metadata locators. Neither smooth annual counts nor maximum dates provide completeness. Missing retained-history evidence will create upper-bound uncertainty in later Atoms, not block a reproducible finite-record cohort. Require an assessed disposition for every documented partition.
6. Apply this single global order: any operationally incomplete required attempt gives terminal `no_result` and no scientific state; otherwise $N > 0$ gives usable; otherwise $N = 0$ with at least one supported-index tenant and zero unresolved-index tenants gives empty; otherwise all ten evidenced-unsupported-index gives boundary; otherwise gives otherwise. Thus $N = 0$ plus any unresolved-index tenant gives otherwise, while $N > 0$ plus unresolved-index tenants gives usable confined to frozen supported scope. Unresolved outcome coverage never changes tenant index support. There is no minimum N for usability; small-N reporting may be disclosure-limited.

Tenant-support decision table (first match; labels are scope diagnostics, not additional Atom states): - operationally incomplete: a necessary metadata or supported-table read failed, timed out, or was not completed. Stop this Atom as `no_result`; do not certify an accessible-subset result. A completed catalogue inspection proving absence is not a failed query.

A projection logically unnecessary after an evidenced structural boundary is recorded not_applicable, not an uncompleted attempt. - evidenced-unsupported-index: completed metadata inspection proves absence/incompatibility of disclosure(disclosure_id,date), disclosure_agreement(disclosure_id,agreement_id), or agreement(agreement_id,type_cls,effective_date,termination_date); or a definitive versioned class dictionary proves no separable commercial-license class. Incompatibility means a documented different entity grain, non-tenant-scoped/nonreproducible identity mapping, or date units not transformable to civil dates without imputation. A mere failed cast at individual keys is DC4 quarantine, not this structural state. - unresolved-index: no preceding reason applies, but the required table/grain/identity/date semantics, snapshot date, or commercial-license codebook cannot be resolved after completed authorized metadata inspection. Exclude this tenant before outcome computation, recording exactly which support remains unknown. Missing dictionaries are not evidence of absent license classes. - supported-index: all preceding conditions are false, required structures/semantics and snapshot date are resolved, and the dictionary has at least one separable qualifying class. Execute DC4/DC5; unknown or mixed values are key-level index exclusions, never guessed licenses. Date-field missingness, malformed keys, or no eligible rows do not independently revoke structural support. Evidenced absence of other projected fields (including party structure, local IDs, signature/expiration and descriptive classes) is represented by typed unknown values with provenance. Missing signature/expiration is allowed as in DC5; descriptive classes receive missing buckets; outcome-specific fields restrict later judgments as DC6–DC8 require. Unavailable follow-up/retention metadata is outcome-support unknown. Record separate index_support and outcome_coverage columns so these cannot be interchanged. A field newly lost after the contract is frozen is assessed under the downstream source-mismatch rules, never silently remapped.

Estimator/diagnostics: exact support counts and exclusion ratios only, no causal parameter. The 0-tolerance relational invariants prevent accidental multiplication; the eligibility cutoffs implement the target event, not outcome-optimized cleaning. Report missing signatures, missing expiration and simultaneous index ties as construct limits. Metadata attestations cannot prove the current link applied at index signature.

Synthetic checks: duplicate link pairs do not change N; identical projected entity duplicates collapse, conflicting ones quarantine; one bundled a0 linked to two eligible disclosures yields N=2 but one index agreement; missing P0 does not remove an index; equal termination/expiration does not qualify; missing expiration with otherwise valid early-termination field does qualify and is flagged; same-date indices select lexicographically reproducibly; February 29 anniversaries use February 28; missing codebook yields unresolved-index, not a guessed LICENSE class. Mixed-support synthetic case: one supported-index tenant with 100 eligible synthetic disclosures, one unresolved-index codebook, and eight evidenced-unsupported-index tenants gives usable, N=100, and activation of Atom 2 only over the first tenant; no outcome assertion is implied. With N=0 and that unresolved tenant the state is otherwise. With N=0, one supported-index tenant and nine evidenced-unsupported-index tenants

it is empty. Ten evidenced-unsupported-index tenants give boundary. One uncompleted required attempt gives no_result even if another tenant has eligible rows. All conflicting keys in an otherwise supported tenant yield supported-index with N=0, never discretionary tenant removal. Consequences: usable activates mandatory Atom 2. Empty/boundary/otherwise stop substantive successors with the appropriate unresolved scope; no_result blocks them operationally.

Exact input fields and provenance: disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls), disclosure_agreement(disclosure_id,agreement_id,role), agreement(agreement_id,agreement_local_id,type), agreement_counterparty(agreement_id,counterparty_id), counterparty(counterparty_id,counterparty_local_id). Use supplied schema-only.md lines 9–51 and 89–149, DC2. All are allowed APTO tables, physical lowercase. Frozen semantic coding is second-chances-termination-v3 plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record descriptive estimand, not a sampled population or causal effect. No estimator standard errors, clustering-based p-values, confirmatory hypotheses or significance tests are registered (statistical multiplicity family size zero); no holdout is used. Shared agreements create dependence and unit multiplicity, which must be reported, not hidden with independent-Bernoulli intervals. Logical uncertainty from unresolved indicators is distinct from misclassification, population selection and construct uncertainty. No welfare SESOI or statistical-equivalence claim exists. Report exact fractions/bounds and thresholds as descriptive only. Never infer prevalence or precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema version 1): Invoke prereg/execution/run_atom.py -atom atom-000001; analysis.atom1 implements this Atom, using core.Records and DC1–DC9. The authority remains this Atom protocol. Load the exact projections and metadata statuses described in execution/input-interface.md. All ten metadata inspections precede cohort freezing; no real class values, mounts or coverage are supplied by this draft. Missing production definitions are registered unresolved requirements, not permission to invent a default. The input adapter’s CSV/Parquet paths are governed bindings, not scientific choices. Keep the same input fingerprint and cohort hash across all descendants; ledger rows are read only by Atoms 5–6 and have a separate frozen hash. A changed frozen non-ledger source is operational no_result unless a completed, cited source-contract inspection establishes the boundary region specified here. Atom 5’s frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by analysis.atom1; construction and tri-valued predicates are core.Records.select_indices/history/strict/receipts as appropriate. As an explicit necessary-condition clarification, a known signature at or before index termination fails the strict requirement even when the later effective date is unknown; a missing signature remains unknown. Other known false strict requirements likewise dominate unresolved facts. An invalid cross-tenant candidate link is never a witness and leaves

a possible-event flag within an eligible disclosure history. Zero-tolerance cardinality assertions apply to joins; duplicate links become sets and cannot multiply outcomes. Individual broken/conflicting keys are audited and quarantined as DC4 specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000001/ contains provenance.json (semantic/execution-code, source/cohort and applicable ledger hashes, Python version, timestamp); diagnostics.csv (check,order,numerator,denominator,status,reason); disposition.json (atom,state or null,terminal or null,status,activation text/value,trace,reason,hashes); synthetic-checks.json (current synthetic proof and code hash). Numerical values are emitted only after a completed scientific state. Inactive or failed work emits disposition/provenance/diagnostics and no numerical tables. Registered numerical interfaces: release-candidate/support.csv (tenant, index_support, outcome_coverage, construct, status, reason, in_frozen_scope); release-candidate/cohort-flow.csv (stage, count, unit); release-candidate/composition.csv (dimension, category, status, count, index_agreements). Restricted derivations: cohort.csv (tenant,d,a0,t0,index_effective_date,simultaneous_index,missing_signature,missing_expiration,P0,P0_complete); link-audit.csv (table,key,related_key,reason,optional_projection_hash); link-roles.csv (d,a,roles); index-flags.csv (d,agreement_id,flag). Every completed Atom also writes restricted/field-missingness.csv (table,field,missing,rows), restricted/source-metadata.csv (tenant,metadata), restricted/result.json (reproducible complete module payload for downstream binding), and restricted/metrics.json when numerical public-candidate tables exist. CSV nested objects use JSON text; raw transaction values never enter World prose. The machine-checkable column index is execution/output-contract.yaml, subordinate to this protocol.

Figure 1 is implemented at prereg/paper/figures/figure1.py and consumes only its figures.yaml tables. The governed visualizer creates release-candidate/figure1.pdf after disclosure screening; the analysis dispatcher does not render or publish raw records. This replaces the SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without replacing estimands. Atom 1 composition remains a full table; other paired displays can occupy panels within one figure. Figure code calculates no new estimator. Empty, partial and unactivated inputs produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-figure integration in figure_checks.py. Generated values, PDFs, PNGs and test logs stay outside the World. Tests include the independently specified decade between index effective date and termination; agreements on both sides of termination; selection separately from timing; leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards; unknown versus false; source mismatch; cohort/bundle/cardinality invariance; classifications and receipt timing; exact integer thresholds; every mandatory branch; missing/partial/inactive plot inputs and long-label/close-endpoint geometry. Any failed prerequisite test stops data execution as no_result; a passing test does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interruptions, read/cast-contract errors, failed assertions and unresolved software defects are terminal `no_result` with no scientific state or estimate; missing data documented as an evidenced construct boundary follows that boundary region. Missing retention remains indicator uncertainty, not a statistical null. Unrun members remain pending while predecessors may resolve and not `_activated` with trace at closeout. Report restrictions before compatible primary/supplementary Molecule clauses, then residual unresolved scope. No result licenses a new cohort, clock, code mapping, causal claim or unregistered estimator.

Exclusion-unit clarification: invalid/conflicting disclosure identities are counted as quarantined exact-key groups (all missing-key representations form an unresolved group), not as an identified number of inventions. `cohort-flow.csv` labels their unit separately; Figure 1 gives them a separate panel. All remaining waterfall rows count identified disclosures. This changes neither eligible N nor any outcome denominator. Restricted `link-audit.csv` preserves faulty keys and conflict hashes; `link-roles.csv` preserves the role sets without using them for selection.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance revision v002; native schema version 1). The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results. Use explicit `-world READ_ONLY_WORLD` and `-source-root EXECUTING_SRC` with `run_atom.py`. The source root contains execution/ and paper/figures/; the World root contains atoms/, molecules/, prereg/. Never infer the deployed World from **file**. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `-synthetic-fixture` is mutually exclusive with `-inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`; `diagnostics.csv(check,order,numerator,denominator,status,reason)` is fixed for all dispositions. Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings.

Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events. Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label `report_mode=partial_preview`. Final closeout requires an explicit `result/no_result` for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in `output-contract.yaml` and `results-bindings.yaml`. Suppressing Atom 3 also suppresses Atom 6 `continuity_state` in `table/metric` presentation and `receipt_continuity_scope`, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression. Every figure implements the registered DataFrame API with no data reads or estimator. Runtime `style_dir` binds the supplied HelveticaNeue regular/medium/bold/italic TrueType files by exact path; missing required fonts fail, while `style_dir=None` is explicitly preview-only. Rerender both widths, enforce ≤ 170 mm height, and retain vector/font/Unicode/page checks. The chart catalog and render-package layouts remain disabled; manuscript class and compiler-owned TeX/PDF checks remain intact. Tests include absent, partial, inactive/no_result inputs, long labels, nearby endpoints and both certain/possible overlap. Synthetic output remains outside the World and no manuscript slot is filled. V003 SUPPORT AND IDENTITY REPAIR (same scientific amendment 2, no new result regions). Before applying the ordered support table, validate metadata consistency. `license_separability` must be present, absent or unresolved; omitted/null means unresolved. The class mapping, if supplied, must be an object with actual Boolean/null values. An absent separability assessment with any qualifying true code is contradictory; a present assessment with a supplied mapping containing no qualifying true code is also contradictory. These are operational no_result, before any row read, not a choice between conflicting scientific authorities. Missing mappings/version/hash remain unresolved as already registered. An unresolved or omitted separability assessment stays unresolved-index even with a tentative positive mapping, unless an earlier evidenced structural boundary applies. supported-index requires explicitly present separability, resolved required structures, snapshot and versioned dictionary with a qualifying class. The same gate is executed by `load_bundle` before CSV/Parquet reads and Records before projection. Excluded unresolved tenants cannot enter frozen N; they may coexist with a positive supported cohort, exactly as the original support table permits. Invalid identities use tagged internal count keys. None, empty string and numeric NaN form one unresolved missing-key group for the registered exclusion count, invariant to the supported file adapter. Distinct malformed nonmissing values

remain distinct (including literal strings such as None or nan); valid tenant-prefixed identities are never merged with these tags. Count keys are not invented entity IDs. Every original projected faulty row remains in the restricted link audit with its original key representation and projection hash; identical missing-key groups do not collapse audit rows. CSV may encode null and empty alike, so projection hashes retain representation provenance without changing the Figure 1 count or eligible denominator. Tests save memory/CSV/Parquet cohort-flow and audit files, render Figure 1 from the saved flow, and verify excluded bindings are never opened.

V004 direct closeout additionally reconciles independently bound actual and local source/cohort freezes and the applicable ledger freeze; incompatible snapshots cannot be composed into one reported study. A mismatch blocks publication assembly pending governed resolution, never changes a completed estimate or silently refreshes a predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific amendment 2). execution/README.md indexes this Atom’s complete runnable command, analysis callable, exact inputs, outputs and synthetic checks. Shared implementations are used, not seven duplicate estimators. Standalone `-dispatch-policy activation_respecting` is the default and retains the activation expression above. An explicit `-dispatch-policy direct` attempts this selected Atom immediately, without waiting for outer activation. Runtime direct scheduling selects the first B members in Molecule membership order; budget is a dispatch choice recorded before execution, never chosen from results. No registered scientific question, local key, estimator, clock, threshold, conditional scope or graph edge changes. Direct dispatch cannot waive input validity or conditional scientific meaning. Reuse actual supplied scientific predecessors and their frozen fingerprints; never replace a supplied `no_result` with a successful retry. If a predecessor record is absent, pending, `not_activated` or `budget_unselected`, registered DC1–DC8 constructions may be computed locally from genuinely supplied projections, using `analysis.py` and `dispatch.local_inputs`. Follow the source Atom activation references to order these calculations; they are internal evidence, not new experiments or accepted predecessor World Atoms. Also construct the shared cohort and broad indicators where this module requires them. Save each local calculation, source-protocol citation, frozen source/cohort/ledger identity, exact outputs and content digest in `restricted/local-construction.json` and `local_evidence` provenance. Never insert these calculations into the caller’s prior results or the World roster. A source-protocol ID in that file is a citation, not a realized member record. All supplied source/cohort and applicable ledger freezes remain binding. Promised but unavailable data, incomplete inspection, failed software or required predecessor `no_result` yields this Atom’s operational `no_result`. Completed evidence establishing an existing boundary follows only that registered boundary region. If local or supplied evidence shows this Atom’s conditional scientific scope is false or unresolved, complete it as the existing otherwise state, with the explicit conditional-scope reason and no numerical rate. In particular, direct dispatch cannot turn all `strict` into the selected Atom 4 claim, material into the selected Atom 7 claim, or unavailable receipt support into a financial result. Otherwise does not assert a statistical null. Conditional scope is checked with the same registered expression, using actual or explicitly

local evidence; no new graph is authored. `disposition.json`, `restricted/result.json` and `provenance.json` record `dispatch_policy` and whether outer activation was bypassed; direct results record `scientific_condition_value` and `local_evidence`, and Atom 6 records `source_state_origins`. These are restricted execution metadata until disclosure approval. Local continuity is labeled as such in the receipt continuity slot; it never claims an accepted Atom 3 result. All source-dependent copies inherit source disclosure limits, including protected local copies. No local evidence may satisfy a missing predecessor World condition in a Molecule composite claim; restrictions always apply and standalone result slots remain scoped to their producing Atom. Publication closeout explicitly declares `dispatch_policy` and, for direct mode, B via budget. It lists all seven members: selected direct attempts retain `done/otherwise/boundary/no_result`; unselected members are `budget_unselected`, never falsely `not_activated`. Missing selected work blocks final closeout; true partial previews remain pending. Default activation-respecting closeout is unchanged. For every source-dependent slot apply disclosure suppression first, including protected source states; then the consuming Atom's `no_result/not_activated/budget_unselected` or completed `boundary/otherwise`; only an actually incomplete preview may use missing-source pending. A final active result lacking essential source/local evidence raises an error. The four reviewed closed inactive routes (empty cohort, evidenced cohort boundary, root `no_result`, continuity `no_result`) must never report pending or preview in these slots. Runnable tests are `test_amendment.py`, `amendment_checks.py` and the full `test_synthetic.py` entry point.

Complete registration fields

```
id: atom-000001
topic: Termination observability
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Can APT0 support a reproducible finite cohort of disclosures with
    a dated recorded early license termination?
  rationale: This measurement judgment determines whether the central
    ↪ population
    is identifiable in the permitted records. It also describes whose records
    are excluded and which observation horizons are unsupported; it is not
    a join-only Atom.
  assumption: The supplied dictionary distinguishes early termination from
    expiration but does not prove date coverage or class definitions.
    ↪ Institutional
    sources motivate termination as an endogenous contract event, not verified
    business failure.
  target_strength: descriptive
  target_shape: pattern
  ratings:
    importance: 4
```

```

novelty: 2
feasibility: 3
data_advantage: 4
informativeness: 0.7
tables:
- DISCLOSURE
- DISCLOSURE_AGREEMENT
- AGREEMENT
- AGREEMENT_COUNTERPARTY
- COUNTERPARTY
activation: 'TRUE'
verdicts:
- key: usable
  region: All ten tenant inspections are complete under the decision table
    below, no required access/read attempt is operationally incomplete,
    and N>0 in the union of supported-index tenants. Other tenants may be
    evidenced-unsupported-index or unresolved-index; they are explicitly
    outside frozen N.
  says: A finite dated-record cohort is reproducible in the frozen
    ↪ supported-index
    scope. Report excluded and unresolved tenant scope separately; this
    result does not resolve their populations or establish complete
    ↪ termination
    histories.
- key: empty
  region: All inspections complete; N=0; at least one tenant is
    ↪ supported-index;
    and no tenant is unresolved-index. Remaining tenants, if any, are
    ↪ evidenced-unsupported-index.
  says: The supported-index snapshot has no eligible dated record. This
    is an empty target within supported scope; excluded tenants remain a
    boundary, and no later-agreement rate or real-world absence follows.
- key: boundary
  region: All inspections complete and every one of the ten tenants is
    ↪ evidenced-unsupported-index
    because an indispensable index structure or separable commercial-license
    class is demonstrably absent or semantically incompatible.
  says: The registered termination-cohort construct cannot be evaluated
    in this evidenced scope. No later-agreement rate is licensed.
- key: otherwise
  region: otherwise
  says: Completed evidence leaves this judgment unresolved. Report the
    ↪ unresolved
    scope; no negative or equivalent-effect claim is licensed.
protocol: |
  AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible
    ↪ termination_date, breaking ties by exact lexicographic agreement_id.
    ↪ Set index_effective_date = a0.effective_date and t0 =
    ↪ a0.termination_date. Never set t0 from index_effective_date. A
    ↪ candidate event timestamp s = a1.effective_date must satisfy t0 < s;
    ↪ signature is a separate strict-only requirement. H1/H2/H3/H5 and the
    ↪ 31-day guard are measured from termination t0. Receipts alone use s
    ↪ as their one-year origin. All examples whose t0 was implicit use this
    ↪ explicit termination definition.

```

Status: registered measurement/descriptive. Population is all
 ↳ structurally documented tenant partitions, then the finite DC5
 ↳ eligible recorded disclosures in supported partitions. Unit of the
 ↳ cohort is one disclosure with one deterministic index agreement; unit
 ↳ of the support map is tenant × required construct. Time zero and
 ↳ windows are DC5. No APT0 outcomes have been read.

Execute in order:

1. Inspect authorized table metadata, aliases, snapshot/extraction
 ↳ identity, provider dictionary version and retention documentation.
 ↳ Bind only DC3's frozen commercial-license predicate before counting o
 ↳ utcomes. Record known present, evidenced absent, unresolved metadata,
 ↳ and access failure separately. Do not open forbidden profiles, title
 ↳ fields or external registries. If any required attempt is interrupted
 ↳ operationally, issue no_result for this planned inspection; do not
 ↳ choose readable tenants because their later outcomes look favorable.
2. Apply the tenant-support table below, then read available exact
 ↳ projections in supported-index tenants and execute DC4 key-level
 ↳ exclusions. Quarantine all conflicting entity keys, reject
 ↳ malformed/cross-tenant links, preserve their implications for
 ↳ later-event uncertainty, and count these defects. There is no
 ↳ corruption-rate cutoff or discretionary tenant removal. Even if every
 ↳ index key is excluded, a structurally supported tenant remains
 ↳ supported-index with zero eligible records. Missing or evidenced
 ↳ absent party fields produce unknown P0 rather than cohort exclusion.
 ↳ Access failures remain operational, not null-filled structure.
3. Execute DC5 eligibility and deterministic index selection. Compute a
 ↳ sequential exclusion waterfall with non-overlapping first exclusion r
 ↳ easons: invalid/conflicting disclosure ID; missing/invalid disclosure
 ↳ date; no structurally linked agreement; no type-resolved commercial
 ↳ agreement; missing/incoherent effective or termination date; known
 ↳ termination >= expiration; known signature after termination;
 ↳ eligible. Also report overlapping defect flags separately so the
 ↳ waterfall does not hide co-occurrence. Missing type/date/unsupported
 ↳ partitions are not a count of true nonterminations.
4. Freeze and hash the supported-index tenant roster, all ten support dis
 ↳ positions, sorted N disclosure/index pairs and schema/code versions
 ↳ before later-event computation. Freeze N only in supported-index
 ↳ tenants; do not append newly resolved tenants later in this graph.
 ↳ Excluded unresolved-index tenants are not part of the bound denominat
 ↳ or. Freeze scope solely by the table and key-level rules, never by
 ↳ later agreements or receipts. Tabulate N and distinct a0 count by
 ↳ tenant, termination calendar year, source field class, missing field,
 ↳ disclosure-kind class and missing kind, subject to disclosure limits.
 ↳ No group comparisons or rankings. Produce Figure 1 for the eligible/e
 ↳ xcluded waterfall; retain every composition dimension in Table 1 and
 ↳ composition.csv, rather than an unreadably dense composition graphic.
5. For each tenant and calendar interval, record retention/coverage
 ↳ attestations for agreement, disclosure links and party links as
 ↳ supported, disproven, or unknown, with dated metadata locators.
 ↳ Neither smooth annual counts nor maximum dates provide completeness.
 ↳ Missing retained-history evidence will create upper-bound uncertainty
 ↳ in later Atoms, not block a reproducible finite-record cohort.
 ↳ Require an assessed disposition for every documented partition.

6. Apply this single global order: any operationally incomplete required
 ↳ attempt gives terminal no_result and no scientific state; otherwise
 ↳ N>0 gives usable; otherwise N=0 with at least one supported-index
 ↳ tenant and zero unresolved-index tenants gives empty; otherwise all
 ↳ ten evidenced-unsupported-index gives boundary; otherwise gives
 ↳ otherwise. Thus N=0 plus any unresolved-index tenant gives otherwise,
 ↳ while N>0 plus unresolved-index tenants gives usable confined to
 ↳ frozen supported scope. Unresolved outcome coverage never changes
 ↳ tenant index support. There is no minimum N for usability; small-N
 ↳ reporting may be disclosure-limited.

Tenant-support decision table (first match; labels are scope diagnostics,
 ↳ not additional Atom states):

- operationally incomplete: a necessary metadata or supported-table read
 ↳ failed, timed out, or was not completed. Stop this Atom as no_result;
 ↳ do not certify an accessible-subset result. A completed catalogue
 ↳ inspection proving absence is not a failed query. A projection
 ↳ logically unnecessary after an evidenced structural boundary is
 ↳ recorded not_applicable, not an uncompleted attempt.
- evidenced-unsupported-index: completed metadata inspection proves
 ↳ absence/incompatibility of disclosure(disclosure_id,date),
 ↳ disclosure_agreement(disclosure_id,agreement_id), or agreement(agreement_id,ent_id,type_cls,effective_date,termination_date); or a definitive
 ↳ versioned class dictionary proves no separable commercial-license
 ↳ class. Incompatibility means a documented different entity grain,
 ↳ non-tenant-scoped/nonreproducible identity mapping, or date units not
 ↳ transformable to civil dates without imputation. A mere failed cast
 ↳ at individual keys is DC4 quarantine, not this structural state.
- unresolved-index: no preceding reason applies, but the required
 ↳ table/grain/identity/date semantics, snapshot date, or
 ↳ commercial-license codebook cannot be resolved after completed
 ↳ authorized metadata inspection. Exclude this tenant before outcome
 ↳ computation, recording exactly which support remains unknown. Missing
 ↳ dictionaries are not evidence of absent license classes.
- supported-index: all preceding conditions are false, required
 ↳ structures/semantics and snapshot date are resolved, and the
 ↳ dictionary has at least one separable qualifying class. Execute
 ↳ DC4/DC5; unknown or mixed values are key-level index exclusions,
 ↳ never guessed licenses. Date-field missingness, malformed keys, or no
 ↳ eligible rows do not independently revoke structural support.

Evidenced absence of other projected fields (including party structure,
 ↳ local IDs, signature/expiration and descriptive classes) is
 ↳ represented by typed unknown values with provenance. Missing
 ↳ signature/expiration is allowed as in DC5; descriptive classes
 ↳ receive missing buckets; outcome-specific fields restrict later
 ↳ judgments as DC6-DC8 require. Unavailable follow-up/retention
 ↳ metadata is outcome-support unknown. Record separate index_support
 ↳ and outcome_coverage columns so these cannot be interchanged. A field
 ↳ newly lost after the contract is frozen is assessed under the
 ↳ downstream source-mismatch rules, never silently remapped.

Estimator/diagnostics: exact support counts and exclusion ratios only, no
 ↳ causal parameter. The 0-tolerance relational invariants prevent
 ↳ accidental multiplication; the eligibility cutoffs implement the
 ↳ target event, not outcome-optimized cleaning. Report missing
 ↳ signatures, missing expiration and simultaneous index ties as
 ↳ construct limits. Metadata attestations cannot prove the current link
 ↳ applied at index signature.

Synthetic checks: duplicate link pairs do not change N; identical
 → projected entity duplicates collapse, conflicting ones quarantine;
 → one bundled a0 linked to two eligible disclosures yields N=2 but one
 → index agreement; missing P0 does not remove an index; equal
 → termination/expiration does not qualify; missing expiration with
 → otherwise valid early-termination field does qualify and is flagged;
 → same-date indices select lexicographically reproducibly; February 29
 → anniversaries use February 28; missing codebook yields unresolved-ind
 → ex, not a guessed LICENSE class. Mixed-support synthetic case: one
 → supported-index tenant with 100 eligible synthetic disclosures, one
 → unresolved-index codebook, and eight evidenced-unsupported-index
 → tenants gives usable, N=100, and activation of Atom 2 only over the
 → first tenant; no outcome assertion is implied. With N=0 and that
 → unresolved tenant the state is otherwise. With N=0, one
 → supported-index tenant and nine evidenced-unsupported-index tenants
 → it is empty. Ten evidenced-unsupported-index tenants give boundary.
 → One uncompleted required attempt gives no_result even if another
 → tenant has eligible rows. All conflicting keys in an otherwise
 → supported tenant yield supported-index with N=0, never discretionary
 → tenant removal. Consequences: usable activates mandatory Atom 2.
 → Empty/boundary/otherwise stop substantive successors with the
 → appropriate unresolved scope; no_result blocks them operationally.

Exact input fields and provenance:

→ disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls),
 → disclosure_agreement(disclosure_id,agreement_id,role),
 → agreement(agreement_id,agreement_local_id,type_cls,field_of_use_cls,e
 → ffective_date,expiration_date,termination_date,sign_date),
 → agreement_counterparty(agreement_id,counterparty_id),
 → counterparty(counterparty_id,counterparty_local_id). Use supplied
 → schema-only.md lines 9-51 and 89-149, DC2. All are allowed APTO
 → tables, physical lowercase. Frozen semantic coding is
 → second-chances-termination-v3 plus provider dictionary hashes bound
 → by Atom 1, DC3. No undocumented field or current status is
 → substituted. Apply DC4: entity many-to-one assertions; distinct pair
 → joins; party-set reduction before disclosure history joins; no
 → cross-tenant joins or silent loss of dangling candidate links. Every
 → reused derived table is reproduced from these projections and checked
 → against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record

→ descriptive estimand, not a sampled population or causal effect. No
 → estimator standard errors, clustering-based p-values, confirmatory
 → hypotheses or significance tests are registered (statistical
 → multiplicity family size zero); no holdout is used. Shared agreements
 → create dependence and unit multiplicity, which must be reported, not
 → hidden with independent-Bernoulli intervals. Logical uncertainty from
 → unresolved indicators is distinct from misclassification, population
 → selection and construct uncertainty. No welfare SESOI or
 → statistical-equivalence claim exists. Report exact fractions/bounds
 → and thresholds as descriptive only. Never infer prevalence or
 → precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema
 → version 1):

Invoke `prereg/execution/run_atom.py --atom atom-000001; analysis.atom1`
 ↳ implements this Atom, using `core.Records` and DC1-DC9. The authority
 ↳ remains this Atom protocol. Load the exact projections and metadata
 ↳ statuses described in `execution/input-interface.md`. All ten metadata
 ↳ inspections precede cohort freezing; no real class values, mounts or
 ↳ coverage are supplied by this draft. Missing production definitions
 ↳ are registered unresolved requirements, not permission to invent a
 ↳ default. The input adapter's CSV/Parquet paths are governed bindings,
 ↳ not scientific choices. Keep the same input fingerprint and cohort
 ↳ hash across all descendants; ledger rows are read only by Atoms 5-6
 ↳ and have a separate frozen hash. A changed frozen non-ledger source
 ↳ is operational `no_result` unless a completed, cited source-contract
 ↳ inspection establishes the boundary region specified here. Atom 5's
 ↳ frozen population mismatch is operational `no_result`.

Ordered executable work is the numbered protocol above, implemented by
 ↳ `analysis.atom1`; construction and tri-valued predicates are
 ↳ `core.Records.select_indices/history/strict/receipts` as appropriate.
 ↳ As an explicit necessary-condition clarification, a known signature
 ↳ at or before index termination fails the strict requirement even when
 ↳ the later effective date is unknown; a missing signature remains
 ↳ unknown. Other known false strict requirements likewise dominate
 ↳ unresolved facts. An invalid cross-tenant candidate link is never a
 ↳ witness and leaves a possible-event flag within an eligible
 ↳ disclosure history. Zero-tolerance cardinality assertions apply to
 ↳ joins; duplicate links become sets and cannot multiply outcomes.
 ↳ Individual broken/conflicting keys are audited and quarantined as DC4
 ↳ specifies, not automatic tenant failures.

Complete current output layout: `governed evidence/atom-000001/` contains
 ↳ `provenance.json` (semantic/execution-code, source/cohort and
 ↳ applicable ledger hashes, Python version, timestamp); `diagnostics.csv`
 ↳ (check,order,numerator,denominator,status,reason); `disposition.json`
 ↳ (atom,state or null,terminal or null,status,activation
 ↳ text/value,trace,reason,hashes); `synthetic-checks.json` (current
 ↳ synthetic proof and code hash). Numerical values are emitted only
 ↳ after a completed scientific state. Inactive or failed work emits
 ↳ `disposition/provenance/diagnostics` and no numerical tables.
 ↳ Registered numerical interfaces: `release-candidate/support.csv`
 ↳ (tenant, index_support, outcome_coverage, construct, status, reason,
 ↳ in_frozen_scope); `release-candidate/cohort-flow.csv` (stage, count,
 ↳ unit); `release-candidate/composition.csv` (dimension, category,
 ↳ status, count, index_agreements). Restricted derivations: `cohort.csv`
 ↳ (tenant,d,a0,t0,index_effective_date,simultaneous_index,missing_signa
 ↳ ture,missing_expiration,P0,P0_complete); `link-audit.csv`
 ↳ (table,key,related_key,reason,optional projection_hash);
 ↳ `link-roles.csv` (d,a,roles); `index-flags.csv` (d,agreement_id,flag).
 ↳ Every completed Atom also writes `restricted/field-missingness.csv`
 ↳ (table,field,missing,rows), `restricted/source-metadata.csv`
 ↳ (tenant,metadata), `restricted/result.json` (reproducible complete
 ↳ module payload for downstream binding), and `restricted/metrics.json`
 ↳ when numerical public-candidate tables exist. CSV nested objects use
 ↳ JSON text; raw transaction values never enter World prose. The
 ↳ machine-checkable column index is `execution/output-contract.yaml`,
 ↳ subordinate to this protocol.

Figure 1 is implemented at prereg/paper/figures/figure1.py and consumes
 ↳ only its figures.yaml tables. The governed visualizer creates release
 ↳ -candidate/figure1.pdf after disclosure screening; the analysis
 ↳ dispatcher does not render or publish raw records. This replaces the
 ↳ SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without
 ↳ replacing estimands. Atom 1 composition remains a full table; other
 ↳ paired displays can occupy panels within one figure. Figure code
 ↳ calculates no new estimator. Empty, partial and unactivated inputs
 ↳ produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-f
 ↳ igure integration in figure_checks.py. Generated values, PDFs, PNGs
 ↳ and test logs stay outside the World. Tests include the independently
 ↳ specified decade between index effective date and termination; agreem
 ↳ ents on both sides of termination; selection separately from timing;
 ↳ leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards;
 ↳ unknown versus false; source mismatch; cohort/bundle/cardinality
 ↳ invariance; classifications and receipt timing; exact integer
 ↳ thresholds; every mandatory branch; missing/partial/inactive plot
 ↳ inputs and long-label/close-endpoint geometry. Any failed
 ↳ prerequisite test stops data execution as no_result; a passing test
 ↳ does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interr
 ↳ uptions, read/cast-contract errors, failed assertions and unresolved
 ↳ software defects are terminal no_result with no scientific state or
 ↳ estimate; missing data documented as an evidenced construct boundary
 ↳ follows that boundary region. Missing retention remains indicator unc
 ↳ ertainty, not a statistical null. Unrun members remain pending while
 ↳ predecessors may resolve and not_activated with trace at closeout.
 ↳ Report restrictions before compatible primary/supplementary Molecule
 ↳ clauses, then residual unresolved scope. No result licenses a new
 ↳ cohort, clock, code mapping, causal claim or unregistered estimator.

Exclusion-unit clarification: invalid/conflicting disclosure identities
 ↳ are counted as quarantined exact-key groups (all missing-key
 ↳ representations form an unresolved group), not as an identified
 ↳ number of inventions. cohort-flow.csv labels their unit separately;
 ↳ Figure 1 gives them a separate panel. All remaining waterfall rows
 ↳ count identified disclosures. This changes neither eligible N nor any
 ↳ outcome denominator. Restricted link-audit.csv preserves faulty keys
 ↳ and conflict hashes; link-roles.csv preserves the role sets without
 ↳ using them for selection.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance
 ↳ revision v002; native schema version 1).

The same question, Atom IDs, result keys, activation, population,
 ↳ horizons, thresholds and finite-record inferential status are
 ↳ retained. These repairs implement the registered science; none was
 ↳ selected from empirical results.

Use explicit `--world READ_ONLY_WORLD` and `--source-root EXECUTING_SRC` with `run_atom.py`. The source root contains `execution/` and `paper/figures/`; the World root contains `atoms/`, `molecules/`, `prereg/`. Never infer the deployed World from `__file__`. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `--synthetic-fixture` is mutually exclusive with `--inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`; `diagnostics.csv(check,order,numerator,denominator,status,reason)` is fixed for all dispositions.

Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events.

Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label `report_mode=partial_preview`. Final closeout requires an explicit `result/no_result` for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in `output-contract.yaml` and `results-bindings.yaml`. Suppressing Atom 3 also suppresses Atom 6 continuity_state in table/metric presentation and receipt_continuity_scope, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression.

Every figure implements the registered DataFrame API with no data reads
 ↳ or estimator. Runtime style_dir binds the supplied HelveticaNeue regu-
 ↳ lar/medium/bold/italic TrueType files by exact path; missing required
 ↳ fonts fail, while style_dir=None is explicitly preview-only. Rerender
 ↳ both widths, enforce <=170 mm height, and retain vector/font/Unicode/
 ↳ page checks. The chart catalog and render-package layouts remain
 ↳ disabled; manuscript class and compiler-owned TeX/PDF checks remain i-
 ↳ ntact. Tests include absent, partial, inactive/no_result inputs, long
 ↳ labels, nearby endpoints and both certain/possible overlap. Synthetic
 ↳ output remains outside the World and no manuscript slot is filled.

V003 SUPPORT AND IDENTITY REPAIR (same scientific amendment 2, no new
 ↳ result regions).

Before applying the ordered support table, validate metadata consistency.
 ↳ license_separability must be present, absent or unresolved;
 ↳ omitted/null means unresolved. The class mapping, if supplied, must
 ↳ be an object with actual Boolean/null values. An absent separability
 ↳ assessment with any qualifying true code is contradictory; a present
 ↳ assessment with a supplied mapping containing no qualifying true code
 ↳ is also contradictory. These are operational no_result, before any
 ↳ row read, not a choice between conflicting scientific authorities.
 ↳ Missing mappings/version/hash remain unresolved as already
 ↳ registered. An unresolved or omitted separability assessment stays
 ↳ unresolved-index even with a tentative positive mapping, unless an
 ↳ earlier evidenced structural boundary applies. supported-index
 ↳ requires explicitly present separability, resolved required
 ↳ structures, snapshot and versioned dictionary with a qualifying
 ↳ class. The same gate is executed by load_bundle before CSV/Parquet
 ↳ reads and Records before projection. Excluded unresolved tenants
 ↳ cannot enter frozen N; they may coexist with a positive supported
 ↳ cohort, exactly as the original support table permits.

Invalid identities use tagged internal count keys. None, empty string and
 ↳ numeric NaN form one unresolved missing-key group for the registered
 ↳ exclusion count, invariant to the supported file adapter. Distinct ma-
 ↳ lformed nonmissing values remain distinct (including literal strings
 ↳ such as None or nan); valid tenant-prefixed identities are never
 ↳ merged with these tags. Count keys are not invented entity IDs. Every
 ↳ original projected faulty row remains in the restricted link audit
 ↳ with its original key representation and projection hash; identical m-
 ↳ issing-key groups do not collapse audit rows. CSV may encode null and
 ↳ empty alike, so projection hashes retain representation provenance
 ↳ without changing the Figure 1 count or eligible denominator. Tests
 ↳ save memory/CSV/Parquet cohort-flow and audit files, render Figure 1
 ↳ from the saved flow, and verify excluded bindings are never opened.

V004 direct closeout additionally reconciles independently bound actual
 ↳ and local source/cohort freezes and the applicable ledger freeze;
 ↳ incompatible snapshots cannot be composed into one reported study. A
 ↳ mismatch blocks publication assembly pending governed resolution,
 ↳ never changes a completed estimate or silently refreshes a
 ↳ predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific
 ↳ amendment 2).

execution/README.md indexes this Atom's complete runnable command,
 ↪ analysis callable, exact inputs, outputs and synthetic checks. Shared
 ↪ implementations are used, not seven duplicate estimators. Standalone
 ↪ --dispatch-policy activation_respecting is the default and retains
 ↪ the activation expression above. An explicit --dispatch-policy direct
 ↪ attempts this selected Atom immediately, without waiting for outer
 ↪ activation. Runtime direct scheduling selects the first B members in
 ↪ Molecule membership order; budget is a dispatch choice recorded
 ↪ before execution, never chosen from results. No registered scientific
 ↪ question, local key, estimator, clock, threshold, conditional scope
 ↪ or graph edge changes.
 Direct dispatch cannot waive input validity or conditional scientific
 ↪ meaning. Reuse actual supplied scientific predecessors and their
 ↪ frozen fingerprints; never replace a supplied no_result with a
 ↪ successful retry. If a predecessor record is absent, pending,
 ↪ not_activated or budget_unselected, registered DC1-DC8 constructions
 ↪ may be computed locally from genuinely supplied projections, using
 ↪ analysis.py and dispatch.local_inputs. Follow the source Atom
 ↪ activation references to order these calculations; they are internal
 ↪ evidence, not new experiments or accepted predecessor World Atoms.
 ↪ Also construct the shared cohort and broad indicators where this
 ↪ module requires them. Save each local calculation, source-protocol
 ↪ citation, frozen source/cohort/ledger identity, exact outputs and
 ↪ content digest in restricted/local-construction.json and
 ↪ local_evidence provenance. Never insert these calculations into the
 ↪ caller's prior results or the World roster. A source-protocol ID in
 ↪ that file is a citation, not a realized member record.
 All supplied source/cohort and applicable ledger freezes remain binding.
 ↪ Promised but unavailable data, incomplete inspection, failed software
 ↪ or required predecessor no_result yields this Atom's operational
 ↪ no_result. Completed evidence establishing an existing boundary
 ↪ follows only that registered boundary region. If local or supplied
 ↪ evidence shows this Atom's conditional scientific scope is false or
 ↪ unresolved, complete it as the existing otherwise state, with the
 ↪ explicit conditional-scope reason and no numerical rate. In
 ↪ particular, direct dispatch cannot turn all_strict into the selected
 ↪ Atom 4 claim, material into the selected Atom 7 claim, or unavailable
 ↪ receipt support into a financial result. Otherwise does not assert a
 ↪ statistical null. Conditional scope is checked with the same
 ↪ registered expression, using actual or explicitly local evidence; no
 ↪ new graph is authored.

disposition.json, restricted/result.json and provenance.json record
 ↪ dispatch_policy and whether outer activation was bypassed; direct
 ↪ results record scientific_condition_value and local_evidence, and
 ↪ Atom 6 records source_state_origins. These are restricted execution
 ↪ metadata until disclosure approval. Local continuity is labeled as
 ↪ such in the receipt continuity slot; it never claims an accepted Atom
 ↪ 3 result. All source-dependent copies inherit source disclosure
 ↪ limits, including protected local copies. No local evidence may
 ↪ satisfy a missing predecessor World condition in a Molecule composite
 ↪ claim; restrictions always apply and standalone result slots remain
 ↪ scoped to their producing Atom.
 Publication closeout explicitly declares dispatch_policy and, for direct
 ↪ mode, B via budget. It lists all seven members: selected direct
 ↪ attempts retain done/otherwise/boundary/no_result; unselected members
 ↪ are budget_unselected, never falsely not_activated. Missing selected
 ↪ work blocks final closeout; true partial previews remain pending.
 ↪ Default activation-respecting closeout is unchanged. For every
 ↪ source-dependent slot apply disclosure suppression first, including
 ↪ protected source states; then the consuming Atom's
 ↪ no_result/not_activated/budget_unselected or completed
 ↪ boundary/otherwise; only an actually incomplete preview may use
 ↪ missing-source pending. A final active result lacking essential
 ↪ source/local evidence raises an error. The four reviewed closed
 ↪ inactive routes (empty cohort, evidenced cohort boundary, root
 ↪ no_result, continuity no_result) must never report pending or preview
 ↪ in these slots. Runnable tests are test_amendment.py,
 ↪ amendment_checks.py and the full test_synthetic.py entry point.

Registered question

Can APTO support a reproducible finite cohort of disclosures with a dated recorded early license termination?

Disclosed amendment, scientific amendment 2, revision v004; native schema version 1. The operator reviewed a prior-run manuscript; this author received no empirical results. Prospective execution specification only. This Atom is pending; no APTO observation, numerical result or realized state is asserted. Its registration payload owns its protocol, activation and possible results.

atom-000002: Later recorded partners

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible termination_date, breaking ties by exact lexicographic agreement_id. Set index_effective_date = a0.effective_date and t0 = a0.termination_date. Never set t0 from index_effective_date. A candidate event timestamp s = a1.effective_date must satisfy t0 < s; signature is a separate strict-only requirement. H1/H2/H3/H5 and the 31-day guard are measured from termination t0. Receipts alone use s as their one-year origin. All examples whose t0 was implicit use this explicit termination definition.

Status: primary registered descriptive estimate, not a confirmatory statistical test. Population, unit, index dates, exclusions and fixed N are exactly DC5 as frozen by Atom 1. No dropping recent records, missing P0, unknown later links or negative cases. Time horizon is H3, with H1 and H2 descriptive illustrations only. Exposure

is eligibility after recorded termination; outcome is DC6's retrospective recorded-ID event. There are no controls or treatment effects.

Execute in order: 1. Reproduce Atom 1's frozen cohort and validate its input hashes/projections; diagnose source mismatch before estimates. Verify many-to-one joins and preservation of all N including histories with no later rows. Expand all linked candidate agreements; do not filter out a record with an unresolved relevant field before deciding whether it could be a witness. 2. At H1, H2 and H3 apply DC6 per disclosure. Use disjoint sets rather than a lead-party ID; known common ID makes a candidate nonqualifying. Known new party alongside a common party is not a disjoint-set event. Preserve same-day starts as not post-termination, and missing dates as possibly in-horizon unless decisively ruled out. Obtain all definite witness pairs and the earliest witness date. Preserve remaining candidates as impossible or unresolved with precise reason. 3. Apply DC6's explicit simultaneous marginal monotonic closure on the H1,H2,H3 raw indicator arrays; retain raw and closed indicators in restricted evidence. Then compute exact $L_h, U_h, W_h = \text{sum}(l_o), Z_h = \text{sum}(1-h_i), Q_h = \text{sum}(h_i-l_o)$; assert $W+Z+Q=N$. Enforce logical monotonicity: $l_o(H1) \leq l_o(H2) \leq l_o(H3), h_i(H1) \leq h_i(H2) \leq h_i(H3)$. Cross-horizon knowledge is shared, so a certified absence through H3 certifies absence through earlier horizons unless an earlier definite witness exposes an error. Any violation is a software/data-contract error, not a statistical result. 4. Report $[L3, U3]$ as the primary bound and plot lower/upper cumulative envelopes at 1,2,3 years. Report N, distinct index agreements and contributing tenants, but no equal-university or field-specific outcome alternatives. An additional delay histogram among earliest witnessed events uses bins $(t_0, t_0+30 \text{ civil days}], (t_0+30 \text{ civil days}, H1], (H1, H2], (H2, H3]$; evaluate membership using each disclosure's own calendar anniversaries so the bins agree with cumulative event clocks, including leap years. Label it conditional on witnessed events and as earliest definite recorded-effective-date timing, not earliest possible timing when another candidate is unresolved; it is not a median waiting time for the full cohort. Report DC6 signature chronology flags for all broad witness paths (path denominator) and earliest-witness paths (W3 denominator), with missing flags explicit. A known late signature never changes an event's anniversary or delay bin; broad rates cannot establish execution by that anniversary. 5. Sensitivity: report missingness-specific counts, bound width $Q3/N$ and unresolved indicators needed for the interval to cross 0.10: the smallest integer $k \geq 0$ such that $(W3+k)/N \geq 0.10$, capped at Q3 and labeled unreachable if required $k > Q3$. No power calculation based on schema; no arbitrary precision cutoff. Attach all index flags and coverage restrictions to the interpretation. 6. Adjudicate the ordered regions. $U3=0$ means exact zero supported for this finite recorded cohort and lies in `low_no_witness`; $U3>0$ with $W3=0$ must not be called no subsequent contracting. Equal 0.10 is material when $L3=0.10$ and uncertain when only $U3=0.10$. Outcomes do not change N, classes or h.

Synthetic checks: $N=4$ with two definite witnesses, one supported non-event and one unresolved gives $[0.50, 0.75]$ (synthetic only); a missing-date linked license makes an otherwise empty history unknown; missing follow-up with no candidates gives $[0, 1]$ for that unit; common old/new party ID prevents a witness; same-date new agreement does not qualify; later start outside H3 can qualify at H5 only; duplicated parties/links

and input order leave bounds unchanged; a receipt never influences witness selection. With `t0=2000-01-01`, `effective=2000-07-01`, `signature=2004-01-01`, complete history and valid disjoint parties, H1/H2/H3 indicators are all one and the earliest witness is in the first-anniversary bin; H5 adds no first event. Missing signature produces the identical broad indicators and timing with a missing chronology flag; both cases fail or leave unknown the separate strict signature condition as DC7 requires. An effective date after H3 but by H5, with certified no earlier event, alone supports a late first event. Test an event exactly on a leap-spanning H1 anniversary against its cumulative and histogram membership. Test exact threshold equality and every local region.

Consequences: `material`, `witnessed_uncertain` and `low_with_witness` activate Atoms 3 and 5. Both low states, `witnessed_uncertain` and `unresolved_no_witness` activate Atom 7. `Material` does not activate Atom 7. `Boundary/otherwise/no_result` stop dependent scientific branches. The two low states have the same rate interpretation but differ in whether a downstream witness population exists; they are local states, not additional scientific Atoms.

Exact input fields and provenance: `disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls)`, `disclosure_agreement(disclosure_id,agreement_id,role)`, `agreement(agreement_id,agreement_local_id,type_cls,f)`, `agreement_counterparty(agreement_id,counterparty_id)`, `counterparty(counterparty_id,counterparty_local_id)`. Use supplied schema-only.md lines 9–51 and 89–149, DC2. All are allowed APTO tables, physical lowercase. Frozen semantic coding is `second-chances-termination-v3` plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record descriptive estimand, not a sampled population or causal effect. No estimator standard errors, clustering-based p-values, confirmatory hypotheses or significance tests are registered (statistical multiplicity family size zero); no holdout is used. Shared agreements create dependence and unit multiplicity, which must be reported, not hidden with independent-Bernoulli intervals. Logical uncertainty from unresolved indicators is distinct from misclassification, population selection and construct uncertainty. No welfare SESOI or statistical-equivalence claim exists. Report exact fractions/bounds and thresholds as descriptive only. Never infer prevalence or precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema version 1): Invoke `prereg/execution/run_atom.py -atom atom-000002`; `analysis.atom2` implements this Atom, using `core.Records` and DC1–DC9. The authority remains this Atom protocol. Load the exact projections and metadata statuses described in `execution/input-interface.md`. All ten metadata inspections precede cohort freezing; no real class values, mounts or coverage are supplied by this draft. Missing production definitions are registered unresolved requirements, not permission to invent a default. The input adapter’s CSV/Parquet paths are governed bindings, not scientific choices. Keep the same input fingerprint and cohort hash across all descendants; ledger rows are read only by Atoms 5–6 and have a separate frozen hash.

A changed frozen non-ledger source is operational no_result unless a completed, cited source-contract inspection establishes the boundary region specified here. Atom 5's frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by analysis.atom2; construction and tri-valued predicates are core.Records.select_indices/history/strict/receipts as appropriate. As an explicit necessary-condition clarification, a known signature at or before index termination fails the strict requirement even when the later effective date is unknown; a missing signature remains unknown. Other known false strict requirements likewise dominate unresolved facts. An invalid cross-tenant candidate link is never a witness and leaves a possible-event flag within an eligible disclosure history. Zero-tolerance cardinality assertions apply to joins; duplicate links become sets and cannot multiply outcomes. Individual broken/conflicting keys are audited and quarantined as DC4 specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000002/ contains provenance.json (semantic/execution-code, source/cohort and applicable ledger hashes, Python version, timestamp); diagnostics.csv (check,order,numerator,denominator,status,reason); disposition.json (atom,state or null,terminal or null,status,activation text/value,trace,reason,hashes); synthetic-checks.json (current synthetic proof and code hash). Numerical values are emitted only after a completed scientific state. Inactive or failed work emits disposition/provenance/diagnostics and no numerical tables. Registered numerical interfaces: release-candidate/transition-bounds.csv (N, W, Z, Q, L, U, h, index_agreements, tenants); release-candidate/delays.csv (interval, count); release-candidate/signature-chronology.csv (flag, unit, numerator, denominator). Restricted derivations: events.csv (d,a0,a1,t0,index_effective_date,s,value,reason,delay_days); indicators.csv (d,h,lo,hi,earliest,coverage,horizon_years,raw_lo,raw_hi,closed_lo,closed_hi). Every completed Atom also writes restricted/field-missingness.csv (table,field,missing,rows), restricted/source-metadata.csv (tenant,metadata), restricted/result.json (reproducible complete module payload for downstream binding), and restricted/metrics.json when numerical public-candidate tables exist. CSV nested objects use JSON text; raw transaction values never enter World prose. The machine-checkable column index is execution/output-contract.yaml, subordinate to this protocol.

Figure 2 is implemented at prereg/paper/figures/figure2.py and consumes only its figures.yaml tables. The governed visualizer creates release-candidate/figure2.pdf after disclosure screening; the analysis dispatcher does not render or publish raw records. This replaces the SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without replacing estimands. Atom 1 composition remains a full table; other paired displays can occupy panels within one figure. Figure code calculates no new estimator. Empty, partial and unactivated inputs produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-figure integration in figure_checks.py. Generated values, PDFs, PNGs and test logs stay outside the World. Tests include the independently specified decade between index

effective date and termination; agreements on both sides of termination; selection separately from timing; leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards; unknown versus false; source mismatch; cohort/bundle/cardinality invariance; classifications and receipt timing; exact integer thresholds; every mandatory branch; missing/partial/inactive plot inputs and long-label/close-endpoint geometry. Any failed prerequisite test stops data execution as `no_result`; a passing test does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interruptions, read/cast-contract errors, failed assertions and unresolved software defects are terminal `no_result` with no scientific state or estimate; missing data documented as an evidenced construct boundary follows that boundary region. Missing retention remains indicator uncertainty, not a statistical null. Unrun members remain pending while predecessors may resolve and not `_activated` with trace at closeout. Report restrictions before compatible primary/supplementary Molecule clauses, then residual unresolved scope. No result licenses a new cohort, clock, code mapping, causal claim or unregistered estimator.

Threshold-sensitivity output retains both raw required `_unresolved k` and capped `_unresolved = min(k,Q)`, together with available `_unresolved Q` and reachable `= (k<=Q)`. This preserves the registered cap and explicit unreachable distinction without changing adjudication. For Atom 2 these values are in `restricted/metrics.json`; `strict-bounds.csv` and `late-bounds.csv` include them in their registered candidate summary.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance revision v002; native schema version 1). The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results. Use explicit `-world READ_ONLY_WORLD` and `-source-root EXECUTING_SRC` with `run_atom.py`. The source root contains execution/ and paper/figures/; the World root contains atoms/, molecules/, prereg/. Never infer the deployed World from **file**. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `-synthetic-fixture` is mutually exclusive with `-inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared

columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are field-missingness.csv(table,field,missing,rows) and source-metadata.csv(tenant,metadata); diagnostics.csv(check,order,numerator,denominator,status,reason) is fixed for all dispositions. Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events. Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label report_mode=partial_preview. Final closeout requires an explicit result/no_result for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in output-contract.yaml and results-bindings.yaml. Suppressing Atom 3 also suppresses Atom 6 continuity_state in table/metric presentation and receipt_continuity_scope, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression. Every figure implements the registered DataFrame API with no data reads or estimator. Runtime style_dir binds the supplied HelveticaNeue regular/medium/bold/italic TrueType files by exact path; missing required fonts fail, while style_dir=None is explicitly preview-only. Rerender both widths, enforce <=170 mm height, and retain vector/font/Unicode/page checks. The chart catalog and render-package layouts remain disabled; manuscript class and compiler-owned TeX/PDF checks remain intact. Tests include absent, partial, inactive/no_result inputs, long labels, nearby endpoints and both certain/possible overlap. Synthetic output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual and local source/cohort freezes and the applicable ledger freeze; incompatible snapshots cannot be composed into one reported study. A mismatch blocks publication assembly pending governed resolution, never changes a completed estimate or silently refreshes a predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific amendment 2). execution/README.md indexes this Atom’s complete runnable command, analysis callable, exact inputs, outputs and synthetic checks. Shared implementations are used, not seven duplicate estimators. Standalone -dispatch-policy activation_respecting is the default and retains the activation expression above. An explicit -dispatch-policy direct attempts this selected Atom immediately, without

waiting for outer activation. Runtime direct scheduling selects the first B members in Molecule membership order; budget is a dispatch choice recorded before execution, never chosen from results. No registered scientific question, local key, estimator, clock, threshold, conditional scope or graph edge changes. Direct dispatch cannot waive input validity or conditional scientific meaning. Reuse actual supplied scientific predecessors and their frozen fingerprints; never replace a supplied `no_result` with a successful retry. If a predecessor record is absent, pending, `not_activated` or `budget_unselected`, registered DC1–DC8 constructions may be computed locally from genuinely supplied projections, using `analysis.py` and `dispatch.local_inputs`. Follow the source Atom activation references to order these calculations; they are internal evidence, not new experiments or accepted predecessor World Atoms. Also construct the shared cohort and broad indicators where this module requires them. Save each local calculation, source-protocol citation, frozen source/cohort/ledger identity, exact outputs and content digest in `restricted/local-construction.json` and `local_evidence` provenance. Never insert these calculations into the caller’s prior results or the World roster. A source-protocol ID in that file is a citation, not a realized member record. All supplied source/cohort and applicable ledger freezes remain binding. Promised but unavailable data, incomplete inspection, failed software or required predecessor `no_result` yields this Atom’s operational `no_result`. Completed evidence establishing an existing boundary follows only that registered boundary region. If local or supplied evidence shows this Atom’s conditional scientific scope is false or unresolved, complete it as the existing otherwise state, with the explicit conditional-scope reason and no numerical rate. In particular, direct dispatch cannot turn `all_strict` into the selected Atom 4 claim, material into the selected Atom 7 claim, or unavailable receipt support into a financial result. Otherwise does not assert a statistical null. Conditional scope is checked with the same registered expression, using actual or explicitly local evidence; no new graph is authored. `disposition.json`, `restricted/result.json` and `provenance.json` record `dispatch_policy` and whether outer activation was bypassed; direct results record `scientific_condition_value` and `local_evidence`, and Atom 6 records `source_state_origins`. These are restricted execution metadata until disclosure approval. Local continuity is labeled as such in the receipt continuity slot; it never claims an accepted Atom 3 result. All source-dependent copies inherit source disclosure limits, including protected local copies. No local evidence may satisfy a missing predecessor World condition in a Molecule composite claim; restrictions always apply and standalone result slots remain scoped to their producing Atom. Publication closeout explicitly declares `dispatch_policy` and, for direct mode, B via budget. It lists all seven members: selected direct attempts retain `done/otherwise/boundary/no_result`; unselected members are `budget_unselected`, never falsely `not_activated`. Missing selected work blocks final closeout; true partial previews remain pending. Default activation-respecting closeout is unchanged. For every source-dependent slot apply disclosure suppression first, including protected source states; then the consuming Atom’s `no_result/not_activated/budget_unselected` or completed `boundary/otherwise`; only an actually incomplete preview may use missing-source pending. A final active result lacking essential source/local evidence raises an error. The four reviewed closed inactive routes (empty cohort, evidenced cohort boundary, root `no_result`, continuity

no_result) must never report pending or preview in these slots. Runnable tests are test_amendment.py, amendment_checks.py and the full test_synthetic.py entry point.

Complete registration fields

```
id: atom-000002
topic: Later recorded partners
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: What fraction of eligible disclosures has a documented commercial
    agreement with disjoint recorded parties within three years of its index
    termination?
  rationale: This is the primary finite-cohort estimate, separating witnessed
    later contracting from certified absence and unresolved follow-up. Annual
    envelopes illustrate timing without selecting a survival model.
  assumption: DC6 witnesses must be correctly dated and linked; negative
    ↪ evidence
    requires independent retention/coverage support. Endogenous termination
    and retrospective links forbid causal or legal-rights claims.
  target_strength: descriptive
  target_shape: temporal
  ratings:
    importance: 4
    novelty: 4
    feasibility: 3
    data_advantage: 4
    informativeness: 0.7
  tables:
    - DISCLOSURE
    - DISCLOSURE_AGREEMENT
    - AGREEMENT
    - AGREEMENT_COUNTERPARTY
    - COUNTERPARTY
  activation: state(atom-000001) == "usable"
  verdicts:
    - key: boundary
      region: Reproduction proves the frozen cohort or essential event fields
        no longer meet the registered schema/identity contract; this is an
        ↪ evidenced
        source-contract change, not a transient query error.
      says: The primary estimand cannot be adjudicated under the frozen input
        contract; report source mismatch, not a zero.
    - key: material
      region: N>0, computation/assertions complete and L3>=0.10 (including
        ↪ equality).
      says: At least one in ten eligible recorded disclosures has a qualifying
        later-party record within three years, under the recorded-ID definition;
        report [L3,U3] and no causal claim.
    - key: low_with_witness
      region: N>0, computation/assertions complete, U3<0.10 and W3>0.
```

says: The full logical range is below the author-set one-in-ten attention threshold within this cohort. This is not an equivalence or welfare-null result. Definite witnesses permit the registered continuity and receipt follow-ups.

- key: low_no_witness
region: $N > 0$, computation/assertions complete, $U3 < 0.10$ and $W3 = 0$.
says: The full logical range is below the author-set one-in-ten attention threshold within this cohort. This is not an equivalence or welfare-null result. No definite witness is established; distinguish certified $U3 = 0$ from unresolved $U3 > 0$.
- key: witnessed_uncertain
region: $N > 0$, $L3 < 0.10 \leq U3$ and the count of three-year definite witnesses $W3 > 0$.
says: Later-party records exist, but incomplete information prevents
↳ classification
relative to the attention threshold.
- key: unresolved_no_witness
region: $N > 0$, $L3 = 0$ and $U3 \geq 0.10$.
says: No definite later-party record has been established; the supported range still allows a material share. This is unresolved evidence, not absence.
- key: otherwise
region: otherwise
says: Completed evidence leaves this judgment unresolved. Report the
↳ unresolved
scope; no negative or equivalent-effect claim is licensed.

protocol: |

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible
↳ termination_date, breaking ties by exact lexicographic agreement_id.
↳ Set index_effective_date = a0.effective_date and t0 =
↳ a0.termination_date. Never set t0 from index_effective_date. A
↳ candidate event timestamp s = a1.effective_date must satisfy $t0 < s$;
↳ signature is a separate strict-only requirement. H1/H2/H3/H5 and the
↳ 31-day guard are measured from termination t0. Receipts alone use s
↳ as their one-year origin. All examples whose t0 was implicit use this
↳ explicit termination definition.

Status: primary registered descriptive estimate, not a confirmatory
↳ statistical test. Population, unit, index dates, exclusions and fixed
↳ N are exactly DC5 as frozen by Atom 1. No dropping recent records,
↳ missing P0, unknown later links or negative cases. Time horizon is
↳ H3, with H1 and H2 descriptive illustrations only. Exposure is eligib
↳ ility after recorded termination; outcome is DC6's retrospective
↳ recorded-ID event. There are no controls or treatment effects.

Execute in order:

1. Reproduce Atom 1's frozen cohort and validate its input
↳ hashes/projections; diagnose source mismatch before estimates. Verify
↳ many-to-one joins and preservation of all N including histories with
↳ no later rows. Expand all linked candidate agreements; do not filter
↳ out a record with an unresolved relevant field before deciding
↳ whether it could be a witness.
2. At H1, H2 and H3 apply DC6 per disclosure. Use disjoint sets rather th
↳ an a lead-party ID; known common ID makes a candidate nonqualifying.
↳ Known new party alongside a common party is not a disjoint-set event.
↳ Preserve same-day starts as not post-termination, and missing dates
↳ as possibly in-horizon unless decisively ruled out. Obtain all
↳ definite witness pairs and the earliest witness date. Preserve
↳ remaining candidates as impossible or unresolved with precise reason.

3. Apply DC6's explicit simultaneous marginal monotonic closure on the
 - H1,H2,H3 raw indicator arrays; retain raw and closed indicators in restricted evidence. Then compute exact $L_h, U_h, W_h = \text{sum}(l_o)$, $Z_h = \text{sum}(1 - h_i)$, $Q_h = \text{sum}(h_i - l_o)$; assert $W + Z + Q = N$. Enforce logical monotonicity: $l_o(H1) \leq l_o(H2) \leq l_o(H3)$, $h_i(H1) \leq h_i(H2) \leq h_i(H3)$.
 - Cross-horizon knowledge is shared, so a certified absence through H3 certifies absence through earlier horizons unless an earlier definite witness exposes an error. Any violation is a software/data-contract error, not a statistical result.
4. Report $[L3, U3]$ as the primary bound and plot lower/upper cumulative envelopes at 1,2,3 years. Report N, distinct index agreements and contributing tenants, but no equal-university or field-specific outcome alternatives. An additional delay histogram among earliest witnessed events uses bins $(t_0, t_0+30 \text{ civil days}]$, $(t_0+30 \text{ civil days}, H1]$, $(H1, H2]$, $(H2, H3]$; evaluate membership using each disclosure's own calendar anniversaries so the bins agree with cumulative event clocks, including leap years. Label it conditional on witnessed events and as earliest definite recorded-effective-date timing, not earliest possible timing when another candidate is unresolved; it is not a median waiting time for the full cohort. Report DC6 signature chronology flags for all broad witness paths (path denominator) and earliest-witness paths ($W3$ denominator), with missing flags explicit. A known late signature never changes an event's anniversary or delay bin; broad rates cannot establish execution by that anniversary.
5. Sensitivity: report missingness-specific counts, bound width $Q3/N$ and unresolved indicators needed for the interval to cross 0.10: the smallest integer $k \geq 0$ such that $(W3+k)/N \geq 0.10$, capped at $Q3$ and labeled unreachable if required $k > Q3$. No power calculation based on schema; no arbitrary precision cutoff. Attach all index flags and coverage restrictions to the interpretation.
6. Adjudicate the ordered regions. $U3=0$ means exact zero supported for this finite recorded cohort and lies in low_no_witness; $U3>0$ with $W3=0$ must not be called no subsequent contracting. Equal 0.10 is material when $L3=0.10$ and uncertain when only $U3=0.10$. Outcomes do not change N, classes or h.

Synthetic checks: $N=4$ with two definite witnesses, one supported
 → non-event and one unresolved gives $[0.50, 0.75]$ (synthetic only); a
 → missing-date linked license makes an otherwise empty history unknown;
 → missing follow-up with no candidates gives $[0, 1]$ for that unit;
 → common old/new party ID prevents a witness; same-date new agreement
 → does not qualify; later start outside H3 can qualify at H5 only;
 → duplicated parties/links and input order leave bounds unchanged; a
 → receipt never influences witness selection. With $t_0=2000-01-01$,
 → effective=2000-07-01, signature=2004-01-01, complete history and
 → valid disjoint parties, H1/H2/H3 indicators are all one and the
 → earliest witness is in the first-anniversary bin; H5 adds no first
 → event. Missing signature produces the identical broad indicators and
 → timing with a missing chronology flag; both cases fail or leave
 → unknown the separate strict signature condition as DC7 requires. An
 → effective date after H3 but by H5, with certified no earlier event,
 → alone supports a late first event. Test an event exactly on a
 → leap-spanning H1 anniversary against its cumulative and histogram
 → membership. Test exact threshold equality and every local region.

Consequences: material, witnessed_uncertain and low_with_witness activate
 ↳ Atoms 3 and 5. Both low states, witnessed_uncertain and
 ↳ unresolved_no_witness activate Atom 7. Material does not activate
 ↳ Atom 7. Boundary/otherwise/no_result stop dependent scientific
 ↳ branches. The two low states have the same rate interpretation but
 ↳ differ in whether a downstream witness population exists; they are
 ↳ local states, not additional scientific Atoms.

Exact input fields and provenance:

↳ disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls),
 ↳ disclosure_agreement(disclosure_id,agreement_id,role),
 ↳ agreement(agreement_id,agreement_local_id,type_cls,field_of_use_cls,e
 ↳ ffective_date,expiration_date,termination_date,sign_date),
 ↳ agreement_counterparty(agreement_id,counterparty_id),
 ↳ counterparty(counterparty_id,counterparty_local_id). Use supplied
 ↳ schema-only.md lines 9-51 and 89-149, DC2. All are allowed APTO
 ↳ tables, physical lowercase. Frozen semantic coding is
 ↳ second-chances-termination-v3 plus provider dictionary hashes bound
 ↳ by Atom 1, DC3. No undocumented field or current status is
 ↳ substituted. Apply DC4: entity many-to-one assertions; distinct pair
 ↳ joins; party-set reduction before disclosure history joins; no
 ↳ cross-tenant joins or silent loss of dangling candidate links. Every
 ↳ reused derived table is reproduced from these projections and checked
 ↳ against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record

↳ descriptive estimand, not a sampled population or causal effect. No
 ↳ estimator standard errors, clustering-based p-values, confirmatory
 ↳ hypotheses or significance tests are registered (statistical
 ↳ multiplicity family size zero); no holdout is used. Shared agreements
 ↳ create dependence and unit multiplicity, which must be reported, not
 ↳ hidden with independent-Bernoulli intervals. Logical uncertainty from
 ↳ unresolved indicators is distinct from misclassification, population
 ↳ selection and construct uncertainty. No welfare SESOI or
 ↳ statistical-equivalence claim exists. Report exact fractions/bounds
 ↳ and thresholds as descriptive only. Never infer prevalence or
 ↳ precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema
 ↳ version 1):

Invoke prereg/execution/run_atom.py --atom atom-000002; analysis.atom2
 ↳ implements this Atom, using core.Records and DC1-DC9. The authority
 ↳ remains this Atom protocol. Load the exact projections and metadata
 ↳ statuses described in execution/input-interface.md. All ten metadata
 ↳ inspections precede cohort freezing; no real class values, mounts or
 ↳ coverage are supplied by this draft. Missing production definitions
 ↳ are registered unresolved requirements, not permission to invent a
 ↳ default. The input adapter's CSV/Parquet paths are governed bindings,
 ↳ not scientific choices. Keep the same input fingerprint and cohort
 ↳ hash across all descendants; ledger rows are read only by Atoms 5-6
 ↳ and have a separate frozen hash. A changed frozen non-ledger source
 ↳ is operational no_result unless a completed, cited source-contract
 ↳ inspection establishes the boundary region specified here. Atom 5's
 ↳ frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by

- analysis.atom2; construction and tri-valued predicates are
- core.Records.select_indices/history/strict/receipts as appropriate.
- As an explicit necessary-condition clarification, a known signature
- at or before index termination fails the strict requirement even when
- the later effective date is unknown; a missing signature remains
- unknown. Other known false strict requirements likewise dominate
- unresolved facts. An invalid cross-tenant candidate link is never a
- witness and leaves a possible-event flag within an eligible
- disclosure history. Zero-tolerance cardinality assertions apply to
- joins; duplicate links become sets and cannot multiply outcomes.
- Individual broken/conflicting keys are audited and quarantined as DC4
- specifics, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000002/ contains

- provenance.json (semantic/execution-code, source/cohort and
- applicable ledger hashes, Python version, timestamp); diagnostics.csv
- (check,order,numerator,denominator,status,reason); disposition.json
- (atom,state or null,terminal or null,status,activation text/value,tra
- ce.reason,hashes); synthetic-checks.json (current synthetic proof and
- code hash). Numerical values are emitted only after a completed
- scientific state. Inactive or failed work emits disposition/provenanc
- e/diagnostics and no numerical tables. Registered numerical
- interfaces: release-candidate/transition-bounds.csv (N, W, Z, Q, L,
- U, h, index_agreements, tenants); release-candidate/delays.csv
- (interval, count); release-candidate/signature-chronology.csv (flag,
- unit, numerator, denominator). Restricted derivations: events.csv
- (d,a0,a1,t0,index_effective_date,s,value,reason,delay_days);
- indicators.csv (d,h,lo,hi,earliest,coverage,horizon_years,raw_lo,raw_
- hi,closed_lo,closed_hi). Every completed Atom also writes
- restricted/field-missingness.csv (table,field,missing,rows), restrict
- ed/source-metadata.csv (tenant,metadata), restricted/result.json
- (reproducible complete module payload for downstream binding), and
- restricted/metrics.json when numerical public-candidate tables exist.
- CSV nested objects use JSON text; raw transaction values never enter
- World prose. The machine-checkable column index is
- execution/output-contract.yaml, subordinate to this protocol.

Figure 2 is implemented at prereg/paper/figures/figure2.py and consumes

- only its figures.yaml tables. The governed visualizer creates release
- -candidate/figure2.pdf after disclosure screening; the analysis
- dispatcher does not render or publish raw records. This replaces the
- SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without
- replacing estimands. Atom 1 composition remains a full table; other
- paired displays can occupy panels within one figure. Figure code
- calculates no new estimator. Empty, partial and unactivated inputs
- produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-f

- igure integration in figure_checks.py. Generated values, PDFs, PNGs
- and test logs stay outside the World. Tests include the independently
- specified decade between index effective date and termination; agreem
- ents on both sides of termination; selection separately from timing;
- leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards;
- unknown versus false; source mismatch; cohort/bundle/cardinality
- invariance; classifications and receipt timing; exact integer
- thresholds; every mandatory branch; missing/partial/inactive plot
- inputs and long-label/close-endpoint geometry. Any failed
- prerequisite test stops data execution as no_result; a passing test
- does not establish actual APT0 availability or empirical validity.

Local states use the first matching registered region. Operational interr
 ↪ uptions, read/cast-contract errors, failed assertions and unresolved
 ↪ software defects are terminal no_result with no scientific state or
 ↪ estimate; missing data documented as an evidenced construct boundary
 ↪ follows that boundary region. Missing retention remains indicator unc
 ↪ ertainty, not a statistical null. Unrun members remain pending while
 ↪ predecessors may resolve and not_activated with trace at closeout.
 ↪ Report restrictions before compatible primary/supplementary Molecule
 ↪ clauses, then residual unresolved scope. No result licenses a new
 ↪ cohort, clock, code mapping, causal claim or unregistered estimator.

Threshold-sensitivity output retains both raw required_unresolved k and c
 ↪ apped_unresolved = min(k,Q), together with available_unresolved Q and
 ↪ reachable = (k<=Q). This preserves the registered cap and explicit
 ↪ unreachable distinction without changing adjudication. For Atom 2
 ↪ these values are in restricted/metrics.json; strict-bounds.csv and
 ↪ late-bounds.csv include them in their registered candidate summary.

VOO2 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance
 ↪ revision v002; native schema version 1).

The same question, Atom IDs, result keys, activation, population,
 ↪ horizons, thresholds and finite-record inferential status are
 ↪ retained. These repairs implement the registered science; none was
 ↪ selected from empirical results.

Use explicit --world READ_ONLY_WORLD and --source-root EXECUTING_SRC with
 ↪ run_atom.py. The source root contains execution/ and paper/figures/;
 ↪ the World root contains atoms/, molecules/, prereg/. Never infer the
 ↪ deployed World from __file__. The dispatcher, saver and test runner
 ↪ propagate both roots. provenance.py hashes a fixed nonempty roster of
 ↪ executing Python sources, separately from immutable Atom/Molecule
 ↪ protocols and scientific/interface sources in the World. Missing
 ↪ files, stale/incomplete certificates or mismatched predecessor
 ↪ code/World/registration identity stop data access as operational
 ↪ no_result. Required certificate checks are unit_semantics,
 ↪ file_formats, copied_cli and runtime_figures, including 130.7 mm and
 ↪ 180 mm exports checked with validate_exports and the exact supplied
 ↪ fonts. Unit-only reports do not authorize bound data. Built-in
 ↪ --synthetic-fixture is mutually exclusive with --inputs and generates
 ↪ artificial records only; its disposition is not a production
 ↪ certificate. Pure in-memory functions are for synthetic/unit use; the
 ↪ governed entry point is the certificate-gated CLI. The complete test
 ↪ runner invokes copied source against a separate World using persisted
 ↪ predecessors, and also exercises the ordinary certified CSV-input CLI.
 All restricted CSV schemas, including zero-row scientific outputs, are fi
 ↪ xed in output-contract.yaml (interface 2). Optional audit values are
 ↪ empty cells in their declared columns, not omitted headers. An empty
 ↪ cohort, empty witness table or empty ledger-derived audit retains its
 ↪ scientific table schema. Failed/inactive work instead emits
 ↪ nonnumerical disposition and diagnostic files. Common restricted
 ↪ headers are field-missingness.csv(table,field,missing,rows) and
 ↪ source-metadata.csv(tenant,metadata);
 ↪ diagnostics.csv(check,order,numerator,denominator,status,reason) is
 ↪ fixed for all dispositions.

Raw provenance represents numeric NaN, +infinity and -infinity with
 ↳ distinct tagged scalar objects before JSON hashing; original strings
 ↳ remain strings. Duplicate/conflict audits remain deterministic and
 ↳ retain representational distinctions. Receipt normalization then
 ↳ converts all nonfinite/unparseable amounts to unknown under DC8, rega
 ↳ rdless of memory/CSV/Parquet representation. File representations may
 ↳ have different raw provenance hashes; they must produce equivalent
 ↳ scientific indicators and result states for semantically equivalent
 ↳ inputs. Unknown amounts are never zeros or dropped records. Known cos
 ↳ t/out-of-window events remain decisively irrelevant, while a definite
 ↳ positive witness dominates unresolved potentially positive events.

Publication assembly first reconciles with authoritative Molecule members
 ↳ hip. Partial previews list all seven members as observed dispositions
 ↳ or explicitly pending and label report_mode=partial_preview. Final
 ↳ closeout requires an explicit result/no_result for every activated
 ↳ member; it may derive inactive dispositions only from registered
 ↳ conditions and predecessor closure, preserving unknownness. A missing
 ↳ activated analysis prevents final closeout. Source boundaries and
 ↳ failed predecessors do not become negative evidence. Direct copied so
 ↳ urce-state columns have declared dependencies in output-contract.yaml
 ↳ and results-bindings.yaml. Suppressing Atom 3 also suppresses Atom 6
 ↳ continuity_state in table/metric presentation and receipt_continuity_
 ↳ scope, direct Atom 3 slots, and protected interpretation/trace
 ↳ material; independently releasable financial quantities remain
 ↳ subject to governed approval and complementary suppression.

Every figure implements the registered DataFrame API with no data reads
 ↳ or estimator. Runtime style_dir binds the supplied HelveticaNeue regu
 ↳ lar/medium/bold/italic TrueType files by exact path; missing required
 ↳ fonts fail, while style_dir=None is explicitly preview-only. Rerender
 ↳ both widths, enforce <=170 mm height, and retain vector/font/Unicode/
 ↳ page checks. The chart catalog and render-package layouts remain
 ↳ disabled; manuscript class and compiler-owned TeX/PDF checks remain i
 ↳ ntact. Tests include absent, partial, inactive/no_result inputs, long
 ↳ labels, nearby endpoints and both certain/possible overlap. Synthetic
 ↳ output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual
 ↳ and local source/cohort freezes and the applicable ledger freeze;
 ↳ incompatible snapshots cannot be composed into one reported study. A
 ↳ mismatch blocks publication assembly pending governed resolution,
 ↳ never changes a completed estimate or silently refreshes a
 ↳ predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific
 ↳ amendment 2).

execution/README.md indexes this Atom's complete runnable command,
 ↳ analysis callable, exact inputs, outputs and synthetic checks. Shared
 ↳ implementations are used, not seven duplicate estimators. Standalone
 ↳ --dispatch-policy activation_respecting is the default and retains
 ↳ the activation expression above. An explicit --dispatch-policy direct
 ↳ attempts this selected Atom immediately, without waiting for outer
 ↳ activation. Runtime direct scheduling selects the first B members in
 ↳ Molecule membership order; budget is a dispatch choice recorded
 ↳ before execution, never chosen from results. No registered scientific
 ↳ question, local key, estimator, clock, threshold, conditional scope
 ↳ or graph edge changes.

Direct dispatch cannot waive input validity or conditional scientific
 ↳ meaning. Reuse actual supplied scientific predecessors and their
 ↳ frozen fingerprints; never replace a supplied no_result with a
 ↳ successful retry. If a predecessor record is absent, pending,
 ↳ not_activated or budget_unselected, registered DC1-DC8 constructions
 ↳ may be computed locally from genuinely supplied projections, using
 ↳ analysis.py and dispatch.local_inputs. Follow the source Atom
 ↳ activation references to order these calculations; they are internal
 ↳ evidence, not new experiments or accepted predecessor World Atoms.
 ↳ Also construct the shared cohort and broad indicators where this
 ↳ module requires them. Save each local calculation, source-protocol
 ↳ citation, frozen source/cohort/ledger identity, exact outputs and
 ↳ content digest in restricted/local-construction.json and
 ↳ local_evidence provenance. Never insert these calculations into the
 ↳ caller's prior results or the World roster. A source-protocol ID in
 ↳ that file is a citation, not a realized member record.
 All supplied source/cohort and applicable ledger freezes remain binding.
 ↳ Promised but unavailable data, incomplete inspection, failed software
 ↳ or required predecessor no_result yields this Atom's operational
 ↳ no_result. Completed evidence establishing an existing boundary
 ↳ follows only that registered boundary region. If local or supplied
 ↳ evidence shows this Atom's conditional scientific scope is false or
 ↳ unresolved, complete it as the existing otherwise state, with the
 ↳ explicit conditional-scope reason and no numerical rate. In
 ↳ particular, direct dispatch cannot turn all_strict into the selected
 ↳ Atom 4 claim, material into the selected Atom 7 claim, or unavailable
 ↳ receipt support into a financial result. Otherwise does not assert a
 ↳ statistical null. Conditional scope is checked with the same
 ↳ registered expression, using actual or explicitly local evidence; no
 ↳ new graph is authored.
 disposition.json, restricted/result.json and provenance.json record
 ↳ dispatch_policy and whether outer activation was bypassed; direct
 ↳ results record scientific_condition_value and local_evidence, and
 ↳ Atom 6 records source_state_origins. These are restricted execution
 ↳ metadata until disclosure approval. Local continuity is labeled as
 ↳ such in the receipt continuity slot; it never claims an accepted Atom
 ↳ 3 result. All source-dependent copies inherit source disclosure
 ↳ limits, including protected local copies. No local evidence may
 ↳ satisfy a missing predecessor World condition in a Molecule composite
 ↳ claim; restrictions always apply and standalone result slots remain
 ↳ scoped to their producing Atom.
 Publication closeout explicitly declares dispatch_policy and, for direct
 ↳ mode, B via budget. It lists all seven members: selected direct
 ↳ attempts retain done/otherwise/boundary/no_result; unselected members
 ↳ are budget_unselected, never falsely not_activated. Missing selected
 ↳ work blocks final closeout; true partial previews remain pending.
 ↳ Default activation-respecting closeout is unchanged. For every
 ↳ source-dependent slot apply disclosure suppression first, including
 ↳ protected source states; then the consuming Atom's
 ↳ no_result/not_activated/budget_unselected or completed
 ↳ boundary/otherwise; only an actually incomplete preview may use
 ↳ missing-source pending. A final active result lacking essential
 ↳ source/local evidence raises an error. The four reviewed closed
 ↳ inactive routes (empty cohort, evidenced cohort boundary, root
 ↳ no_result, continuity no_result) must never report pending or preview
 ↳ in these slots. Runnable tests are test_amendment.py,
 ↳ amendment_checks.py and the full test_synthetic.py entry point.

Registered question

What fraction of eligible disclosures has a documented commercial agreement with disjoint recorded parties within three years of its index termination?

Disclosed amendment, scientific amendment 2, revision v004; native schema version 1. The operator reviewed a prior-run manuscript; this author received no empirical results. Prospective execution specification only. This Atom is pending; no APTO observation, numerical result or realized state is asserted. Its registration payload owns its protocol, activation and possible results.

atom-000003: Continuity versus gaps

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible termination_date, breaking ties by exact lexicographic agreement_id. Set index_effective_date = a0.effective_date and t0 = a0.termination_date. Never set t0 from index_effective_date. A candidate event timestamp s = a1.effective_date must satisfy t0 < s; signature is a separate strict-only requirement. H1/H2/H3/H5 and the 31-day guard are measured from termination t0. Receipts alone use s as their one-year origin. All examples whose t0 was implicit use this explicit termination definition.

Status: outcome-selected exploratory descriptive diagnostic. Population is the W3 distinct disclosures with at least one definite broad witness in Atom 2. Unit for the main diagnostic is disclosure; secondary illustration is the distinct witness (disclosure,index,later-agreement) path. Keep all paths and freeze their count; never select by revenue. Time zero t0, witness starts s ≤ H3, and intervals are DC5–DC7. No unobserved corporate ownership, patent dates or contemporaneous link membership is inferred.

Execute in order: 1. Reproduce W3 and all broad witnesses; preserve input contract and all linked agreement candidates from Atom 2. Verify party/local-ID many-to-one joins, no data-driven deduplication and no artificial cross-tenant continuity. Read no entity names. 2. For each broad path evaluate all DC7 requirements. Keep separate three-valued flags: distinct agreement local IDs; post-t0 signature; signature ≤ effective; gap ≥ 31 days; simultaneous index; counterparty-local-ID collision; overlapping interval; complete gap-history evidence. Make a known false predicate dominate unknowns, otherwise all true is strict and remaining paths unknown. Fields of use equal/different/unknown are illustrative only and do not override the path predicate. 3. For each witnessed disclosure classify strict if ANY path is strict; else non-strict if EVERY broad path has a definite false strict predicate; else unknown. Compute S,F,V with S+F+V=W3. Report $[S/W3, (S+V)/W3]$ as a diagnostic bound on how many witnessed histories survive this definition, not the full-cohort re-entry rate. A not-yet-definite broad candidate does not change this diagnostic population but remains relevant for Atom 4's full-cohort upper bound. 4. Describe mutually exclusive first failing/unknown reasons in this order: local agreement identity, known party local-ID collision/missingness, retrospective/missing signature, ≤30-day gap, simultaneous index, overlap or possible overlap, unsupported gap retention. Also report nonexclusive flag frequencies because mechanisms can overlap. Missing party-local

IDs are unknown, not proof of new independent firms. A3's unconditional institution-limit restriction applies even if S=W3. 5. Adjudicate all_strict first, then none_strict, mixed, unresolved; contradictions/sum failures are operational errors. Thresholds 0 and 100% answer the all/some/none diagnostic exactly; there is no significance criterion. This is not a test of the comparative performance of universities.

Synthetic checks: an agreement starting before t0 and ending after t0 creates overlap; unknown end produces possible overlap rather than certain dormancy; an earlier agreement ended at t0 does not overlap the open gap; 30 days fails and 31 days passes the guard; equal local agreement IDs fail even with different global IDs; same-day index ties fail strictness; one clean and one ambiguous witness for a disclosure classifies that disclosure strict; all false requirements dominate missing irrelevant requirements; matching field macros do not prove rights equality.

Consequences: all_strict licenses the limited statement that all witnessed disclosures have a strict path and does not activate Atom 4. None_strict, mixed or unresolved activates mandatory Atom 4 to quantify the stricter outcome for the original N, not only W3. Boundary/otherwise/no_result leaves that diagnostic unresolved and cannot manufacture re-entry. Completion in any scientific state allows the independently supported receipt result to be labeled with its continuity scope; receipt analysis never requires a favorable continuity result.

Exact input fields and provenance: disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls), disclosure_agreement(disclosure_id,agreement_id,role), agreement(agreement_id,agreement_local_id,type_cls,f, agreement_counterparty(agreement_id,counterparty_id), counterparty(counterparty_id,counterparty_local_id)). Use supplied schema-only.md lines 9–51 and 89–149, DC2. All are allowed APTO tables, physical lowercase. Frozen semantic coding is second-chances-termination-v3 plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record descriptive estimand, not a sampled population or causal effect. No estimator standard errors, clustering-based p-values, confirmatory hypotheses or significance tests are registered (statistical multiplicity family size zero); no holdout is used. Shared agreements create dependence and unit multiplicity, which must be reported, not hidden with independent-Bernoulli intervals. Logical uncertainty from unresolved indicators is distinct from misclassification, population selection and construct uncertainty. No welfare SESOI or statistical-equivalence claim exists. Report exact fractions/bounds and thresholds as descriptive only. Never infer prevalence or precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema version 1): Invoke prereg/execution/run_atom.py -atom atom-000003; analysis.atom3 implements this Atom, using core.Records and DC1–DC9. The authority remains this Atom protocol. Load the exact projections and metadata statuses described in execution/input-interface.md. All ten metadata inspections precede cohort freezing; no real class values, mounts or coverage are supplied by this draft.

Missing production definitions are registered unresolved requirements, not permission to invent a default. The input adapter's CSV/Parquet paths are governed bindings, not scientific choices. Keep the same input fingerprint and cohort hash across all descendants; ledger rows are read only by Atoms 5–6 and have a separate frozen hash. A changed frozen non-ledger source is operational `no_result` unless a completed, cited source-contract inspection establishes the boundary region specified here. Atom 5's frozen population mismatch is operational `no_result`.

Ordered executable work is the numbered protocol above, implemented by `analysis.atom3`; construction and tri-valued predicates are `core.Records.select_indices/history/strict/receipts` as appropriate. As an explicit necessary-condition clarification, a known signature at or before index termination fails the strict requirement even when the later effective date is unknown; a missing signature remains unknown. Other known false strict requirements likewise dominate unresolved facts. An invalid cross-tenant candidate link is never a witness and leaves a possible-event flag within an eligible disclosure history. Zero-tolerance cardinality assertions apply to joins; duplicate links become sets and cannot multiply outcomes. Individual broken/conflicting keys are audited and quarantined as DC4 specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000003/ contains `provenance.json` (semantic/execution-code, source/cohort and applicable ledger hashes, Python version, timestamp); `diagnostics.csv` (check,order,numerator,denominator,status,reason); `disposition.json` (atom,state or null,terminal or null,status,activation text/value,trace,reason,hashes); `synthetic-checks.json` (current synthetic proof and code hash). Numerical values are emitted only after a completed scientific state. Inactive or failed work emits `disposition/provenance/diagnostics` and no numerical tables. Registered numerical interfaces: `release-candidate/continuity.csv` (W3, S, F, V, lower, upper); `release-candidate/continuity-reasons.csv` (reason, assessment, kind, unit, numerator, denominator). Restricted derivations: `continuity-paths.csv` (d,a0,a1,t0,s,broad,strict,reason,field_comparison,agreement_identity,party_local_identity,signature,separa); `continuity-disclosures.csv` (d,strict). Every completed Atom also writes `restricted/field-missingness.csv` (table,field,missing,rows), `restricted/source-metadata.csv` (tenant,metadata), `restricted/result.json` (reproducible complete module payload for downstream binding), and `restricted/metrics.json` when numerical public-candidate tables exist. CSV nested objects use JSON text; raw transaction values never enter World prose. The machine-checkable column index is `execution/output-contract.yaml`, subordinate to this protocol.

Figure 3 is implemented at `prereg/paper/figures/figure3.py` and consumes only its `figures.yaml` tables. The governed visualizer creates `release-candidate/figure3.pdf` after disclosure screening; the analysis dispatcher does not render or publish raw records. This replaces the SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without replacing estimands. Atom 1 composition remains a full table; other paired displays can occupy panels within one figure. Figure code calculates no new estimator. Empty, partial and unactivated inputs produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in `execution/test_synthetic.py`, with per-figure integration in `figure_checks.py`. Generated values, PDFs, PNGs and test logs stay outside the World. Tests include the independently specified decade between index effective date and termination; agreements on both sides of termination; selection separately from timing; leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards; unknown versus false; source mismatch; cohort/bundle/cardinality invariance; classifications and receipt timing; exact integer thresholds; every mandatory branch; missing/partial/inactive plot inputs and long-label/close-endpoint geometry. Any failed prerequisite test stops data execution as `no_result`; a passing test does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interruptions, read/cast-contract errors, failed assertions and unresolved software defects are terminal `no_result` with no scientific state or estimate; missing data documented as an evidenced construct boundary follows that boundary region. Missing retention remains indicator uncertainty, not a statistical null. Unrun members remain pending while predecessors may resolve and not activated with trace at closeout. Report restrictions before compatible primary/supplementary Molecule clauses, then residual unresolved scope. No result licenses a new cohort, clock, code mapping, causal claim or unregistered estimator.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance revision v002; native schema version 1). The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results. Use explicit `-world READ_ONLY_WORLD` and `-source-root EXECUTING_SRC` with `run_atom.py`. The source root contains `execution/` and `paper/figures/`; the World root contains `atoms/`, `molecules/`, `prereg/`. Never infer the deployed World from **file**. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `-synthetic-fixture` is mutually exclusive with `-inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`;

diagnostics.csv(check,order,numerator,denominator,status,reason) is fixed for all dispositions. Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events. Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label report_mode=partial_preview. Final closeout requires an explicit result/no_result for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in output-contract.yaml and results-bindings.yaml. Suppressing Atom 3 also suppresses Atom 6 continuity_state in table/metric presentation and receipt_continuity_scope, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression. Every figure implements the registered DataFrame API with no data reads or estimator. Runtime style_dir binds the supplied HelveticaNeue regular/medium/bold/italic TrueType files by exact path; missing required fonts fail, while style_dir=None is explicitly preview-only. Rerender both widths, enforce <=170 mm height, and retain vector/font/Unicode/page checks. The chart catalog and render-package layouts remain disabled; manuscript class and compiler-owned TeX/PDF checks remain intact. Tests include absent, partial, inactive/no_result inputs, long labels, nearby endpoints and both certain/possible overlap. Synthetic output remains outside the World and no manuscript slot is filled.

Atom 3 display clarification: continuity-reasons.csv adds assessment. For kind=first_reason, assessment is passes for strict, otherwise failed_or_unknown: this preserves the original mutually exclusive first-reason totals under neutral predicate labels. Known false requirements take precedence over unknown ones; within each group the existing ordered requirement list applies. The all-pass strict bucket is displayed as Strict path. The no_overlap bucket is labeled Absence of overlap under First requirement assessment, never Overlapping agreement. This bucket combines failures and unresolved requirements; caption and paper state that explicitly. Nonexclusive flag rows retain separate passes/fails/unknown assessments, so Table 2 preserves definite versus possible overlap and every other predicate distinction. Field comparison rows use equal/different/unknown. Denominators and strict classification are unchanged.

V004 direct closeout additionally reconciles independently bound actual and local source/cohort freezes and the applicable ledger freeze; incompatible snapshots cannot be composed into one reported study. A mismatch blocks publication assembly

pending governed resolution, never changes a completed estimate or silently refreshes a predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific amendment 2). execution/README.md indexes this Atom’s complete runnable command, analysis callable, exact inputs, outputs and synthetic checks. Shared implementations are used, not seven duplicate estimators. Standalone `–dispatch-policy activation` respecting is the default and retains the activation expression above. An explicit `–dispatch-policy direct` attempts this selected Atom immediately, without waiting for outer activation. Runtime direct scheduling selects the first B members in Molecule membership order; budget is a dispatch choice recorded before execution, never chosen from results. No registered scientific question, local key, estimator, clock, threshold, conditional scope or graph edge changes. Direct dispatch cannot waive input validity or conditional scientific meaning. Reuse actual supplied scientific predecessors and their frozen fingerprints; never replace a supplied `no_result` with a successful retry. If a predecessor record is absent, pending, `not_activated` or `budget_unselected`, registered DC1–DC8 constructions may be computed locally from genuinely supplied projections, using `analysis.py` and `dispatch.local_inputs`. Follow the source Atom activation references to order these calculations; they are internal evidence, not new experiments or accepted predecessor World Atoms. Also construct the shared cohort and broad indicators where this module requires them. Save each local calculation, source-protocol citation, frozen source/cohort/ledger identity, exact outputs and content digest in `restricted/local-construction.json` and `local_evidence` provenance. Never insert these calculations into the caller’s prior results or the World roster. A source-protocol ID in that file is a citation, not a realized member record. All supplied source/cohort and applicable ledger freezes remain binding. Promised but unavailable data, incomplete inspection, failed software or required predecessor `no_result` yields this Atom’s operational `no_result`. Completed evidence establishing an existing boundary follows only that registered boundary region. If local or supplied evidence shows this Atom’s conditional scientific scope is false or unresolved, complete it as the existing otherwise state, with the explicit conditional-scope reason and no numerical rate. In particular, direct dispatch cannot turn `all_strict` into the selected Atom 4 claim, material into the selected Atom 7 claim, or unavailable receipt support into a financial result. Otherwise does not assert a statistical null. Conditional scope is checked with the same registered expression, using actual or explicitly local evidence; no new graph is authored. `disposition.json`, `restricted/result.json` and `provenance.json` record `dispatch_policy` and whether outer activation was bypassed; direct results record `scientific_condition_value` and `local_evidence`, and Atom 6 records `source_state_origins`. These are restricted execution metadata until disclosure approval. Local continuity is labeled as such in the receipt continuity slot; it never claims an accepted Atom 3 result. All source-dependent copies inherit source disclosure limits, including protected local copies. No local evidence may satisfy a missing predecessor World condition in a Molecule composite claim; restrictions always apply and standalone result slots remain scoped to their producing Atom. Publication close-out explicitly declares `dispatch_policy` and, for direct mode, B via budget. It lists all seven members: selected direct attempts retain `done/otherwise/boundary/no_result`;

unselected members are budget_unselected, never falsely not_activated. Missing selected work blocks final closeout; true partial previews remain pending. Default activation-respecting closeout is unchanged. For every source-dependent slot apply disclosure suppression first, including protected source states; then the consuming Atom's no_result/not_activated/budget_unselected or completed boundary/otherwise; only an actually incomplete preview may use missing-source pending. A final active result lacking essential source/local evidence raises an error. The four reviewed closed inactive routes (empty cohort, evidenced cohort boundary, root no_result, continuity no_result) must never report pending or preview in these slots. Runnable tests are test_amendment.py, amendment_checks.py and the full test_synthetic.py entry point.

Complete registration fields

```
id: atom-000003
topic: Continuity versus gaps
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Do the witnessed later-party sequences contain a clean recorded
    gap, or are they compatible with overlapping licenses and administrative
    succession?
  rationale: 'This diagnostic has a distinct substantive meaning: a later
    agreement need not represent re-entry after a gap. It determines which
    storyline is consistent with the recorded histories.'
  assumption: Institutional licensing can be nonexclusive or limited in scope;
    neither a termination nor a field-of-use macro proves all rights ended.
    DC7 is a stricter recorded-history screen only.
  target_strength: descriptive
  target_shape: comparison
  ratings:
    importance: 4
    novelty: 3
    feasibility: 3
    data_advantage: 4
    informativeness: 0.7
  tables:
    - DISCLOSURE
    - DISCLOSURE_AGREEMENT
    - AGREEMENT
    - AGREEMENT_COUNTERPARTY
    - COUNTERPARTY
  activation: (state(atom-000002) == "material" OR state(atom-000002) ==
    ↪ "low_with_witness"
    OR state(atom-000002) == "witnessed_uncertain")
  verdicts:
    - key: boundary
      region: The completed inspection proves indispensable history/identity
        fields changed or became unavailable relative to the registered input
        contract.
```

says: Continuity cannot be judged; the primary broad interval remains a recorded-sequence result only.

- key: all_strict
 - region: $W3 > 0$, all computations complete, and every witnessed disclosure has at least one definite DC7 strict witness ($S=W3$).
 - says: All witnessed disclosure sequences have at least one strict
 - ↪ recorded-gap
 - path. This does not prove legal relicensing or corporate independence.
- key: none_strict
 - region: $W3 > 0$, $S=0$ and unknown-strict disclosure count $V=0$.
 - says: Every observed broad-witness disclosure fails the strict path
 - ↪ definition.
 - Broad later agreements cannot be portrayed as clean recorded re-entry.
- key: mixed
 - region: $W3 > 0$, $0 < S < W3$ and $V=0$.
 - says: Some witnessed disclosures have strict paths and some do not. A single unqualified gap/re-entry storyline is unsupported.
- key: unresolved
 - region: $W3 > 0$, $S < W3$ and $V > 0$.
 - says: Incomplete interval or identity evidence prevents classifying at least one witnessed disclosure; known strict paths may coexist with this limitation.
- key: otherwise
 - region: otherwise
 - says: Completed evidence leaves this judgment unresolved. Report the
 - ↪ unresolved
 - scope; no negative or equivalent-effect claim is licensed.

protocol: |

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible

- ↪ termination_date, breaking ties by exact lexicographic agreement_id.
- ↪ Set index_effective_date = a0.effective_date and $t0 =$
- ↪ a0.termination_date. Never set t0 from index_effective_date. A
- ↪ candidate event timestamp $s = a1.effective_date$ must satisfy $t0 < s$;
- ↪ signature is a separate strict-only requirement. H1/H2/H3/H5 and the
- ↪ 31-day guard are measured from termination t0. Receipts alone use s
- ↪ as their one-year origin. All examples whose t0 was implicit use this
- ↪ explicit termination definition.

Status: outcome-selected exploratory descriptive diagnostic. Population

- ↪ is the W3 distinct disclosures with at least one definite broad
- ↪ witness in Atom 2. Unit for the main diagnostic is disclosure;
- ↪ secondary illustration is the distinct witness
- ↪ (disclosure,index,later-agreement) path. Keep all paths and freeze
- ↪ their count; never select by revenue. Time zero t0, witness starts
- ↪ $s \leq H3$, and intervals are DC5-DC7. No unobserved corporate ownership,
- ↪ patent dates or contemporaneous link membership is inferred.

Execute in order:

1. Reproduce W3 and all broad witnesses; preserve input contract and all
 - ↪ linked agreement candidates from Atom 2. Verify party/local-ID
 - ↪ many-to-one joins, no data-driven deduplication and no artificial
 - ↪ cross-tenant continuity. Read no entity names.
2. For each broad path evaluate all DC7 requirements. Keep separate
 - ↪ three-valued flags: distinct agreement local IDs; post-t0 signature;
 - ↪ signature $\leq$ effective; gap $\geq$ 31 days; simultaneous index;
 - ↪ counterparty-local-ID collision; overlapping interval; complete
 - ↪ gap-history evidence. Make a known false predicate dominate unknowns,
 - ↪ otherwise all true is strict and remaining paths unknown. Fields of
 - ↪ use equal/different/unknown are illustrative only and do not override
 - ↪ the path predicate.

3. For each witnessed disclosure classify strict if ANY path is strict;
 - else non-strict if EVERY broad path has a definite false strict predicate; else unknown. Compute S,F,V with $S+F+V=W3$. Report $[S/W3, (S+V)/W3]$ as a diagnostic bound on how many witnessed histories survive this definition, not the full-cohort re-entry rate. A not-yet-definite broad candidate does not change this diagnostic population but remains relevant for Atom 4's full-cohort upper bound.
4. Describe mutually exclusive first failing/unknown reasons in this order: local agreement identity, known party local-ID collision/missingness, retrospective/missing signature, ≤ 30 -day gap, simultaneous index, overlap or possible overlap, unsupported gap retention. Also report nonexclusive flag frequencies because mechanisms can overlap. Missing party-local IDs are unknown, not proof of new independent firms. A3's unconditional institution-limit restriction applies even if $S=W3$.
5. Adjudicate all_strict first, then none_strict, mixed, unresolved; contradictions/sum failures are operational errors. Thresholds 0 and 100% answer the all/some/none diagnostic exactly; there is no significance criterion. This is not a test of the comparative performance of universities.

Synthetic checks: an agreement starting before t0 and ending after t0 creates overlap; unknown end produces possible overlap rather than certain dormancy; an earlier agreement ended at t0 does not overlap the open gap; 30 days fails and 31 days passes the guard; equal local agreement IDs fail even with different global IDs; same-day index ties fail strictness; one clean and one ambiguous witness for a disclosure classifies that disclosure strict; all false requirements dominate missing irrelevant requirements; matching field macros do not prove rights equality.

Consequences: all_strict licenses the limited statement that all witnessed disclosures have a strict path and does not activate Atom 4. None_strict, mixed or unresolved activates mandatory Atom 4 to quantify the stricter outcome for the original N, not only W3. Boundary/otherwise/no_result leaves that diagnostic unresolved and cannot manufacture re-entry. Completion in any scientific state allows the independently supported receipt result to be labeled with its continuity scope; receipt analysis never requires a favorable continuity result.

Exact input fields and provenance:

- disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls),
- disclosure_agreement(disclosure_id,agreement_id,role),
- agreement(agreement_id,agreement_local_id,type_cls,field_of_use_cls,effective_date,expiration_date,termination_date,sign_date),
- agreement_counterparty(agreement_id,counterparty_id),
- counterparty(counterparty_id,counterparty_local_id). Use supplied schema-only.md lines 9-51 and 89-149, DC2. All are allowed APT0 tables, physical lowercase. Frozen semantic coding is second-chances-termination-v3 plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record
→ descriptive estimand, not a sampled population or causal effect. No
→ estimator standard errors, clustering-based p-values, confirmatory
→ hypotheses or significance tests are registered (statistical
→ multiplicity family size zero); no holdout is used. Shared agreements
→ create dependence and unit multiplicity, which must be reported, not
→ hidden with independent-Bernoulli intervals. Logical uncertainty from
→ unresolved indicators is distinct from misclassification, population
→ selection and construct uncertainty. No welfare SESOI or
→ statistical-equivalence claim exists. Report exact fractions/bounds
→ and thresholds as descriptive only. Never infer prevalence or
→ precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema
→ version 1):
Invoke prereg/execution/run_atom.py --atom atom-000003; analysis.atom3
→ implements this Atom, using core.Records and DC1-DC9. The authority
→ remains this Atom protocol. Load the exact projections and metadata
→ statuses described in execution/input-interface.md. All ten metadata
→ inspections precede cohort freezing; no real class values, mounts or
→ coverage are supplied by this draft. Missing production definitions
→ are registered unresolved requirements, not permission to invent a
→ default. The input adapter's CSV/Parquet paths are governed bindings,
→ not scientific choices. Keep the same input fingerprint and cohort
→ hash across all descendants; ledger rows are read only by Atoms 5-6
→ and have a separate frozen hash. A changed frozen non-ledger source
→ is operational no_result unless a completed, cited source-contract
→ inspection establishes the boundary region specified here. Atom 5's
→ frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by
→ analysis.atom3; construction and tri-valued predicates are
→ core.Records.select_indices/history/strict/receipts as appropriate.
→ As an explicit necessary-condition clarification, a known signature
→ at or before index termination fails the strict requirement even when
→ the later effective date is unknown; a missing signature remains
→ unknown. Other known false strict requirements likewise dominate
→ unresolved facts. An invalid cross-tenant candidate link is never a
→ witness and leaves a possible-event flag within an eligible
→ disclosure history. Zero-tolerance cardinality assertions apply to
→ joins; duplicate links become sets and cannot multiply outcomes.
→ Individual broken/conflicting keys are audited and quarantined as DC4
→ specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000003/ contains
 ↳ provenance.json (semantic/execution-code, source/cohort and
 ↳ applicable ledger hashes, Python version, timestamp); diagnostics.csv
 ↳ (check,order,numerator,denominator,status,reason); disposition.json
 ↳ (atom,state or null,terminal or null,status,activation
 ↳ text/value,trace,reason,hashes); synthetic-checks.json (current
 ↳ synthetic proof and code hash). Numerical values are emitted only
 ↳ after a completed scientific state. Inactive or failed work emits
 ↳ disposition/provenance/diagnostics and no numerical tables.
 ↳ Registered numerical interfaces: release-candidate/continuity.csv
 ↳ (W3, S, F, V, lower, upper); release-candidate/continuity-reasons.csv
 ↳ (reason, assessment, kind, unit, numerator, denominator). Restricted
 ↳ derivations: continuity-paths.csv (d,a0,a1,t0,s,broad,strict,reason,f
 ↳ ield_comparison,agreement_identity,party_local_identity,signature,sep
 ↳ aration_31_days,single_index,no_overlap,gap_history);
 ↳ continuity-disclosures.csv (d,strict). Every completed Atom also
 ↳ writes restricted/field-missingness.csv (table,field,missing,rows),
 ↳ restricted/source-metadata.csv (tenant,metadata), restricted/result.j
 ↳ son (reproducible complete module payload for downstream binding),
 ↳ and restricted/metrics.json when numerical public-candidate tables
 ↳ exist. CSV nested objects use JSON text; raw transaction values never
 ↳ enter World prose. The machine-checkable column index is
 ↳ execution/output-contract.yaml, subordinate to this protocol.

Figure 3 is implemented at prereg/paper/figures/figure3.py and consumes
 ↳ only its figures.yaml tables. The governed visualizer creates release
 ↳ -candidate/figure3.pdf after disclosure screening; the analysis
 ↳ dispatcher does not render or publish raw records. This replaces the
 ↳ SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without
 ↳ replacing estimands. Atom 1 composition remains a full table; other
 ↳ paired displays can occupy panels within one figure. Figure code
 ↳ calculates no new estimator. Empty, partial and unactivated inputs
 ↳ produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-f
 ↳ igure integration in figure_checks.py. Generated values, PDFs, PNGs
 ↳ and test logs stay outside the World. Tests include the independently
 ↳ specified decade between index effective date and termination; agreem
 ↳ ents on both sides of termination; selection separately from timing;
 ↳ leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards;
 ↳ unknown versus false; source mismatch; cohort/bundle/cardinality
 ↳ invariance; classifications and receipt timing; exact integer
 ↳ thresholds; every mandatory branch; missing/partial/inactive plot
 ↳ inputs and long-label/close-endpoint geometry. Any failed
 ↳ prerequisite test stops data execution as no_result; a passing test
 ↳ does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interr
 ↳ uptions, read/cast-contract errors, failed assertions and unresolved
 ↳ software defects are terminal no_result with no scientific state or
 ↳ estimate; missing data documented as an evidenced construct boundary
 ↳ follows that boundary region. Missing retention remains indicator unc
 ↳ ertainty, not a statistical null. Unrun members remain pending while
 ↳ predecessors may resolve and not_activated with trace at closeout.
 ↳ Report restrictions before compatible primary/supplementary Molecule
 ↳ clauses, then residual unresolved scope. No result licenses a new
 ↳ cohort, clock, code mapping, causal claim or unregistered estimator.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance
 ↳ revision v002; native schema version 1).

The same question, Atom IDs, result keys, activation, population,
 ↳ horizons, thresholds and finite-record inferential status are
 ↳ retained. These repairs implement the registered science; none was
 ↳ selected from empirical results.

Use explicit --world READ_ONLY_WORLD and --source-root EXECUTING_SRC with
 ↳ run_atom.py. The source root contains execution/ and paper/figures/;
 ↳ the World root contains atoms/, molecules/, prereg/. Never infer the
 ↳ deployed World from __file__. The dispatcher, saver and test runner
 ↳ propagate both roots. provenance.py hashes a fixed nonempty roster of
 ↳ executing Python sources, separately from immutable Atom/Molecule
 ↳ protocols and scientific/interface sources in the World. Missing
 ↳ files, stale/incomplete certificates or mismatched predecessor
 ↳ code/World/registration identity stop data access as operational
 ↳ no_result. Required certificate checks are unit_semantics,
 ↳ file_formats, copied_cli and runtime_figures, including 130.7 mm and
 ↳ 180 mm exports checked with validate_exports and the exact supplied
 ↳ fonts. Unit-only reports do not authorize bound data. Built-in
 ↳ --synthetic-fixture is mutually exclusive with --inputs and generates
 ↳ artificial records only; its disposition is not a production
 ↳ certificate. Pure in-memory functions are for synthetic/unit use; the
 ↳ governed entry point is the certificate-gated CLI. The complete test
 ↳ runner invokes copied source against a separate World using persisted
 ↳ predecessors, and also exercises the ordinary certified CSV-input CLI.

All restricted CSV schemas, including zero-row scientific outputs, are fi
 ↳ xed in output-contract.yaml (interface 2). Optional audit values are
 ↳ empty cells in their declared columns, not omitted headers. An empty
 ↳ cohort, empty witness table or empty ledger-derived audit retains its
 ↳ scientific table schema. Failed/inactive work instead emits
 ↳ nonnumerical disposition and diagnostic files. Common restricted
 ↳ headers are field-missingness.csv(table,field,missing,rows) and
 ↳ source-metadata.csv(tenant,metadata);
 ↳ diagnostics.csv(check,order,numerator,denominator,status,reason) is
 ↳ fixed for all dispositions.

Raw provenance represents numeric NaN, +infinity and -infinity with
 ↳ distinct tagged scalar objects before JSON hashing; original strings
 ↳ remain strings. Duplicate/conflict audits remain deterministic and
 ↳ retain representational distinctions. Receipt normalization then
 ↳ converts all nonfinite/unparseable amounts to unknown under DC8, rega
 ↳ rdless of memory/CSV/Parquet representation. File representations may
 ↳ have different raw provenance hashes; they must produce equivalent
 ↳ scientific indicators and result states for semantically equivalent
 ↳ inputs. Unknown amounts are never zeros or dropped records. Known cos
 ↳ t/out-of-window events remain decisively irrelevant, while a definite
 ↳ positive witness dominates unresolved potentially positive events.

Publication assembly first reconciles with authoritative Molecule members
 ↳ hip. Partial previews list all seven members as observed dispositions
 ↳ or explicitly pending and label report_mode=partial_preview. Final
 ↳ closeout requires an explicit result/no_result for every activated
 ↳ member; it may derive inactive dispositions only from registered
 ↳ conditions and predecessor closure, preserving unknownness. A missing
 ↳ activated analysis prevents final closeout. Source boundaries and
 ↳ failed predecessors do not become negative evidence. Direct copied so
 ↳ urce-state columns have declared dependencies in output-contract.yaml
 ↳ and results-bindings.yaml. Suppressing Atom 3 also suppresses Atom 6
 ↳ continuity_state in table/metric presentation and receipt_continuity_
 ↳ scope, direct Atom 3 slots, and protected interpretation/trace
 ↳ material; independently releasable financial quantities remain
 ↳ subject to governed approval and complementary suppression.

Every figure implements the registered DataFrame API with no data reads
 ↳ or estimator. Runtime style_dir binds the supplied HelveticaNeue regu-
 ↳ lar/medium/bold/italic TrueType files by exact path; missing required
 ↳ fonts fail, while style_dir=None is explicitly preview-only. Rerender
 ↳ both widths, enforce <=170 mm height, and retain vector/font/Unicode/
 ↳ page checks. The chart catalog and render-package layouts remain
 ↳ disabled; manuscript class and compiler-owned TeX/PDF checks remain i-
 ↳ ntact. Tests include absent, partial, inactive/no_result inputs, long
 ↳ labels, nearby endpoints and both certain/possible overlap. Synthetic
 ↳ output remains outside the World and no manuscript slot is filled.

Atom 3 display clarification: continuity-reasons.csv adds assessment. For
 ↳ kind=first_reason, assessment is passes for strict, otherwise
 ↳ failed_or_unknown: this preserves the original mutually exclusive
 ↳ first-reason totals under neutral predicate labels. Known false
 ↳ requirements take precedence over unknown ones; within each group the
 ↳ existing ordered requirement list applies. The all-pass strict bucket
 ↳ is displayed as Strict path. The no_overlap bucket is labeled Absence
 ↳ of overlap under First requirement assessment, never Overlapping
 ↳ agreement. This bucket combines failures and unresolved requirements;
 ↳ caption and paper state that explicitly. Nonexclusive flag rows
 ↳ retain separate passes/fails/unknown assessments, so Table 2
 ↳ preserves definite versus possible overlap and every other predicate
 ↳ distinction. Field comparison rows use equal/different/unknown.
 ↳ Denominators and strict classification are unchanged.

V004 direct closeout additionally reconciles independently bound actual
 ↳ and local source/cohort freezes and the applicable ledger freeze;
 ↳ incompatible snapshots cannot be composed into one reported study. A
 ↳ mismatch blocks publication assembly pending governed resolution,
 ↳ never changes a completed estimate or silently refreshes a
 ↳ predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific
 ↳ amendment 2).
 execution/README.md indexes this Atom's complete runnable command,
 ↳ analysis callable, exact inputs, outputs and synthetic checks. Shared
 ↳ implementations are used, not seven duplicate estimators. Standalone
 ↳ --dispatch-policy activation_respecting is the default and retains
 ↳ the activation expression above. An explicit --dispatch-policy direct
 ↳ attempts this selected Atom immediately, without waiting for outer
 ↳ activation. Runtime direct scheduling selects the first B members in
 ↳ Molecule membership order; budget is a dispatch choice recorded
 ↳ before execution, never chosen from results. No registered scientific
 ↳ question, local key, estimator, clock, threshold, conditional scope
 ↳ or graph edge changes.

Direct dispatch cannot waive input validity or conditional scientific
 ↳ meaning. Reuse actual supplied scientific predecessors and their
 ↳ frozen fingerprints; never replace a supplied no_result with a
 ↳ successful retry. If a predecessor record is absent, pending,
 ↳ not_activated or budget_unselected, registered DC1-DC8 constructions
 ↳ may be computed locally from genuinely supplied projections, using
 ↳ analysis.py and dispatch.local_inputs. Follow the source Atom
 ↳ activation references to order these calculations; they are internal
 ↳ evidence, not new experiments or accepted predecessor World Atoms.
 ↳ Also construct the shared cohort and broad indicators where this
 ↳ module requires them. Save each local calculation, source-protocol
 ↳ citation, frozen source/cohort/ledger identity, exact outputs and
 ↳ content digest in restricted/local-construction.json and
 ↳ local_evidence provenance. Never insert these calculations into the
 ↳ caller's prior results or the World roster. A source-protocol ID in
 ↳ that file is a citation, not a realized member record.
 All supplied source/cohort and applicable ledger freezes remain binding.
 ↳ Promised but unavailable data, incomplete inspection, failed software
 ↳ or required predecessor no_result yields this Atom's operational
 ↳ no_result. Completed evidence establishing an existing boundary
 ↳ follows only that registered boundary region. If local or supplied
 ↳ evidence shows this Atom's conditional scientific scope is false or
 ↳ unresolved, complete it as the existing otherwise state, with the
 ↳ explicit conditional-scope reason and no numerical rate. In
 ↳ particular, direct dispatch cannot turn all_strict into the selected
 ↳ Atom 4 claim, material into the selected Atom 7 claim, or unavailable
 ↳ receipt support into a financial result. Otherwise does not assert a
 ↳ statistical null. Conditional scope is checked with the same
 ↳ registered expression, using actual or explicitly local evidence; no
 ↳ new graph is authored.
 disposition.json, restricted/result.json and provenance.json record
 ↳ dispatch_policy and whether outer activation was bypassed; direct
 ↳ results record scientific_condition_value and local_evidence, and
 ↳ Atom 6 records source_state_origins. These are restricted execution
 ↳ metadata until disclosure approval. Local continuity is labeled as
 ↳ such in the receipt continuity slot; it never claims an accepted Atom
 ↳ 3 result. All source-dependent copies inherit source disclosure
 ↳ limits, including protected local copies. No local evidence may
 ↳ satisfy a missing predecessor World condition in a Molecule composite
 ↳ claim; restrictions always apply and standalone result slots remain
 ↳ scoped to their producing Atom.
 Publication closeout explicitly declares dispatch_policy and, for direct
 ↳ mode, B via budget. It lists all seven members: selected direct
 ↳ attempts retain done/otherwise/boundary/no_result; unselected members
 ↳ are budget_unselected, never falsely not_activated. Missing selected
 ↳ work blocks final closeout; true partial previews remain pending.
 ↳ Default activation-respecting closeout is unchanged. For every
 ↳ source-dependent slot apply disclosure suppression first, including
 ↳ protected source states; then the consuming Atom's
 ↳ no_result/not_activated/budget_unselected or completed
 ↳ boundary/otherwise; only an actually incomplete preview may use
 ↳ missing-source pending. A final active result lacking essential
 ↳ source/local evidence raises an error. The four reviewed closed
 ↳ inactive routes (empty cohort, evidenced cohort boundary, root
 ↳ no_result, continuity no_result) must never report pending or preview
 ↳ in these slots. Runnable tests are test_amendment.py,
 ↳ amendment_checks.py and the full test_synthetic.py entry point.

Registered question

Do the witnessed later-party sequences contain a clean recorded gap, or are they compatible with overlapping licenses and administrative succession?

Disclosed amendment, scientific amendment 2, revision v004; native schema version 1. The operator reviewed a prior-run manuscript; this author received no empirical results. Prospective execution specification only. This Atom is pending; no APTO observation, numerical result or realized state is asserted. Its registration payload owns its protocol, activation and possible results.

atom-000004: Strict recorded reentry

AMENDMENT CLOCK: For every disclosure, select a_0 by minimum eligible `termination_date`, breaking ties by exact lexicographic `agreement_id`. Set `index_effective_date` = a_0 .`effective_date` and $t_0 = a_0$.`termination_date`. Never set t_0 from `index_effective_date`. A candidate event timestamp $s = a_1$.`effective_date` must satisfy $t_0 < s$; signature is a separate strict-only requirement. H1/H2/H3/H5 and the 31-day guard are measured from termination t_0 . Receipts alone use s as their one-year origin. All examples whose t_0 was implicit use this explicit termination definition.

Status: exploratory descriptive, selected by observed continuity in Atom 3, using the same data. No holdout or independent confirmation is claimed. Population and N , unit, t_0 , H3, exclusions and index choice remain exactly Atom 1/DC5. Do not subset to disclosures with clean paths, complete party sets, known signatures or favorable fields. Outcome is existence of any DC6 broad path satisfying every DC7 strict predicate within H3.

Execute in order: 1. Reproduce N and all original candidate histories, including nonwitnessed disclosures and unresolved broad candidates. Reconcile W3/S/F/V with Atoms 2/3, then evaluate DC7 for all potential paths, not just Atom 2's earliest witness. All relevant key/cardinality invariants remain mandatory. 2. Set `strict_lo_d`=1 iff a definite strict path exists. For each other disclosure, `strict_hi_d`=0 iff no missing future/unexported agreement is possible under certified follow-up and EVERY potentially broad path is either definitely impossible as broad or has at least one definitely false strict requirement. Otherwise `strict_hi_d`=1. Known ineligibility of an index-level strict requirement (e.g. simultaneous index flag) can certify strict impossibility for that disclosure even when later observation is incomplete. Do not require full history to rule out a path whose necessary 31-day guard or other known requirement already fails. 3. Compute $L_s = \text{sum}(\text{lo})/N$ and $U_s = \text{sum}(\text{hi})/N$. Assert per-unit `strict_lo` ≤ `broad_lo` and `strict_hi` ≤ `broad_hi` using shared information and logical closure. For the full-cohort share of broad events that fail the strict definition, report the paired logical range $[\max(0, L_3 - U_s), \min(1, U_3 - L_s)]$, explicitly conservative if cross-unit joint constraints could tighten it; do not treat endpoints as confidence limits. No data-driven third definition or alternate gap length. 4. Plot broad and strict three-year intervals on the same $[0,1]$ axis with N and unresolved shares. Report all failing/missing guards; no successful-path-only storytelling. Compute threshold sensitivity as in Atom 2 with strict indicators. Do not report a causal gap versus no-gap comparison, a t-test or a p-value. 5. Adjudicate `material_strict` at equality 0.10; `below_strict` only if $U_s < 0.10$;

otherwise strict_uncertain when the threshold is crossed. Exact Us=0 is a defined strict-record zero only, and can coexist with broad later agreements.

Synthetic checks: for N=4 with strict indicators (1,1),(0,0),(0,1),(0,0), report [0.25,0.50] (synthetic only); known simultaneous index makes strict impossible without requiring later observed rows; an unresolved candidate with sufficient calendar space remains possible; removing a missing-signature disclosure would change N and must fail; two qualifying paths for one disclosure count once; strict interval cannot exceed broad per-unit possibilities. Consequences: all scientific states supply a restricted supplementary interpretation only; no new Atom is selected by this result. Boundary/otherwise/no_result does not overturn the primary broad estimate.

Exact input fields and provenance: disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls), disclosure_agreement(disclosure_id,agreement_id,role), agreement(agreement_id,agreement_local_id,type_cls,f), agreement_counterparty(agreement_id,counterparty_id), counterparty(counterparty_id,counterparty_local_id). Use supplied schema-only.md lines 9–51 and 89–149, DC2. All are allowed APTO tables, physical lowercase. Frozen semantic coding is second-chances-termination-v3 plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record descriptive estimand, not a sampled population or causal effect. No estimator standard errors, clustering-based p-values, confirmatory hypotheses or significance tests are registered (statistical multiplicity family size zero); no holdout is used. Shared agreements create dependence and unit multiplicity, which must be reported, not hidden with independent-Bernoulli intervals. Logical uncertainty from unresolved indicators is distinct from misclassification, population selection and construct uncertainty. No welfare SESOI or statistical-equivalence claim exists. Report exact fractions/bounds and thresholds as descriptive only. Never infer prevalence or precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema version 1): Invoke prereg/execution/run_atom.py -atom atom-000004; analysis.atom4 implements this Atom, using core.Records and DC1–DC9. The authority remains this Atom protocol. Load the exact projections and metadata statuses described in execution/input-interface.md. All ten metadata inspections precede cohort freezing; no real class values, mounts or coverage are supplied by this draft. Missing production definitions are registered unresolved requirements, not permission to invent a default. The input adapter's CSV/Parquet paths are governed bindings, not scientific choices. Keep the same input fingerprint and cohort hash across all descendants; ledger rows are read only by Atoms 5–6 and have a separate frozen hash. A changed frozen non-ledger source is operational no_result unless a completed, cited source-contract inspection establishes the boundary region specified here. Atom 5's frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by analysis.atom4; construction and tri-valued predicates are

core.Records.select_indices/history/strict/receipts as appropriate. As an explicit necessary-condition clarification, a known signature at or before index termination fails the strict requirement even when the later effective date is unknown; a missing signature remains unknown. Other known false strict requirements likewise dominate unresolved facts. An invalid cross-tenant candidate link is never a witness and leaves a possible-event flag within an eligible disclosure history. Zero-tolerance cardinality assertions apply to joins; duplicate links become sets and cannot multiply outcomes. Individual broken/conflicting keys are audited and quarantined as DC4 specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000004/ contains provenance.json (semantic/execution-code, source/cohort and applicable ledger hashes, Python version, timestamp); diagnostics.csv (check,order,numerator,denominator,status,reason); disposition.json (atom,state or null,terminal or null,status,activation text/value,trace,reason,hashes); synthetic-checks.json (current synthetic proof and code hash). Numerical values are emitted only after a completed scientific state. Inactive or failed work emits disposition/provenance/diagnostics and no numerical tables. Registered numerical interfaces: release-candidate/strict-bounds.csv (N, L3, U3, Ls, Us, unknown, strict_witnesses, broad_minus_strict_lower, broad_minus_strict_upper, required_unresolved, available_unresolved, reachable, capped_unresolved). Restricted derivations: strict-indicators.csv (d,lo,hi,lo_broad,hi_broad); strict-paths.csv with the same path fields as Atom 3. Every completed Atom also writes restricted/field-missingness.csv (table,field,missing,rows), restricted/source-metadata.csv (tenant,metadata), restricted/result.json (reproducible complete module payload for downstream binding), and restricted/metrics.json when numerical public-candidate tables exist. CSV nested objects use JSON text; raw transaction values never enter World prose. The machine-checkable column index is execution/output-contract.yaml, subordinate to this protocol.

Figure 4 is implemented at prereg/paper/figures/figure4.py and consumes only its figures.yaml tables. The governed visualizer creates release-candidate/figure4.pdf after disclosure screening; the analysis dispatcher does not render or publish raw records. This replaces the SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without replacing estimands. Atom 1 composition remains a full table; other paired displays can occupy panels within one figure. Figure code calculates no new estimator. Empty, partial and unactivated inputs produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-figure integration in figure_checks.py. Generated values, PDFs, PNGs and test logs stay outside the World. Tests include the independently specified decade between index effective date and termination; agreements on both sides of termination; selection separately from timing; leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards; unknown versus false; source mismatch; cohort/bundle/cardinality invariance; classifications and receipt timing; exact integer thresholds; every mandatory branch; missing/partial/inactive plot inputs and long-label/close-endpoint geometry.

Any failed prerequisite test stops data execution as `no_result`; a passing test does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interruptions, read/cast-contract errors, failed assertions and unresolved software defects are terminal `no_result` with no scientific state or estimate; missing data documented as an evidenced construct boundary follows that boundary region. Missing retention remains indicator uncertainty, not a statistical null. Unrun members remain pending while predecessors may resolve and not `activated` with trace at closeout. Report restrictions before compatible primary/supplementary Molecule clauses, then residual unresolved scope. No result licenses a new cohort, clock, code mapping, causal claim or unregistered estimator.

Threshold-sensitivity output retains both raw required `unresolved k` and capped `unresolved = min(k,Q)`, together with available `unresolved Q` and reachable `= (k<=Q)`. This preserves the registered cap and explicit unreachable distinction without changing adjudication. For Atom 2 these values are in `restricted/metrics.json`; `strict-bounds.csv` and `late-bounds.csv` include them in their registered candidate summary.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance revision v002; native schema version 1). The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results. Use explicit `-world READ_ONLY_WORLD` and `-source-root EXECUTING_SRC` with `run_atom.py`. The source root contains `execution/` and `paper/figures/`; the World root contains `atoms/`, `molecules/`, `prereg/`. Never infer the deployed World from **file**. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `-synthetic-fixture` is mutually exclusive with `-inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`; `diagnostics.csv(check,order,numerator,denominator,status,reason)` is fixed for all dispositions. Raw provenance represents numeric NaN, +infinity and -infinity with

distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events. Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label `report_mode=partial_preview`. Final closeout requires an explicit `result/no_result` for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in `output-contract.yaml` and `results-bindings.yaml`. Suppressing Atom 3 also suppresses Atom 6 `continuity_state` in table/metric presentation and `receipt_continuity_scope`, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression. Every figure implements the registered DataFrame API with no data reads or estimator. Runtime `style_dir` binds the supplied HelveticaNeue regular/medium/bold/italic TrueType files by exact path; missing required fonts fail, while `style_dir=None` is explicitly preview-only. Rerender both widths, enforce ≤ 170 mm height, and retain vector/font/Unicode/page checks. The chart catalog and render-package layouts remain disabled; manuscript class and compiler-owned TeX/PDF checks remain intact. Tests include absent, partial, inactive/`no_result` inputs, long labels, nearby endpoints and both certain/possible overlap. Synthetic output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual and local source/cohort freezes and the applicable ledger freeze; incompatible snapshots cannot be composed into one reported study. A mismatch blocks publication assembly pending governed resolution, never changes a completed estimate or silently refreshes a predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific amendment 2). `execution/README.md` indexes this Atom’s complete runnable command, analysis callable, exact inputs, outputs and synthetic checks. Shared implementations are used, not seven duplicate estimators. Standalone `-dispatch-policy_activation_respecting` is the default and retains the activation expression above. An explicit `-dispatch-policy_direct` attempts this selected Atom immediately, without waiting for outer activation. Runtime direct scheduling selects the first B members in Molecule membership order; budget is a dispatch choice recorded before execution, never chosen from results. No registered scientific question, local key, estimator, clock, threshold, conditional scope or graph edge changes. Direct dispatch cannot waive input validity or conditional scientific meaning. Reuse actual supplied scientific predecessors and their frozen fingerprints; never replace a supplied `no_result` with

a successful retry. If a predecessor record is absent, pending, not_activated or budget_unselected, registered DC1–DC8 constructions may be computed locally from genuinely supplied projections, using analysis.py and dispatch.local_inputs. Follow the source Atom activation references to order these calculations; they are internal evidence, not new experiments or accepted predecessor World Atoms. Also construct the shared cohort and broad indicators where this module requires them. Save each local calculation, source-protocol citation, frozen source/cohort/ledger identity, exact outputs and content digest in restricted/local-construction.json and local_evidence provenance. Never insert these calculations into the caller’s prior results or the World roster. A source-protocol ID in that file is a citation, not a realized member record. All supplied source/cohort and applicable ledger freezes remain binding. Promised but unavailable data, incomplete inspection, failed software or required predecessor no_result yields this Atom’s operational no_result. Completed evidence establishing an existing boundary follows only that registered boundary region. If local or supplied evidence shows this Atom’s conditional scientific scope is false or unresolved, complete it as the existing otherwise state, with the explicit conditional-scope reason and no numerical rate. In particular, direct dispatch cannot turn all_strict into the selected Atom 4 claim, material into the selected Atom 7 claim, or unavailable receipt support into a financial result. Otherwise does not assert a statistical null. Conditional scope is checked with the same registered expression, using actual or explicitly local evidence; no new graph is authored. disposition.json, restricted/result.json and provenance.json record dispatch_policy and whether outer activation was bypassed; direct results record scientific_condition_value and local_evidence, and Atom 6 records source_state_origins. These are restricted execution metadata until disclosure approval. Local continuity is labeled as such in the receipt continuity slot; it never claims an accepted Atom 3 result. All source-dependent copies inherit source disclosure limits, including protected local copies. No local evidence may satisfy a missing predecessor World condition in a Molecule composite claim; restrictions always apply and standalone result slots remain scoped to their producing Atom. Publication closeout explicitly declares dispatch_policy and, for direct mode, B via budget. It lists all seven members: selected direct attempts retain done/otherwise/boundary/no_result; unselected members are budget_unselected, never falsely not_activated. Missing selected work blocks final closeout; true partial previews remain pending. Default activation-respecting closeout is unchanged. For every source-dependent slot apply disclosure suppression first, including protected source states; then the consuming Atom’s no_result/not_activated/budget_unselected or completed boundary/otherwise; only an actually incomplete preview may use missing-source pending. A final active result lacking essential source/local evidence raises an error. The four reviewed closed inactive routes (empty cohort, evidenced cohort boundary, root no_result, continuity no_result) must never report pending or preview in these slots. Runnable tests are test_amendment.py, amendment_checks.py and the full test_synthetic.py entry point.

Complete registration fields

```
id: atom-000004
topic: Strict recorded reentry
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: How frequent is strict recorded re-entry within three years in
    the original cohort, once the continuity diagnostic shows ambiguity or
    non-strict paths?
  rationale: This selected refinement asks a narrower question on the same
    denominator, preserving uncertainty instead of presenting only a favorable
    clean subsample.
  assumption: Passing DC7 demonstrates a recorded gap under conservative
    ↪ timing
    and identity guards; it still cannot establish exact legal rights or
    ↪ corporate
    independence.
  target_strength: descriptive
  target_shape: comparison
  ratings:
    importance: 4
    novelty: 3
    feasibility: 3
    data_advantage: 4
    informativeness: 0.7
  tables:
    - DISCLOSURE
    - DISCLOSURE_AGREEMENT
    - AGREEMENT
    - AGREEMENT_COUNTERPARTY
    - COUNTERPARTY
  activation: (state(atom-000003) == "none_strict" OR state(atom-000003) ==
    "mixed" OR state(atom-000003) == "unresolved")
  verdicts:
    - key: boundary
      region: Completed inspection proves the frozen denominator or essential
        fields cannot be reproduced under the original contract.
      says: No stricter rate can be supplied; retain the primary broad estimate
        and the evidenced limitation.
    - key: material_strict
      region:  $N > 0$ , all computations complete, and  $L_s \geq 0.10$ .
      says: At least one in ten eligible recorded disclosures has a strict
        ↪ recorded-gap
        path; this selected descriptive result does not identify rescue or
        ↪ restoration
        of rights.
    - key: below_strict
      region:  $N > 0$ , all computations complete, and  $U_s < 0.10$ .
      says: Strict recorded-gap paths have a logical upper bound below one in
        ten. The broad sequence result and this narrower definition may convey
        different portfolio histories.
    - key: strict_uncertain
      region:  $N > 0$ , all computations complete, and  $L_s < 0.10 \leq U_s$ .
```

says: The stricter three-year fraction straddles the attention threshold after preserving unresolved paths.

- key: otherwise
- region: otherwise

says: Completed evidence leaves this judgment unresolved. Report the

- unresolved

scope; no negative or equivalent-effect claim is licensed.

protocol: |

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible

- termination_date, breaking ties by exact lexicographic agreement_id.
- Set index_effective_date = a0.effective_date and t0 =
- a0.termination_date. Never set t0 from index_effective_date. A
- candidate event timestamp s = a1.effective_date must satisfy t0 < s;
- signature is a separate strict-only requirement. H1/H2/H3/H5 and the
- 31-day guard are measured from termination t0. Receipts alone use s
- as their one-year origin. All examples whose t0 was implicit use this
- explicit termination definition.

Status: exploratory descriptive, selected by observed continuity in Atom

- 3, using the same data. No holdout or independent confirmation is
- claimed. Population and N, unit, t0, H3, exclusions and index choice
- remain exactly Atom 1/DC5. Do not subset to disclosures with clean
- paths, complete party sets, known signatures or favorable fields.
- Outcome is existence of any DC6 broad path satisfying every DC7
- strict predicate within H3.

Execute in order:

1. Reproduce N and all original candidate histories, including
 - nonwitnessed disclosures and unresolved broad candidates. Reconcile
 - W3/S/F/V with Atoms 2/3, then evaluate DC7 for all potential paths,
 - not just Atom 2's earliest witness. All relevant key/cardinality
 - invariants remain mandatory.
2. Set strict lo_d=1 iff a definite strict path exists. For each other
 - disclosure, strict hi_d=0 iff no missing future/unexported agreement
 - is possible under certified follow-up and EVERY potentially broad
 - path is either definitely impossible as broad or has at least one
 - definitely false strict requirement. Otherwise strict hi_d=1. Known
 - ineligibility of an index-level strict requirement (e.g. simultaneous
 - index flag) can certify strict impossibility for that disclosure even
 - when later observation is incomplete. Do not require full history to
 - rule out a path whose necessary 31-day guard or other known
 - requirement already fails.
3. Compute $Ls = \sum(lo)/N$ and $Us = \sum(hi)/N$. Assert per-unit strict
 - $lo \leq$ broad lo and strict $hi \leq$ broad hi using shared information and
 - logical closure. For the full-cohort share of broad events that fail
 - the strict definition, report the paired logical range $[\max(0, L3 - Us),$
 - $\min(1, U3 - Ls)]$, explicitly conservative if cross-unit joint
 - constraints could tighten it; do not treat endpoints as confidence
 - limits. No data-driven third definition or alternate gap length.
4. Plot broad and strict three-year intervals on the same [0,1] axis with
 - N and unresolved shares. Report all failing/missing guards; no
 - successful-path-only storytelling. Compute threshold sensitivity as
 - in Atom 2 with strict indicators. Do not report a causal gap versus
 - no-gap comparison, a t-test or a p-value.
5. Adjudicate material_strict at equality 0.10; below_strict only if
 - $Us < 0.10$; otherwise strict_uncertain when the threshold is crossed.
 - Exact $Us=0$ is a defined strict-record zero only, and can coexist with
 - broad later agreements.

Synthetic checks: for N=4 with strict indicators (1,1),(0,0),(0,1),(0,0),
 ↳ report [0.25,0.50] (synthetic only); known simultaneous index makes
 ↳ strict impossible without requiring later observed rows; an
 ↳ unresolved candidate with sufficient calendar space remains possible;
 ↳ removing a missing-signature disclosure would change N and must fail;
 ↳ two qualifying paths for one disclosure count once; strict interval
 ↳ cannot exceed broad per-unit possibilities. Consequences: all scienti
 ↳ fic states supply a restricted supplementary interpretation only; no
 ↳ new Atom is selected by this result. Boundary/otherwise/no_result
 ↳ does not overturn the primary broad estimate.

Exact input fields and provenance:

↳ disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls),
 ↳ disclosure_agreement(disclosure_id,agreement_id,role),
 ↳ agreement(agreement_id,agreement_local_id,type_cls,field_of_use_cls,e
 ↳ ffective_date,expiration_date,termination_date,sign_date),
 ↳ agreement_counterparty(agreement_id,counterparty_id),
 ↳ counterparty(counterparty_id,counterparty_local_id). Use supplied
 ↳ schema-only.md lines 9-51 and 89-149, DC2. All are allowed APT0
 ↳ tables, physical lowercase. Frozen semantic coding is
 ↳ second-chances-termination-v3 plus provider dictionary hashes bound
 ↳ by Atom 1, DC3. No undocumented field or current status is
 ↳ substituted. Apply DC4: entity many-to-one assertions; distinct pair
 ↳ joins; party-set reduction before disclosure history joins; no
 ↳ cross-tenant joins or silent loss of dangling candidate links. Every
 ↳ reused derived table is reproduced from these projections and checked
 ↳ against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record
 ↳ descriptive estimand, not a sampled population or causal effect. No
 ↳ estimator standard errors, clustering-based p-values, confirmatory
 ↳ hypotheses or significance tests are registered (statistical
 ↳ multiplicity family size zero); no holdout is used. Shared agreements
 ↳ create dependence and unit multiplicity, which must be reported, not
 ↳ hidden with independent-Bernoulli intervals. Logical uncertainty from
 ↳ unresolved indicators is distinct from misclassification, population
 ↳ selection and construct uncertainty. No welfare SESOI or
 ↳ statistical-equivalence claim exists. Report exact fractions/bounds
 ↳ and thresholds as descriptive only. Never infer prevalence or
 ↳ precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema
 ↳ version 1):

Invoke prereg/execution/run_atom.py --atom atom-000004; analysis.atom4
 ↳ implements this Atom, using core.Records and DC1-DC9. The authority
 ↳ remains this Atom protocol. Load the exact projections and metadata
 ↳ statuses described in execution/input-interface.md. All ten metadata
 ↳ inspections precede cohort freezing; no real class values, mounts or
 ↳ coverage are supplied by this draft. Missing production definitions
 ↳ are registered unresolved requirements, not permission to invent a
 ↳ default. The input adapter's CSV/Parquet paths are governed bindings,
 ↳ not scientific choices. Keep the same input fingerprint and cohort
 ↳ hash across all descendants; ledger rows are read only by Atoms 5-6
 ↳ and have a separate frozen hash. A changed frozen non-ledger source
 ↳ is operational no_result unless a completed, cited source-contract
 ↳ inspection establishes the boundary region specified here. Atom 5's
 ↳ frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by

- analysis.atom4; construction and tri-valued predicates are
- core.Records.select_indices/history/strict/receipts as appropriate.
- As an explicit necessary-condition clarification, a known signature
- at or before index termination fails the strict requirement even when
- the later effective date is unknown; a missing signature remains
- unknown. Other known false strict requirements likewise dominate
- unresolved facts. An invalid cross-tenant candidate link is never a
- witness and leaves a possible-event flag within an eligible
- disclosure history. Zero-tolerance cardinality assertions apply to
- joins; duplicate links become sets and cannot multiply outcomes.
- Individual broken/conflicting keys are audited and quarantined as DC4
- specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000004/ contains

- provenance.json (semantic/execution-code, source/cohort and
- applicable ledger hashes, Python version, timestamp); diagnostics.csv
- (check,order,numerator,denominator,status,reason); disposition.json
- (atom,state or null,terminal or null,status,activation
- text/value,trace,reason,hashes); synthetic-checks.json (current
- synthetic proof and code hash). Numerical values are emitted only
- after a completed scientific state. Inactive or failed work emits dis
- position/provenance/diagnostics and no numerical tables. Registered
- numerical interfaces: release-candidate/strict-bounds.csv (N, L3, U3,
- Ls, Us, unknown, strict_witnesses, broad_minus_strict_lower,
- broad_minus_strict_upper, required_unresolved, available_unresolved,
- reachable, capped_unresolved). Restricted derivations:
- strict-indicators.csv (d,lo,hi,lo_broad,hi_broad); strict-paths.csv
- with the same path fields as Atom 3. Every completed Atom also writes
- restricted/field-missingness.csv (table,field,missing,rows), restrict
- ed/source-metadata.csv (tenant,metadata), restricted/result.json
- (reproducible complete module payload for downstream binding), and
- restricted/metrics.json when numerical public-candidate tables exist.
- CSV nested objects use JSON text; raw transaction values never enter
- World prose. The machine-checkable column index is
- execution/output-contract.yaml, subordinate to this protocol.

Figure 4 is implemented at prereg/paper/figures/figure4.py and consumes

- only its figures.yaml tables. The governed visualizer creates release
- -candidate/figure4.pdf after disclosure screening; the analysis
- dispatcher does not render or publish raw records. This replaces the
- SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without
- replacing estimands. Atom 1 composition remains a full table; other
- paired displays can occupy panels within one figure. Figure code
- calculates no new estimator. Empty, partial and unactivated inputs
- produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-f

- igure integration in figure_checks.py. Generated values, PDFs, PNGs
- and test logs stay outside the World. Tests include the independently
- specified decade between index effective date and termination; agreem
- ents on both sides of termination; selection separately from timing;
- leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards;
- unknown versus false; source mismatch; cohort/bundle/cardinality
- invariance; classifications and receipt timing; exact integer
- thresholds; every mandatory branch; missing/partial/inactive plot
- inputs and long-label/close-endpoint geometry. Any failed
- prerequisite test stops data execution as no_result; a passing test
- does not establish actual APT0 availability or empirical validity.

Local states use the first matching registered region. Operational interr
 ↳ uptions, read/cast-contract errors, failed assertions and unresolved
 ↳ software defects are terminal no_result with no scientific state or
 ↳ estimate; missing data documented as an evidenced construct boundary
 ↳ follows that boundary region. Missing retention remains indicator unc
 ↳ ertainty, not a statistical null. Unrun members remain pending while
 ↳ predecessors may resolve and not_activated with trace at closeout.
 ↳ Report restrictions before compatible primary/supplementary Molecule
 ↳ clauses, then residual unresolved scope. No result licenses a new
 ↳ cohort, clock, code mapping, causal claim or unregistered estimator.

Threshold-sensitivity output retains both raw required_unresolved k and c
 ↳ apped_unresolved = min(k,Q), together with available_unresolved Q and
 ↳ reachable = (k<=Q). This preserves the registered cap and explicit
 ↳ unreachable distinction without changing adjudication. For Atom 2
 ↳ these values are in restricted/metrics.json; strict-bounds.csv and
 ↳ late-bounds.csv include them in their registered candidate summary.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance
 ↳ revision v002; native schema version 1).

The same question, Atom IDs, result keys, activation, population,
 ↳ horizons, thresholds and finite-record inferential status are
 ↳ retained. These repairs implement the registered science; none was
 ↳ selected from empirical results.

Use explicit --world READ_ONLY_WORLD and --source-root EXECUTING_SRC with
 ↳ run_atom.py. The source root contains execution/ and paper/figures/;
 ↳ the World root contains atoms/, molecules/, prereg/. Never infer the
 ↳ deployed World from __file__. The dispatcher, saver and test runner
 ↳ propagate both roots. provenance.py hashes a fixed nonempty roster of
 ↳ executing Python sources, separately from immutable Atom/Molecule
 ↳ protocols and scientific/interface sources in the World. Missing
 ↳ files, stale/incomplete certificates or mismatched predecessor
 ↳ code/World/registration identity stop data access as operational
 ↳ no_result. Required certificate checks are unit_semantics,
 ↳ file_formats, copied_cli and runtime_figures, including 130.7 mm and
 ↳ 180 mm exports checked with validate_exports and the exact supplied
 ↳ fonts. Unit-only reports do not authorize bound data. Built-in
 ↳ --synthetic-fixture is mutually exclusive with --inputs and generates
 ↳ artificial records only; its disposition is not a production
 ↳ certificate. Pure in-memory functions are for synthetic/unit use; the
 ↳ governed entry point is the certificate-gated CLI. The complete test
 ↳ runner invokes copied source against a separate World using persisted
 ↳ predecessors, and also exercises the ordinary certified CSV-input CLI.
 All restricted CSV schemas, including zero-row scientific outputs, are fi
 ↳ xed in output-contract.yaml (interface 2). Optional audit values are
 ↳ empty cells in their declared columns, not omitted headers. An empty
 ↳ cohort, empty witness table or empty ledger-derived audit retains its
 ↳ scientific table schema. Failed/inactive work instead emits
 ↳ nonnumerical disposition and diagnostic files. Common restricted
 ↳ headers are field-missingness.csv(table,field,missing,rows) and
 ↳ source-metadata.csv(tenant,metadata);
 ↳ diagnostics.csv(check,order,numerator,denominator,status,reason) is
 ↳ fixed for all dispositions.

Raw provenance represents numeric NaN, +infinity and -infinity with
 ↳ distinct tagged scalar objects before JSON hashing; original strings
 ↳ remain strings. Duplicate/conflict audits remain deterministic and
 ↳ retain representational distinctions. Receipt normalization then
 ↳ converts all nonfinite/unparseable amounts to unknown under DC8, rega
 ↳ rdless of memory/CSV/Parquet representation. File representations may
 ↳ have different raw provenance hashes; they must produce equivalent
 ↳ scientific indicators and result states for semantically equivalent
 ↳ inputs. Unknown amounts are never zeros or dropped records. Known cos
 ↳ t/out-of-window events remain decisively irrelevant, while a definite
 ↳ positive witness dominates unresolved potentially positive events.

Publication assembly first reconciles with authoritative Molecule members
 ↳ hip. Partial previews list all seven members as observed dispositions
 ↳ or explicitly pending and label report_mode=partial_preview. Final
 ↳ closeout requires an explicit result/no_result for every activated
 ↳ member; it may derive inactive dispositions only from registered
 ↳ conditions and predecessor closure, preserving unknownness. A missing
 ↳ activated analysis prevents final closeout. Source boundaries and
 ↳ failed predecessors do not become negative evidence. Direct copied so
 ↳ urce-state columns have declared dependencies in output-contract.yaml
 ↳ and results-bindings.yaml. Suppressing Atom 3 also suppresses Atom 6
 ↳ continuity_state in table/metric presentation and receipt_continuity_
 ↳ scope, direct Atom 3 slots, and protected interpretation/trace
 ↳ material; independently releasable financial quantities remain
 ↳ subject to governed approval and complementary suppression.

Every figure implements the registered DataFrame API with no data reads
 ↳ or estimator. Runtime style_dir binds the supplied HelveticaNeue regu
 ↳ lar/medium/bold/italic TrueType files by exact path; missing required
 ↳ fonts fail, while style_dir=None is explicitly preview-only. Rerender
 ↳ both widths, enforce <=170 mm height, and retain vector/font/Unicode/
 ↳ page checks. The chart catalog and render-package layouts remain
 ↳ disabled; manuscript class and compiler-owned TeX/PDF checks remain i
 ↳ ntact. Tests include absent, partial, inactive/no_result inputs, long
 ↳ labels, nearby endpoints and both certain/possible overlap. Synthetic
 ↳ output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual
 ↳ and local source/cohort freezes and the applicable ledger freeze;
 ↳ incompatible snapshots cannot be composed into one reported study. A
 ↳ mismatch blocks publication assembly pending governed resolution,
 ↳ never changes a completed estimate or silently refreshes a
 ↳ predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific
 ↳ amendment 2).

execution/README.md indexes this Atom's complete runnable command,
 ↳ analysis callable, exact inputs, outputs and synthetic checks. Shared
 ↳ implementations are used, not seven duplicate estimators. Standalone
 ↳ --dispatch-policy activation_respecting is the default and retains
 ↳ the activation expression above. An explicit --dispatch-policy direct
 ↳ attempts this selected Atom immediately, without waiting for outer
 ↳ activation. Runtime direct scheduling selects the first B members in
 ↳ Molecule membership order; budget is a dispatch choice recorded
 ↳ before execution, never chosen from results. No registered scientific
 ↳ question, local key, estimator, clock, threshold, conditional scope
 ↳ or graph edge changes.

Direct dispatch cannot waive input validity or conditional scientific
 ↳ meaning. Reuse actual supplied scientific predecessors and their
 ↳ frozen fingerprints; never replace a supplied no_result with a
 ↳ successful retry. If a predecessor record is absent, pending,
 ↳ not_activated or budget_unselected, registered DC1-DC8 constructions
 ↳ may be computed locally from genuinely supplied projections, using
 ↳ analysis.py and dispatch.local_inputs. Follow the source Atom
 ↳ activation references to order these calculations; they are internal
 ↳ evidence, not new experiments or accepted predecessor World Atoms.
 ↳ Also construct the shared cohort and broad indicators where this
 ↳ module requires them. Save each local calculation, source-protocol
 ↳ citation, frozen source/cohort/ledger identity, exact outputs and
 ↳ content digest in restricted/local-construction.json and
 ↳ local_evidence provenance. Never insert these calculations into the
 ↳ caller's prior results or the World roster. A source-protocol ID in
 ↳ that file is a citation, not a realized member record.

All supplied source/cohort and applicable ledger freezes remain binding.
 ↳ Promised but unavailable data, incomplete inspection, failed software
 ↳ or required predecessor no_result yields this Atom's operational
 ↳ no_result. Completed evidence establishing an existing boundary
 ↳ follows only that registered boundary region. If local or supplied
 ↳ evidence shows this Atom's conditional scientific scope is false or
 ↳ unresolved, complete it as the existing otherwise state, with the
 ↳ explicit conditional-scope reason and no numerical rate. In
 ↳ particular, direct dispatch cannot turn all_strict into the selected
 ↳ Atom 4 claim, material into the selected Atom 7 claim, or unavailable
 ↳ receipt support into a financial result. Otherwise does not assert a
 ↳ statistical null. Conditional scope is checked with the same
 ↳ registered expression, using actual or explicitly local evidence; no
 ↳ new graph is authored.

dispatch.json, restricted/result.json and provenance.json record
 ↳ dispatch_policy and whether outer activation was bypassed; direct
 ↳ results record scientific_condition_value and local_evidence, and
 ↳ Atom 6 records source_state_origins. These are restricted execution
 ↳ metadata until disclosure approval. Local continuity is labeled as
 ↳ such in the receipt continuity slot; it never claims an accepted Atom
 ↳ 3 result. All source-dependent copies inherit source disclosure
 ↳ limits, including protected local copies. No local evidence may
 ↳ satisfy a missing predecessor World condition in a Molecule composite
 ↳ claim; restrictions always apply and standalone result slots remain
 ↳ scoped to their producing Atom.

Publication closeout explicitly declares dispatch_policy and, for direct
 ↳ mode, B via budget. It lists all seven members: selected direct
 ↳ attempts retain done/otherwise/boundary/no_result; unselected members
 ↳ are budget_unselected, never falsely not_activated. Missing selected
 ↳ work blocks final closeout; true partial previews remain pending.
 ↳ Default activation-respecting closeout is unchanged. For every
 ↳ source-dependent slot apply disclosure suppression first, including
 ↳ protected source states; then the consuming Atom's
 ↳ no_result/not_activated/budget_unselected or completed
 ↳ boundary/otherwise; only an actually incomplete preview may use
 ↳ missing-source pending. A final active result lacking essential
 ↳ source/local evidence raises an error. The four reviewed closed
 ↳ inactive routes (empty cohort, evidenced cohort boundary, root
 ↳ no_result, continuity no_result) must never report pending or preview
 ↳ in these slots. Runnable tests are test_amendment.py,
 ↳ amendment_checks.py and the full test_synthetic.py entry point.

Registered question

How frequent is strict recorded re-entry within three years in the original cohort, once the continuity diagnostic shows ambiguity or non-strict paths?

Disclosed amendment, scientific amendment 2, revision v004; native schema version 1. The operator reviewed a prior-run manuscript; this author received no empirical results. Prospective execution specification only. This Atom is pending; no APTO observation, numerical result or realized state is asserted. Its registration payload owns its protocol, activation and possible results.

atom-000005: Receipt observability

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible termination_date, breaking ties by exact lexicographic agreement_id. Set index_effective_date = a0.effective_date and t0 = a0.termination_date. Never set t0 from index_effective_date. A candidate event timestamp s = a1.effective_date must satisfy t0 < s; signature is a separate strict-only requirement. H1/H2/H3/H5 and the 31-day guard are measured from termination t0. Receipts alone use s as their one-year origin. All examples whose t0 was implicit use this explicit termination definition.

Status: outcome-selected exploratory measurement diagnostic. Population is M distinct agreement IDs that are definite broad witnesses within H3 for ANY disclosure in frozen N. Count each later agreement once regardless of bundles or several eligible terminations. Time zero s is that agreement's effective_date, outcome window [s,add_years(s,1)]. Do not condition M on a receipt, strict path, school or classification completeness. Cohort membership comes from Atom 2; no ledger information selects it.

Additional exact fields: agreement_revenue_event(agreement_id,event_seq,event_date,fy,payment_type,amount). Supplied schema-only.md lines 69–87. Dtypes and units are DC2; amount is nominal USD. The boolean semantics and extraction hash are frozen before inspecting receipt values. No amount sum, total_revenue comparison, fiscal-year imputation or label-based revenue repair is allowed. Schema warns Chicago classification is unpopulated; inspect actual status, do not copy a claimed count.

Execute in order: 1. Freeze sorted M and map each ID to its supported tenant and effective date, preserving many-to-many disclosure-origin links only in a separate provenance table. Assert M ≤ number of broad witness paths and M equals set cardinality, not row count. A different M on reproduction is an error, not a new sample. 2. Inspect ledger availability, boolean definition, source-classification version, date granularity, extraction cutoff and coverage through each anniversary. Verify FK joins many-to-one to agreement; count orphan events separately without using them. Audit duplicate event_seq and identical projected event rows; do not remove rows based on the assumed ordinal key. Mask unsupported fields to unknown using DC8. 3. For all M, evaluate whether DC8's binary lower and upper indicators coincide. Internally compute K = count(lo == hi) without publishing the positive/negative outcome tally in this diagnostic. The support test can depend on a positive witness being conclusive despite missing other events; therefore it is outcome-selected and not an outcome-blind gate. M never shrinks to K. Record classified-dated support, certified empty ledger,

undated potential event, unknown amount/class and incomplete observation as distinct reasons. 4. If $K=M$ label `full_support`; if $0 < K < M$ `partial_support`. If $K=0$ and concrete missing structure or classification/date evidence explains every unresolved agreement, boundary. If $K=0$ is due to unresolved documentation rather than verified missing support, otherwise. A failed ledger query is `no_result`, not boundary or zero. If M unexpectedly equals zero, return otherwise with inconsistency reason and no receipt calculation.

Estimator: support fraction K/M , no financial-result test or p-value. Missingness diagnostics are exact counts at agreement and event grains; never compare event-row counts with disclosure denominators. Any known positive event can support existence despite undated others; absence requires the much stronger full-observation contract. The lack of a unique transaction key prevents credible sum-based outcomes here but does not invalidate a duplicate-invariant existential receipt indicator.

Synthetic checks: a duplicated classified positive dated event leaves the receipt indicator unchanged; `event_seq` duplicated across distinct events is allowed and never used for deduplication; all-NA is `_revenue` stays unknown; `fy` with no `event_date` cannot place an event in a one-year window; empty ledger plus certified complete coverage supports zero; empty ledger without coverage is unknown; known positive event yields decidable one even with other unknown events; the same replacement linked to three disclosures contributes one to M . Consequences: `full_support`/`partial_support` allow Atom 6, conditional on completion of Atom 3. Boundary/otherwise/`no_result` blocks receipt realization and restricts financial claims; it never implies later contracting had no financial value.

Exact input fields and provenance: `disclosure(disclosure_id,date,category__anzsrc,disclosure_type_cls)`, `disclosure_agreement(disclosure_id,agreement_id,role)`, `agreement(agreement_id,agreement_local_id,type)`, `agreement_counterparty(agreement_id,counterparty_id)`, `counterparty(counterparty_id,counterparty_local_id)`. Use supplied schema-only.md lines 9–51 and 89–149, DC2. All are allowed APTO tables, physical lowercase. Frozen semantic coding is second-chances-termination-v3 plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen N .

Inference, uncertainty and scope: apply DC9. This is a finite-record descriptive estimand, not a sampled population or causal effect. No estimator standard errors, clustering-based p-values, confirmatory hypotheses or significance tests are registered (statistical multiplicity family size zero); no holdout is used. Shared agreements create dependence and unit multiplicity, which must be reported, not hidden with independent-Bernoulli intervals. Logical uncertainty from unresolved indicators is distinct from misclassification, population selection and construct uncertainty. No welfare SESOI or statistical-equivalence claim exists. Report exact fractions/bounds and thresholds as descriptive only. Never infer prevalence or precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema version 1): Invoke `prereg/execution/run_atom.py -atom atom-000005`; `analysis.atom5` implements this Atom, using `core.Records` and DC1–DC9. The authority remains this Atom protocol. Load the exact projections and metadata statuses described in `execution/input-interface.md`. All ten metadata inspections precede cohort freezing; no real class values, mounts or coverage are supplied by this draft. Missing production definitions are registered unresolved requirements, not permission to invent a default. The input adapter’s CSV/Parquet paths are governed bindings, not scientific choices. Keep the same input fingerprint and cohort hash across all descendants; ledger rows are read only by Atoms 5–6 and have a separate frozen hash. A changed frozen non-ledger source is operational `no_result` unless a completed, cited source-contract inspection establishes the boundary region specified here. Atom 5’s frozen population mismatch is operational `no_result`.

Ordered executable work is the numbered protocol above, implemented by `analysis.atom5`; construction and tri-valued predicates are `core.Records.select_indices/history/strict/receipts` as appropriate. As an explicit necessary-condition clarification, a known signature at or before index termination fails the strict requirement even when the later effective date is unknown; a missing signature remains unknown. Other known false strict requirements likewise dominate unresolved facts. An invalid cross-tenant candidate link is never a witness and leaves a possible-event flag within an eligible disclosure history. Zero-tolerance cardinality assertions apply to joins; duplicate links become sets and cannot multiply outcomes. Individual broken/conflicting keys are audited and quarantined as DC4 specifies, not automatic tenant failures.

Complete current output layout: governed `evidence/atom-000005/` contains `provenance.json` (semantic/execution-code, source/cohort and applicable ledger hashes, Python version, timestamp); `diagnostics.csv` (check,order,numerator,denominator,status,reason); `disposition.json` (atom,state or null,terminal or null,status,activation text/value,trace,reason,hashes); `synthetic-checks.json` (current synthetic proof and code hash). Numerical values are emitted only after a completed scientific state. Inactive or failed work emits `disposition/provenance/diagnostics` and no numerical tables. Registered numerical interfaces: `release-candidate/receipt-support.csv` (M, K, unknown); `release-candidate/receipt-support-reasons.csv` (reason, unit, count, denominator). Restricted derivations: `receipt-support.csv` (a1,s,endpoint,lo,hi,decidable,reason,evidenced_gap,earliest); `revenue-audit.csv` (a1,flag, optional count); `receipt-origin-paths.csv` (d,a1). Every completed Atom also writes `restricted/field-missingness.csv` (table,field,missing,rows), `restricted/source-metadata.csv` (tenant,metadata), `restricted/result.json` (reproducible complete module payload for downstream binding), and `restricted/metrics.json` when numerical public-candidate tables exist. CSV nested objects use JSON text; raw transaction values never enter World prose. The machine-checkable column index is `execution/output-contract.yaml`, subordinate to this protocol.

Figure 5 is implemented at `prereg/paper/figures/figure5.py` and consumes only its `figures.yaml` tables. The governed visualizer creates `release-candidate/figure5.pdf` after

disclosure screening; the analysis dispatcher does not render or publish raw records. This replaces the SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without replacing estimands. Atom 1 composition remains a full table; other paired displays can occupy panels within one figure. Figure code calculates no new estimator. Empty, partial and unactivated inputs produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in `execution/test_synthetic.py`, with per-figure integration in `figure_checks.py`. Generated values, PDFs, PNGs and test logs stay outside the World. Tests include the independently specified decade between index effective date and termination; agreements on both sides of termination; selection separately from timing; leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards; unknown versus false; source mismatch; cohort/bundle/cardinality invariance; classifications and receipt timing; exact integer thresholds; every mandatory branch; missing/partial/inactive plot inputs and long-label/close-endpoint geometry. Any failed prerequisite test stops data execution as `no_result`; a passing test does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interruptions, read/cast-contract errors, failed assertions and unresolved software defects are terminal `no_result` with no scientific state or estimate; missing data documented as an evidenced construct boundary follows that boundary region. Missing retention remains indicator uncertainty, not a statistical null. Unrun members remain pending while predecessors may resolve and not `activated` with trace at closeout. Report restrictions before compatible primary/supplementary Molecule clauses, then residual unresolved scope. No result licenses a new cohort, clock, code mapping, causal claim or unregistered estimator.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance revision v002; native schema version 1). The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results. Use explicit `-world READ_ONLY_WORLD` and `-source-root EXECUTING_SRC` with `run_atom.py`. The source root contains `execution/` and `paper/figures/`; the World root contains `atoms/`, `molecules/`, `prereg/`. Never infer the deployed World from **file**. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `-synthetic-fixture` is mutually exclusive with `-inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All

restricted CSV schemas, including zero-row scientific outputs, are fixed in output-contract.yaml (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are field-missingness.csv(table,field,missing,rows) and source-metadata.csv(tenant,metadata); diagnostics.csv(check,order,numerator,denominator,status,reason) is fixed for all dispositions. Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events. Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label report_mode=partial_preview. Final closeout requires an explicit result/no_result for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in output-contract.yaml and results-bindings.yaml. Suppressing Atom 3 also suppresses Atom 6 continuity_state in table/metric presentation and receipt_continuity_scope, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression. Every figure implements the registered DataFrame API with no data reads or estimator. Runtime style_dir binds the supplied HelveticaNeue regular/medium/bold/italic TrueType files by exact path; missing required fonts fail, while style_dir=None is explicitly preview-only. Rerender both widths, enforce <=170 mm height, and retain vector/font/Unicode/page checks. The chart catalog and render-package layouts remain disabled; manuscript class and compiler-owned TeX/PDF checks remain intact. Tests include absent, partial, inactive/no_result inputs, long labels, nearby endpoints and both certain/possible overlap. Synthetic output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual and local source/cohort freezes and the applicable ledger freeze; incompatible snapshots cannot be composed into one reported study. A mismatch blocks publication assembly pending governed resolution, never changes a completed estimate or silently refreshes a predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific amendment 2). execution/README.md indexes this Atom's complete runnable command, analysis callable, exact inputs, outputs and synthetic checks. Shared implementations are used, not seven duplicate estimators. Standalone -dispatch-policy

activation_respecting is the default and retains the activation expression above. An explicit `-dispatch-policy` direct attempts this selected Atom immediately, without waiting for outer activation. Runtime direct scheduling selects the first B members in Molecule membership order; budget is a dispatch choice recorded before execution, never chosen from results. No registered scientific question, local key, estimator, clock, threshold, conditional scope or graph edge changes. Direct dispatch cannot waive input validity or conditional scientific meaning. Reuse actual supplied scientific predecessors and their frozen fingerprints; never replace a supplied `no_result` with a successful retry. If a predecessor record is absent, pending, `not_activated` or `budget_unselected`, registered DC1–DC8 constructions may be computed locally from genuinely supplied projections, using `analysis.py` and `dispatch.local_inputs`. Follow the source Atom activation references to order these calculations; they are internal evidence, not new experiments or accepted predecessor World Atoms. Also construct the shared cohort and broad indicators where this module requires them. Save each local calculation, source-protocol citation, frozen source/cohort/ledger identity, exact outputs and content digest in `restricted/local-construction.json` and `local_evidence` provenance. Never insert these calculations into the caller’s prior results or the World roster. A source-protocol ID in that file is a citation, not a realized member record. All supplied source/cohort and applicable ledger freezes remain binding. Promised but unavailable data, incomplete inspection, failed software or required predecessor `no_result` yields this Atom’s operational `no_result`. Completed evidence establishing an existing boundary follows only that registered boundary region. If local or supplied evidence shows this Atom’s conditional scientific scope is false or unresolved, complete it as the existing otherwise state, with the explicit conditional-scope reason and no numerical rate. In particular, direct dispatch cannot turn `all_strict` into the selected Atom 4 claim, material into the selected Atom 7 claim, or unavailable receipt support into a financial result. Otherwise does not assert a statistical null. Conditional scope is checked with the same registered expression, using actual or explicitly local evidence; no new graph is authored. `disposition.json`, `restricted/result.json` and `provenance.json` record `dispatch_policy` and whether outer activation was bypassed; direct results record `scientific_condition_value` and `local_evidence`, and Atom 6 records `source_state_origins`. These are restricted execution metadata until disclosure approval. Local continuity is labeled as such in the receipt continuity slot; it never claims an accepted Atom 3 result. All source-dependent copies inherit source disclosure limits, including protected local copies. No local evidence may satisfy a missing predecessor World condition in a Molecule composite claim; restrictions always apply and standalone result slots remain scoped to their producing Atom. Publication closeout explicitly declares `dispatch_policy` and, for direct mode, B via budget. It lists all seven members: selected direct attempts retain `done/otherwise/boundary/no_result`; unselected members are `budget_unselected`, never falsely `not_activated`. Missing selected work blocks final closeout; true partial previews remain pending. Default activation-respecting closeout is unchanged. For every source-dependent slot apply disclosure suppression first, including protected source states; then the consuming Atom’s `no_result/not_activated/budget_unselected` or completed `boundary/otherwise`; only an actually incomplete preview may use missing-source pending. A final active result

lacking essential source/local evidence raises an error. The four reviewed closed inactive routes (empty cohort, evidenced cohort boundary, root no_result, continuity no_result) must never report pending or preview in these slots. Runnable tests are test_amendment.py, amendment_checks.py and the full test_synthetic.py entry point.

Complete registration fields

```

id: atom-000005
topic: Receipt observability
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Can one-year positive classified receipt outcomes be adjudicated
    for the distinct witnessed later agreements?
  rationale: Receipt absence has a different observation contract from
    ↪ agreement
    absence. This diagnostic separates unsupported financial records from
    a measured zero.
  assumption: The APT0 ledger mixes costs and receipts, permits nonunique
    event_seq and incomplete dates/classification. Michigan and UW financial
    terms show that a receipt need not represent a sale.
  target_strength: descriptive
  target_shape: pattern
  ratings:
    importance: 4
    novelty: 2
    feasibility: 3
    data_advantage: 4
    informativeness: 0.7
  tables:
    - DISCLOSURE
    - DISCLOSURE_AGREEMENT
    - AGREEMENT
    - AGREEMENT_COUNTERPARTY
    - COUNTERPARTY
    - AGREEMENT_REVENUE_EVENT
  activation: (state(atom-000002) == "material" OR state(atom-000002) ==
    ↪ "low_with_witness"
    OR state(atom-000002) == "witnessed_uncertain")
  verdicts:
    - key: full_support
      region: M>0, complete inspection performed, and all M selected agreements
        have decidable DC8 one-year receipt indicators (K=M).
      says: The registered binary receipt status is observable for every
        ↪ selected
        agreement, conditional on the recorded classification definition; no
        commercialization claim follows.
    - key: partial_support
      region: M>0, complete inspection performed, and 0<K<M.
      says: Some selected receipt indicators are decidable and others remain
        unknown; full-population logical bounds are required.

```

- key: boundary
 - region: M>0, K=0, and completed inspection proves every selected agreement lacks required ledger structure or classified/date support and no
 - ↪ certified
 - zero is available.
 - says: One-year receipt realization cannot be measured in the selected agreement population under this contract; this is not zero receipts.
- key: otherwise
 - region: otherwise
 - says: Completed evidence leaves this judgment unresolved. Report the
 - ↪ unresolved
 - scope; no negative or equivalent-effect claim is licensed.

protocol: |

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible

- ↪ termination_date, breaking ties by exact lexicographic agreement_id.
- ↪ Set index_effective_date = a0.effective_date and t0 =
- ↪ a0.termination_date. Never set t0 from index_effective_date. A
- ↪ candidate event timestamp s = a1.effective_date must satisfy t0 < s;
- ↪ signature is a separate strict-only requirement. H1/H2/H3/H5 and the
- ↪ 31-day guard are measured from termination t0. Receipts alone use s
- ↪ as their one-year origin. All examples whose t0 was implicit use this
- ↪ explicit termination definition.

Status: outcome-selected exploratory measurement diagnostic. Population

- ↪ is M distinct agreement IDs that are definite broad witnesses within
- ↪ H3 for ANY disclosure in frozen N. Count each later agreement once
- ↪ regardless of bundles or several eligible terminations. Time zero s
- ↪ is that agreement's effective_date, outcome window
- ↪ [s,add_years(s,1)]. Do not condition M on a receipt, strict path,
- ↪ school or classification completeness. Cohort membership comes from
- ↪ Atom 2; no ledger information selects it.

Additional exact fields: agreement_revenue_event(agreement_id,event_seq,e_vent_date,fy,payment_type,amount,is_revenue), supplied schema-only.md

- ↪ lines 69-87. Dtypes and units are DC2; amount is nominal USD. The
- ↪ boolean semantics and extraction hash are frozen before inspecting
- ↪ receipt values. No amount sum, `total\_revenue` comparison,
- ↪ fiscal-year imputation or label-based revenue repair is allowed.
- ↪ Schema warns Chicago classification is unpopulated; inspect actual
- ↪ status, do not copy a claimed count.

Execute in order:

1. Freeze sorted M and map each ID to its supported tenant and effective
 - ↪ date, preserving many-to-many disclosure-origin links only in a
 - ↪ separate provenance table. Assert M<=number of broad witness paths
 - ↪ and M equals set cardinality, not row count. A different M on
 - ↪ reproduction is an error, not a new sample.
2. Inspect ledger availability, boolean definition, source-classification
 - ↪ version, date granularity, extraction cutoff and coverage through eac
 - ↪ h anniversary. Verify FK joins many-to-one to agreement; count orphan
 - ↪ events separately without using them. Audit duplicate event_seq and
 - ↪ identical projected event rows; do not remove rows based on the
 - ↪ assumed ordinal key. Mask unsupported fields to unknown using DC8.

3. For all M, evaluate whether DC8's binary lower and upper indicators
 - ↪ coincide. Internally compute $K = \text{count}(lo == hi)$ without publishing the
 - ↪ positive/negative outcome tally in this diagnostic. The support test
 - ↪ can depend on a positive witness being conclusive despite missing
 - ↪ other events; therefore it is outcome-selected and not an
 - ↪ outcome-blind gate. M never shrinks to K. Record classified-dated
 - ↪ support, certified empty ledger, undated potential event, unknown
 - ↪ amount/class and incomplete observation as distinct reasons.
4. If $K=M$ label full_support; if $0 < K < M$ partial_support. If $K=0$ and
 - ↪ concrete missing structure or classification/date evidence explains
 - ↪ every unresolved agreement, boundary. If $K=0$ is due to unresolved
 - ↪ documentation rather than verified missing support, otherwise. A
 - ↪ failed ledger query is no_result, not boundary or zero. If M
 - ↪ unexpectedly equals zero, return otherwise with inconsistency reason
 - ↪ and no receipt calculation.

Estimator: support fraction K/M , no financial-result test or p-value.

- ↪ Missingness diagnostics are exact counts at agreement and event
- ↪ grains; never compare event-row counts with disclosure denominators.
- ↪ Any known positive event can support existence despite undated
- ↪ others; absence requires the much stronger full-observation contract.
- ↪ The lack of a unique transaction key prevents credible sum-based
- ↪ outcomes here but does not invalidate a duplicate-invariant
- ↪ existential receipt indicator.

Synthetic checks: a duplicated classified positive dated event leaves the

- ↪ receipt indicator unchanged; `event\_seq` duplicated across distinct
- ↪ events is allowed and never used for deduplication; all-NA is revenue
- ↪ stays unknown; `fy` with no event_date cannot place an event in a
- ↪ one-year window; empty ledger plus certified complete coverage
- ↪ supports zero; empty ledger without coverage is unknown; known
- ↪ positive event yields decidable one even with other unknown events;
- ↪ the same replacement linked to three disclosures contributes one to
- ↪ M. Consequences: full_support/partial_support allow Atom 6,
- ↪ conditional on completion of Atom 3. Boundary/otherwise/no_result
- ↪ blocks receipt realization and restricts financial claims; it never
- ↪ implies later contracting had no financial value.

Exact input fields and provenance:

- ↪ disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls),
- ↪ disclosure_agreement(disclosure_id,agreement_id,role),
- ↪ agreement(agreement_id,agreement_local_id,type_cls,field_of_use_cls,effective_date,expiration_date,termination_date,sign_date),
- ↪ agreement_counterparty(agreement_id,counterparty_id),
- ↪ counterparty(counterparty_id,counterparty_local_id). Use supplied
- ↪ schema-only.md lines 9-51 and 89-149, DC2. All are allowed APT0
- ↪ tables, physical lowercase. Frozen semantic coding is
- ↪ second-chances-termination-v3 plus provider dictionary hashes bound
- ↪ by Atom 1, DC3. No undocumented field or current status is
- ↪ substituted. Apply DC4: entity many-to-one assertions; distinct pair
- ↪ joins; party-set reduction before disclosure history joins; no
- ↪ cross-tenant joins or silent loss of dangling candidate links. Every
- ↪ reused derived table is reproduced from these projections and checked
- ↪ against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record
→ descriptive estimand, not a sampled population or causal effect. No
→ estimator standard errors, clustering-based p-values, confirmatory
→ hypotheses or significance tests are registered (statistical
→ multiplicity family size zero); no holdout is used. Shared agreements
→ create dependence and unit multiplicity, which must be reported, not
→ hidden with independent-Bernoulli intervals. Logical uncertainty from
→ unresolved indicators is distinct from misclassification, population
→ selection and construct uncertainty. No welfare SESOI or
→ statistical-equivalence claim exists. Report exact fractions/bounds
→ and thresholds as descriptive only. Never infer prevalence or
→ precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema
→ version 1):
Invoke prereg/execution/run_atom.py --atom atom-000005; analysis.atom5
→ implements this Atom, using core.Records and DC1-DC9. The authority
→ remains this Atom protocol. Load the exact projections and metadata
→ statuses described in execution/input-interface.md. All ten metadata
→ inspections precede cohort freezing; no real class values, mounts or
→ coverage are supplied by this draft. Missing production definitions
→ are registered unresolved requirements, not permission to invent a
→ default. The input adapter's CSV/Parquet paths are governed bindings,
→ not scientific choices. Keep the same input fingerprint and cohort
→ hash across all descendants; ledger rows are read only by Atoms 5-6
→ and have a separate frozen hash. A changed frozen non-ledger source
→ is operational no_result unless a completed, cited source-contract
→ inspection establishes the boundary region specified here. Atom 5's
→ frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by
→ analysis.atom5; construction and tri-valued predicates are
→ core.Records.select_indices/history/strict/receipts as appropriate.
→ As an explicit necessary-condition clarification, a known signature
→ at or before index termination fails the strict requirement even when
→ the later effective date is unknown; a missing signature remains
→ unknown. Other known false strict requirements likewise dominate
→ unresolved facts. An invalid cross-tenant candidate link is never a
→ witness and leaves a possible-event flag within an eligible
→ disclosure history. Zero-tolerance cardinality assertions apply to
→ joins; duplicate links become sets and cannot multiply outcomes.
→ Individual broken/conflicting keys are audited and quarantined as DC4
→ specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000005/ contains

- ↪ provenance.json (semantic/execution-code, source/cohort and
- ↪ applicable ledger hashes, Python version, timestamp); diagnostics.csv
- ↪ (check,order,numerator,denominator,status,reason); disposition.json
- ↪ (atom,state or null,terminal or null,status,activation text/value,tra
- ↪ ce,reason,hashes); synthetic-checks.json (current synthetic proof and
- ↪ code hash). Numerical values are emitted only after a completed
- ↪ scientific state. Inactive or failed work emits disposition/provenanc
- ↪ e/diagnostics and no numerical tables. Registered numerical
- ↪ interfaces: release-candidate/receipt-support.csv (M, K, unknown);
- ↪ release-candidate/receipt-support-reasons.csv (reason, unit, count,
- ↪ denominator). Restricted derivations: receipt-support.csv (a1,s,endpo
- ↪ int,lo,hi,decidable,reason,evidenced_gap,earliest); revenue-audit.csv
- ↪ (a1,flag, optional count); receipt-origin-paths.csv (d,a1). Every
- ↪ completed Atom also writes restricted/field-missingness.csv
- ↪ (table,field,missing,rows), restricted/source-metadata.csv
- ↪ (tenant,metadata), restricted/result.json (reproducible complete
- ↪ module payload for downstream binding), and restricted/metrics.json
- ↪ when numerical public-candidate tables exist. CSV nested objects use
- ↪ JSON text; raw transaction values never enter World prose. The
- ↪ machine-checkable column index is execution/output-contract.yaml,
- ↪ subordinate to this protocol.

Figure 5 is implemented at prereg/paper/figures/figure5.py and consumes

- ↪ only its figures.yaml tables. The governed visualizer creates release
- ↪ -candidate/figure5.pdf after disclosure screening; the analysis
- ↪ dispatcher does not render or publish raw records. This replaces the
- ↪ SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without
- ↪ replacing estimands. Atom 1 composition remains a full table; other
- ↪ paired displays can occupy panels within one figure. Figure code
- ↪ calculates no new estimator. Empty, partial and unactivated inputs
- ↪ produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-f

- ↪ igure integration in figure_checks.py. Generated values, PDFs, PNGs
- ↪ and test logs stay outside the World. Tests include the independently
- ↪ specified decade between index effective date and termination; agreem
- ↪ ents on both sides of termination; selection separately from timing;
- ↪ leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards;
- ↪ unknown versus false; source mismatch; cohort/bundle/cardinality
- ↪ invariance; classifications and receipt timing; exact integer
- ↪ thresholds; every mandatory branch; missing/partial/inactive plot
- ↪ inputs and long-label/close-endpoint geometry. Any failed
- ↪ prerequisite test stops data execution as no_result; a passing test
- ↪ does not establish actual APT0 availability or empirical validity.

Local states use the first matching registered region. Operational interr

- ↪ uptions, read/cast-contract errors, failed assertions and unresolved
- ↪ software defects are terminal no_result with no scientific state or
- ↪ estimate; missing data documented as an evidenced construct boundary
- ↪ follows that boundary region. Missing retention remains indicator unc
- ↪ ertainty, not a statistical null. Unrun members remain pending while
- ↪ predecessors may resolve and not_activated with trace at closeout.
- ↪ Report restrictions before compatible primary/supplementary Molecule
- ↪ clauses, then residual unresolved scope. No result licenses a new
- ↪ cohort, clock, code mapping, causal claim or unregistered estimator.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance

- ↪ revision v002; native schema version 1).

The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results.

Use `explicit --world READ_ONLY_WORLD` and `--source-root EXECUTING_SRC` with `run_atom.py`. The source root contains `execution/` and `paper/figures/`; the World root contains `atoms/`, `molecules/`, `prereg/`. Never infer the deployed World from `__file__`. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `--synthetic-fixture` is mutually exclusive with `--inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI.

All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`; `diagnostics.csv(check,order,numerator,denominator,status,reason)` is fixed for all dispositions.

Raw `provenance` represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events.

Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label `report_mode=partial_preview`. Final closeout requires an explicit `result/no_result` for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in `output-contract.yaml` and `results-bindings.yaml`. Suppressing Atom 3 also suppresses Atom 6 continuity_state in table/metric presentation and receipt_continuity_scope, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression.

Every figure implements the registered DataFrame API with no data reads
 ↳ or estimator. Runtime style_dir binds the supplied HelveticaNeue regu-
 ↳ lar/medium/bold/italic TrueType files by exact path; missing required
 ↳ fonts fail, while style_dir=None is explicitly preview-only. Rerender
 ↳ both widths, enforce <=170 mm height, and retain vector/font/Unicode/
 ↳ page checks. The chart catalog and render-package layouts remain
 ↳ disabled; manuscript class and compiler-owned TeX/PDF checks remain i-
 ↳ ntact. Tests include absent, partial, inactive/no_result inputs, long
 ↳ labels, nearby endpoints and both certain/possible overlap. Synthetic
 ↳ output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual
 ↳ and local source/cohort freezes and the applicable ledger freeze;
 ↳ incompatible snapshots cannot be composed into one reported study. A
 ↳ mismatch blocks publication assembly pending governed resolution,
 ↳ never changes a completed estimate or silently refreshes a
 ↳ predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific
 ↳ amendment 2).

execution/README.md indexes this Atom's complete runnable command,
 ↳ analysis callable, exact inputs, outputs and synthetic checks. Shared
 ↳ implementations are used, not seven duplicate estimators. Standalone
 ↳ --dispatch-policy activation_respecting is the default and retains
 ↳ the activation expression above. An explicit --dispatch-policy direct
 ↳ attempts this selected Atom immediately, without waiting for outer
 ↳ activation. Runtime direct scheduling selects the first B members in
 ↳ Molecule membership order; budget is a dispatch choice recorded
 ↳ before execution, never chosen from results. No registered scientific
 ↳ question, local key, estimator, clock, threshold, conditional scope
 ↳ or graph edge changes.

Direct dispatch cannot waive input validity or conditional scientific
 ↳ meaning. Reuse actual supplied scientific predecessors and their
 ↳ frozen fingerprints; never replace a supplied no_result with a
 ↳ successful retry. If a predecessor record is absent, pending,
 ↳ not_activated or budget_unselected, registered DC1-DC8 constructions
 ↳ may be computed locally from genuinely supplied projections, using
 ↳ analysis.py and dispatch.local_inputs. Follow the source Atom
 ↳ activation references to order these calculations; they are internal
 ↳ evidence, not new experiments or accepted predecessor World Atoms.
 ↳ Also construct the shared cohort and broad indicators where this
 ↳ module requires them. Save each local calculation, source-protocol
 ↳ citation, frozen source/cohort/ledger identity, exact outputs and
 ↳ content digest in restricted/local-construction.json and
 ↳ local_evidence provenance. Never insert these calculations into the
 ↳ caller's prior results or the World roster. A source-protocol ID in
 ↳ that file is a citation, not a realized member record.

All supplied source/cohort and applicable ledger freezes remain binding.

- Promised but unavailable data, incomplete inspection, failed software
- or required predecessor no_result yields this Atom's operational
- no_result. Completed evidence establishing an existing boundary
- follows only that registered boundary region. If local or supplied
- evidence shows this Atom's conditional scientific scope is false or
- unresolved, complete it as the existing otherwise state, with the
- explicit conditional-scope reason and no numerical rate. In
- particular, direct dispatch cannot turn all_strict into the selected
- Atom 4 claim, material into the selected Atom 7 claim, or unavailable
- receipt support into a financial result. Otherwise does not assert a
- statistical null. Conditional scope is checked with the same
- registered expression, using actual or explicitly local evidence; no
- new graph is authored.

disposition.json, restricted/result.json and provenance.json record

- dispatch_policy and whether outer activation was bypassed; direct
- results record scientific_condition_value and local_evidence, and
- Atom 6 records source_state_origins. These are restricted execution
- metadata until disclosure approval. Local continuity is labeled as
- such in the receipt continuity slot; it never claims an accepted Atom
- 3 result. All source-dependent copies inherit source disclosure
- limits, including protected local copies. No local evidence may
- satisfy a missing predecessor World condition in a Molecule composite
- claim; restrictions always apply and standalone result slots remain
- scoped to their producing Atom.

Publication closeout explicitly declares dispatch_policy and, for direct

- mode, B via budget. It lists all seven members: selected direct
- attempts retain done/otherwise/boundary/no_result; unselected members
- are budget_unselected, never falsely not_activated. Missing selected
- work blocks final closeout; true partial previews remain pending.
- Default activation-respecting closeout is unchanged. For every
- source-dependent slot apply disclosure suppression first, including
- protected source states; then the consuming Atom's
- no_result/not_activated/budget_unselected or completed
- boundary/otherwise; only an actually incomplete preview may use
- missing-source pending. A final active result lacking essential
- source/local evidence raises an error. The four reviewed closed
- inactive routes (empty cohort, evidenced cohort boundary, root
- no_result, continuity no_result) must never report pending or preview
- in these slots. Runnable tests are test_amendment.py,
- amendment_checks.py and the full test_synthetic.py entry point.

Registered question

Can one-year positive classified receipt outcomes be adjudicated for the distinct witnessed later agreements?

Disclosed amendment, scientific amendment 2, revision v004; native schema version 1. The operator reviewed a prior-run manuscript; this author received no empirical results. Prospective execution specification only. This Atom is pending; no APTO observation, numerical result or realized state is asserted. Its registration payload owns its protocol, activation and possible results.

atom-000006: Receipts after recontracting

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible termination_date, breaking ties by exact lexicographic agreement_id. Set

`index_effective_date = a0.effective_date` and `t0 = a0.termination_date`. Never set `t0` from `index_effective_date`. A candidate event timestamp `s = a1.effective_date` must satisfy `t0 < s`; signature is a separate strict-only requirement. H1/H2/H3/H5 and the 31-day guard are measured from termination `t0`. Receipts alone use `s` as their one-year origin. All examples whose `t0` was implicit use this explicit termination definition.

Status: exploratory descriptive. This Atom reconverges two prior judgments: receipt support from Atom 5 and continuity scope from Atom 3. Any scientific completion of Atom 3 suffices, including a boundary; a favorable gap pattern is not required. If Atom 3 is operational `no_result`, this combined receipt storyline stays blocked. Use all frozen `M` from Atom 5, not only its decidable `K`, with one agreement per unit. Window and coding are exactly DC8; `s` is agreement effective date. Exposure is selection as a witnessed later agreement, not randomized rematching. No comparison with original agreements, nonrecontracted disclosures or nonspinoffs is registered.

Additional exact source: `agreement_revenue_event(agreement_id,event_seq,event_date,fy,payment_type,amount)` schema-only.md 69–87, and its frozen provider-classification hash. Amount sign uses finite Float64 USD >0. No receipts are allocated to disclosures. No annual sums, inflation adjustment, FY fallback, payment-type machine learning, netting or `agreement.total_revenue` validation is authorized.

Execute in order: 1. Reproduce `M`, support flags and the raw event projection; assert all original `M` remain including incomplete ledgers. Join events to agreement once; evaluate receipt existence at agreement grain before any origin-history join. Duplicated rows must not change any indicator. Verify effective dates and one-year cutoffs without imputing calendar years. 2. Compute agreement `lo_r/hi_r` exactly DC8. Negative or zero amounts are not positive receipts; missing amounts or `is_revenue` are possibly positive unless other known facts exclude the window. Events before `s` or after anniversary do not qualify. If an event date is unknown, `fy` is no substitute. Retain refunds and cost flags in diagnostics, not as evidence of net profit or an inferred correction. 3. Compute `Lr=sum(lo_r)/M`, `Ur=sum(hi_r)/M`, positive count, certified non-positive count, unresolved count; assert their sum `M` and reproduce `K` from Atom 5. Report full population interval; no complete-case receipt percentage. For a timing illustration, among agreements with a definite event select earliest known positive dated event in-window and classify delay `[0,30]`, `(30,180]`, `(180,one-year anniversary]` civil days. If earlier undated potentially qualifying receipts exist, call this earliest KNOWN dated event, not first receipt. Never infer inception of product sales. 4. Tag the interpretation with Atom 3's continuity state and give joint context without a new cross-tab hypothesis: later agreements may follow a strict gap, a non-strict sequence, or uncertain continuity. Do not filter to strict agreements or stratify their financial outcomes; that would select a different estimand. Report uncertainty width and the fraction with missing event dates, classification, amount or coverage. 5. First-match regions: `Lr>0` witnesses receipts regardless of width; `Ur=0` establishes finite recorded zero only; `Lr=0<Ur` is unresolved. If no failure or scientific region can be adjudicated after complete inspection, otherwise. No zero-vs-positive significance testing or SESOI is asserted.

Synthetic checks: one \$1 positive classified event followed by a \$1 refund still records `ever-positive=1` and must not be called positive net revenue; cost event with

positive amount but is `_revenue=false` does not qualify; true revenue with missing amount is unknown; a day-zero event is included, day after anniversary excluded; all duplicated link paths leave `M` and receipt indicators unchanged; one positive event plus unresolved others has `lo=hi=1`; metadata-certified empty ledgers yield `[0,0]`, uncertified emptiness `[0,1]`. Test all verdict boundaries. Consequences: every realized state supplies a supplementary selected-population statement bounded by Molecule restrictions; no new analysis activates, and no state is promoted to product success or welfare evidence.

Exact input fields and provenance: `disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls), disclosure_agreement(disclosure_id,agreement_id,role), agreement(agreement_id,agreement_local_id,type), agreement_counterparty(agreement_id,counterparty_id), counterparty(counterparty_id,counterparty_local_id)`. Use supplied schema-only.md lines 9–51 and 89–149, DC2. All are allowed APTO tables, physical lowercase. Frozen semantic coding is second-chances-termination-v3 plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen `N`.

Inference, uncertainty and scope: apply DC9. This is a finite-record descriptive estimand, not a sampled population or causal effect. No estimator standard errors, clustering-based p-values, confirmatory hypotheses or significance tests are registered (statistical multiplicity family size zero); no holdout is used. Shared agreements create dependence and unit multiplicity, which must be reported, not hidden with independent-Bernoulli intervals. Logical uncertainty from unresolved indicators is distinct from misclassification, population selection and construct uncertainty. No welfare SESOI or statistical-equivalence claim exists. Report exact fractions/bounds and thresholds as descriptive only. Never infer prevalence or precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema version 1): Invoke `prereg/execution/run_atom.py -atom atom-000006`; `analysis.atom6` implements this Atom, using `core.Records` and DC1–DC9. The authority remains this Atom protocol. Load the exact projections and metadata statuses described in `execution/input-interface.md`. All ten metadata inspections precede cohort freezing; no real class values, mounts or coverage are supplied by this draft. Missing production definitions are registered unresolved requirements, not permission to invent a default. The input adapter’s CSV/Parquet paths are governed bindings, not scientific choices. Keep the same input fingerprint and cohort hash across all descendants; ledger rows are read only by Atoms 5–6 and have a separate frozen hash. A changed frozen non-ledger source is operational `no_result` unless a completed, cited source-contract inspection establishes the boundary region specified here. Atom 5’s frozen population mismatch is operational `no_result`.

Ordered executable work is the numbered protocol above, implemented by `analysis.atom6`; construction and tri-valued predicates are `core.Records.select_indices/history/strict/receipts` as appropriate. As an explicit necessary-condition clarification, a known signature at or before index termination

fails the strict requirement even when the later effective date is unknown; a missing signature remains unknown. Other known false strict requirements likewise dominate unresolved facts. An invalid cross-tenant candidate link is never a witness and leaves a possible-event flag within an eligible disclosure history. Zero-tolerance cardinality assertions apply to joins; duplicate links become sets and cannot multiply outcomes. Individual broken/conflicting keys are audited and quarantined as DC4 specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000006/ contains provenance.json (semantic/execution-code, source/cohort and applicable ledger hashes, Python version, timestamp); diagnostics.csv (check,order,numerator,denominator,status,reason); disposition.json (atom,state or null,terminal or null,status,activation text/value,trace,reason,hashes); synthetic-checks.json (current synthetic proof and code hash). Numerical values are emitted only after a completed scientific state. Inactive or failed work emits disposition/provenance/diagnostics and no numerical tables. Registered numerical interfaces: release-candidate/receipt-bounds.csv (M, positive, certified_zero, unknown, Lr, Ur, continuity_state); release-candidate/known-receipt-delays.csv (interval, count). Restricted derivations: receipt-indicators.csv with the same receipt fields as Atom 5; receipt-audit.csv (a1,flag,optional count). Every completed Atom also writes restricted/field-missingness.csv (table,field,missing,rows), restricted/source-metadata.csv (tenant,metadata), restricted/result.json (reproducible complete module payload for downstream binding), and restricted/metrics.json when numerical public-candidate tables exist. CSV nested objects use JSON text; raw transaction values never enter World prose. The machine-checkable column index is execution/output-contract.yaml, subordinate to this protocol.

Figure 6 is implemented at prereg/paper/figures/figure6.py and consumes only its figures.yaml tables. The governed visualizer creates release-candidate/figure6.pdf after disclosure screening; the analysis dispatcher does not render or publish raw records. This replaces the SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without replacing estimands. Atom 1 composition remains a full table; other paired displays can occupy panels within one figure. Figure code calculates no new estimator. Empty, partial and unactivated inputs produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-figure integration in figure_checks.py. Generated values, PDFs, PNGs and test logs stay outside the World. Tests include the independently specified decade between index effective date and termination; agreements on both sides of termination; selection separately from timing; leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards; unknown versus false; source mismatch; cohort/bundle/cardinality invariance; classifications and receipt timing; exact integer thresholds; every mandatory branch; missing/partial/inactive plot inputs and long-label/close-endpoint geometry. Any failed prerequisite test stops data execution as no_result; a passing test does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interruptions, read/cast-contract errors, failed assertions and unresolved software defects are terminal `no_result` with no scientific state or estimate; missing data documented as an evidenced construct boundary follows that boundary region. Missing retention remains indicator uncertainty, not a statistical null. Unrun members remain pending while predecessors may resolve and not `_activated` with trace at closeout. Report restrictions before compatible primary/supplementary Molecule clauses, then residual unresolved scope. No result licenses a new cohort, clock, code mapping, causal claim or unregistered estimator.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance revision v002; native schema version 1). The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results. Use explicit `-world READ_ONLY_WORLD` and `-source-root EXECUTING_SRC` with `run_atom.py`. The source root contains execution/ and paper/figures/; the World root contains atoms/, molecules/, prereg/. Never infer the deployed World from `file`. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `-synthetic-fixture` is mutually exclusive with `-inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`; `diagnostics.csv(check,order,numerator,denominator,status,reason)` is fixed for all dispositions. Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain

decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events. Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label `report_mode=partial_preview`. Final closeout requires an explicit `result/no_result` for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in `output-contract.yaml` and `results-bindings.yaml`. Suppressing Atom 3 also suppresses Atom 6 `continuity_state` in `table/metric` presentation and `receipt_continuity_scope`, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression. Every figure implements the registered DataFrame API with no data reads or estimator. Runtime `style_dir` binds the supplied HelveticaNeue regular/medium/bold/italic TrueType files by exact path; missing required fonts fail, while `style_dir=None` is explicitly preview-only. Rerender both widths, enforce ≤ 170 mm height, and retain vector/font/Unicode/page checks. The chart catalog and render-package layouts remain disabled; manuscript class and compiler-owned TeX/PDF checks remain intact. Tests include absent, partial, inactive/`no_result` inputs, long labels, nearby endpoints and both certain/possible overlap. Synthetic output remains outside the World and no manuscript slot is filled.

The `receipt-bounds.csv` `continuity_state` field and `metrics.continuity_state` are direct copies of `atom-000003.state`. Apply that source-state disclosure dependency even when Atom 6 itself is releasable. If the source state is unavailable in a partial preview, the copied slot is pending rather than guessed. No state copy changes financial selection or the receipt estimator. V003 LEDGER REPRODUCTION REPAIR (same scientific amendment 2, no new result region). Before calling `analysis.atom6` or recomputing DC8 indicators, compare the current raw ledger fingerprint with Atom 5's frozen `ledger_hash`, separately from the non-ledger/cohort checks. If unequal, a nonempty `verified_source_change_evidence` citation may bind only a completed inspection proving the changed frozen ledger contract prevents reproducing the registered indicators. This satisfies this Atom's existing boundary predicate: `return state=boundary, terminal=null, status=done`, with no replacement estimates or numerical tables. An unexplained mismatch, incomplete/failed inspection or invalid citation binding is `terminal=no_result, state=null`. A matching ledger never becomes a boundary merely because a citation exists. Ordinary incomplete receipt observation follows DC8 uncertainty, not this route. Preserve Atom 5's M, indicators, state and saved bytes in every case; never refresh or substitute the snapshot. For an evidenced mismatch, `disposition.json` and `restricted/result.json` carry a restricted `source_change` object with `scope=ledger`, the inspection citation, `previous_ledger_hash` and `current_ledger_hash`. It contains no receipt estimate and is not a release table. The analogous non-ledger boundary route records source/cohort hash pairs and its citation. Citation binding is a planner attestation whose substantive evidence must be checked in the governed inspection; string presence alone is not empirical proof. The input interface rejects Boolean or unfinished-inspection objects in place of a citation.

Tests use saved predecessor payloads, verify their digests, save the new disposition, assemble receipt slots and Molecule clauses, and check that neither boundary nor `no_result` emits a replacement receipt rate. All other scope, continuity and disclosure restrictions remain.

V004 direct closeout additionally reconciles independently bound actual and local source/cohort freezes and the applicable ledger freeze; incompatible snapshots cannot be composed into one reported study. A mismatch blocks publication assembly pending governed resolution, never changes a completed estimate or silently refreshes a predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific amendment 2). `execution/README.md` indexes this Atom's complete runnable command, analysis callable, exact inputs, outputs and synthetic checks. Shared implementations are used, not seven duplicate estimators. Standalone `-dispatch-policy` activation `_respecting` is the default and retains the activation expression above. An explicit `-dispatch-policy` direct attempts this selected Atom immediately, without waiting for outer activation. Runtime direct scheduling selects the first B members in Molecule membership order; budget is a dispatch choice recorded before execution, never chosen from results. No registered scientific question, local key, estimator, clock, threshold, conditional scope or graph edge changes. Direct dispatch cannot waive input validity or conditional scientific meaning. Reuse actual supplied scientific predecessors and their frozen fingerprints; never replace a supplied `no_result` with a successful retry. If a predecessor record is absent, pending, `not_activated` or `budget_unselected`, registered DC1–DC8 constructions may be computed locally from genuinely supplied projections, using `analysis.py` and `dispatch.local_inputs`. Follow the source Atom activation references to order these calculations; they are internal evidence, not new experiments or accepted predecessor World Atoms. Also construct the shared cohort and broad indicators where this module requires them. Save each local calculation, source-protocol citation, frozen source/cohort/ledger identity, exact outputs and content digest in `restricted/local-construction.json` and `local_evidence` provenance. Never insert these calculations into the caller's prior results or the World roster. A source-protocol ID in that file is a citation, not a realized member record. All supplied source/cohort and applicable ledger freezes remain binding. Promised but unavailable data, incomplete inspection, failed software or required predecessor `no_result` yields this Atom's operational `no_result`. Completed evidence establishing an existing boundary follows only that registered boundary region. If local or supplied evidence shows this Atom's conditional scientific scope is false or unresolved, complete it as the existing otherwise state, with the explicit conditional-scope reason and no numerical rate. In particular, direct dispatch cannot turn all `_strict` into the selected Atom 4 claim, material into the selected Atom 7 claim, or unavailable receipt support into a financial result. Otherwise does not assert a statistical null. Conditional scope is checked with the same registered expression, using actual or explicitly local evidence; no new graph is authored. `disposition.json`, `restricted/result.json` and `provenance.json` record `dispatch_policy` and whether outer activation was bypassed; direct results record `scientific_condition_value` and `local_evidence`, and Atom 6

records source_state_origins. These are restricted execution metadata until disclosure approval. Local continuity is labeled as such in the receipt continuity slot; it never claims an accepted Atom 3 result. All source-dependent copies inherit source disclosure limits, including protected local copies. No local evidence may satisfy a missing predecessor World condition in a Molecule composite claim; restrictions always apply and standalone result slots remain scoped to their producing Atom. Publication closeout explicitly declares dispatch_policy and, for direct mode, B via budget. It lists all seven members: selected direct attempts retain done/otherwise/boundary/no_result; unselected members are budget_unselected, never falsely not_activated. Missing selected work blocks final closeout; true partial previews remain pending. Default activation-respecting closeout is unchanged. For every source-dependent slot apply disclosure suppression first, including protected source states; then the consuming Atom's no_result/not_activated/budget_unselected or completed boundary/otherwise; only an actually incomplete preview may use missing-source pending. A final active result lacking essential source/local evidence raises an error. The four reviewed closed inactive routes (empty cohort, evidenced cohort boundary, root no_result, continuity no_result) must never report pending or preview in these slots. Runnable tests are test_amendment.py, amendment_checks.py and the full test_synthetic.py entry point.

Complete registration fields

```
id: atom-000006
topic: Receipts after recontracting
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
preregistration:
  version: 1
  mode: adaptive
  question: Among distinct witnessed later agreements, what fraction has a
    positive classified receipt within one year of its effective date?
  rationale: This selected descriptive outcome distinguishes contractual
    ↪ continuation
    from a recorded financial inflow, while preserving ledger uncertainty
    and agreement-level accounting.
  assumption: A positive classified ledger event is evidence of recorded
    ↪ inflow,
    not first sale, net income, profitability or realized technology use.
    Conditioning on later contracting is selection.
  target_strength: descriptive
  target_shape: temporal
  ratings:
    importance: 4
    novelty: 3
    feasibility: 3
    data_advantage: 4
    informativeness: 0.7
  tables:
    - DISCLOSURE
```

```

- DISCLOSURE_AGREEMENT
- AGREEMENT
- AGREEMENT_COUNTERPARTY
- COUNTERPARTY
- AGREEMENT_REVENUE_EVENT
activation: (state(atom-000005) == "full_support" OR state(atom-000005)
== "partial_support") AND done(atom-000003)
verdicts:
- key: boundary
  region: Completed reproduction proves the frozen M or required ledger
  contract differs from the registered input, so DC8 indicators cannot
  be reproduced.
  says: Receipt realization is not available under the registered contract;
  no replacement-cohort financial rate is licensed.
- key: receipts_witnessed
  region: M>0, all computations complete and receipt lower bound Lr>0.
  says: At least one selected agreement has a positive classified receipt
  within one year. Report [Lr,Ur]; the selected financial sequence is
  not commercialization or a causal return.
- key: recorded_zero
  region: M>0, all computations complete and Ur=0.
  says: No positive classified one-year receipt occurred in the certified
  recorded ledgers for this selected agreement population. This is neither
  no lifetime revenue nor no product development.
- key: receipts_unresolved
  region: M>0, all computations complete, Lr=0 and Ur>0.
  says: No definite one-year receipt is established, but missing information
  permits receipts. Absence is unresolved.
- key: otherwise
  region: otherwise
  says: Completed evidence leaves this judgment unresolved. Report the
  ↪ unresolved
  scope; no negative or equivalent-effect claim is licensed.
protocol: |
  AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible
  ↪ termination_date, breaking ties by exact lexicographic agreement_id.
  ↪ Set index_effective_date = a0.effective_date and t0 =
  ↪ a0.termination_date. Never set t0 from index_effective_date. A
  ↪ candidate event timestamp s = a1.effective_date must satisfy t0 < s;
  ↪ signature is a separate strict-only requirement. H1/H2/H3/H5 and the
  ↪ 31-day guard are measured from termination t0. Receipts alone use s
  ↪ as their one-year origin. All examples whose t0 was implicit use this
  ↪ explicit termination definition.

Status: exploratory descriptive. This Atom reconverges two prior
↪ judgments: receipt support from Atom 5 and continuity scope from Atom
↪ 3. Any scientific completion of Atom 3 suffices, including a
↪ boundary; a favorable gap pattern is not required. If Atom 3 is
↪ operational no_result, this combined receipt storyline stays blocked.
↪ Use all frozen M from Atom 5, not only its decidable K, with one
↪ agreement per unit. Window and coding are exactly DC8; s is agreement
↪ effective date. Exposure is selection as a witnessed later agreement,
↪ not randomized rematching. No comparison with original agreements,
↪ nonrecontracted disclosures or nonspinofts is registered.

```

Additional exact source: `agreement_revenue_event(agreement_id,event_seq,e_vent_date,fy,payment_type,amount,is_revenue)`, schema-only.md 69-87,
 ↳ and its frozen provider-classification hash. Amount sign uses finite
 ↳ Float64 USD >0. No receipts are allocated to disclosures. No annual
 ↳ sums, inflation adjustment, FY fallback, payment-type machine
 ↳ learning, netting or ``agreement.total_revenue`` validation is
 ↳ authorized.

Execute in order:

1. Reproduce M, support flags and the raw event projection; assert all
 ↳ original M remain including incomplete ledgers. Join events to
 ↳ agreement once; evaluate receipt existence at agreement grain before
 ↳ any origin-history join. Duplicated rows must not change any
 ↳ indicator. Verify effective dates and one-year cutoffs without
 ↳ imputing calendar years.
2. Compute agreement `lo_r/hi_r` exactly DC8. Negative or zero amounts are
 ↳ not positive receipts; missing amounts or `is_revenue` are possibly
 ↳ positive unless other known facts exclude the window. Events before s
 ↳ or after anniversary do not qualify. If an event date is unknown, `fy`
 ↳ is no substitute. Retain refunds and cost flags in diagnostics, not
 ↳ as evidence of net profit or an inferred correction.
3. Compute `Lr=sum(lo_r)/M`, `Ur=sum(hi_r)/M`, positive count, certified
 ↳ non-positive count, unresolved count; assert their sum M and
 ↳ reproduce K from Atom 5. Report full population interval; no
 ↳ complete-case receipt percentage. For a timing illustration, among
 ↳ agreements with a definite event select earliest known positive dated
 ↳ event in-window and classify delay `[0,30]`, `(30,180]`, `(180,one-year`
 ↳ `anniversary]` civil days. If earlier undated potentially qualifying
 ↳ receipts exist, call this earliest KNOWN dated event, not first
 ↳ receipt. Never infer inception of product sales.
4. Tag the interpretation with Atom 3's continuity state and give joint
 ↳ context without a new cross-tab hypothesis: later agreements may
 ↳ follow a strict gap, a non-strict sequence, or uncertain continuity.
 ↳ Do not filter to strict agreements or stratify their financial
 ↳ outcomes; that would select a different estimand. Report uncertainty
 ↳ width and the fraction with missing event dates, classification,
 ↳ amount or coverage.
5. First-match regions: `Lr>0` witnesses receipts regardless of width; `Ur=0`
 ↳ establishes finite recorded zero only; `Lr=0<Ur` is unresolved. If no
 ↳ failure or scientific region can be adjudicated after complete
 ↳ inspection, otherwise. No zero-vs-positive significance testing or
 ↳ SESOI is asserted.

Synthetic checks: one \$1 positive classified event followed by a \$1
 ↳ refund still records `ever-positive=1` and must not be called positive
 ↳ net revenue; cost event with positive amount but `is_revenue=false`
 ↳ does not qualify; true revenue with missing amount is unknown; a
 ↳ day-zero event is included, day after anniversary excluded; all
 ↳ duplicated link paths leave M and receipt indicators unchanged; one
 ↳ positive event plus unresolved others has `lo=hi=1`; metadata-certified
 ↳ empty ledgers yield `[0,0]`, uncertified emptiness `[0,1]`. Test all
 ↳ verdict boundaries. Consequences: every realized state supplies a
 ↳ supplementary selected-population statement bounded by Molecule
 ↳ restrictions; no new analysis activates, and no state is promoted to
 ↳ product success or welfare evidence.

Exact input fields and provenance:

- ↪ disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls),
- ↪ disclosure_agreement(disclosure_id,agreement_id,role),
- ↪ agreement(agreement_id,agreement_local_id,type_cls,field_of_use_cls,effective_date,expiration_date,termination_date,sign_date),
- ↪ agreement_counterparty(agreement_id,counterparty_id),
- ↪ counterparty(counterparty_id,counterparty_local_id). Use supplied
- ↪ schema-only.md lines 9-51 and 89-149, DC2. All are allowed APTO
- ↪ tables, physical lowercase. Frozen semantic coding is
- ↪ second-chances-termination-v3 plus provider dictionary hashes bound
- ↪ by Atom 1, DC3. No undocumented field or current status is
- ↪ substituted. Apply DC4: entity many-to-one assertions; distinct pair
- ↪ joins; party-set reduction before disclosure history joins; no
- ↪ cross-tenant joins or silent loss of dangling candidate links. Every
- ↪ reused derived table is reproduced from these projections and checked
- ↪ against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record

- ↪ descriptive estimand, not a sampled population or causal effect. No
- ↪ estimator standard errors, clustering-based p-values, confirmatory
- ↪ hypotheses or significance tests are registered (statistical
- ↪ multiplicity family size zero); no holdout is used. Shared agreements
- ↪ create dependence and unit multiplicity, which must be reported, not
- ↪ hidden with independent-Bernoulli intervals. Logical uncertainty from
- ↪ unresolved indicators is distinct from misclassification, population
- ↪ selection and construct uncertainty. No welfare SESOI or
- ↪ statistical-equivalence claim exists. Report exact fractions/bounds
- ↪ and thresholds as descriptive only. Never infer prevalence or
- ↪ precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema
↪ version 1):

Invoke prereg/execution/run_atom.py --atom atom-000006; analysis.atom6
↪ implements this Atom, using core.Records and DC1-DC9. The authority
↪ remains this Atom protocol. Load the exact projections and metadata
↪ statuses described in execution/input-interface.md. All ten metadata
↪ inspections precede cohort freezing; no real class values, mounts or
↪ coverage are supplied by this draft. Missing production definitions
↪ are registered unresolved requirements, not permission to invent a
↪ default. The input adapter's CSV/Parquet paths are governed bindings,
↪ not scientific choices. Keep the same input fingerprint and cohort
↪ hash across all descendants; ledger rows are read only by Atoms 5-6
↪ and have a separate frozen hash. A changed frozen non-ledger source
↪ is operational no_result unless a completed, cited source-contract
↪ inspection establishes the boundary region specified here. Atom 5's
↪ frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by

- analysis.atom6; construction and tri-valued predicates are
- core.Records.select_indices/history/strict/receipts as appropriate.
- As an explicit necessary-condition clarification, a known signature
- at or before index termination fails the strict requirement even when
- the later effective date is unknown; a missing signature remains
- unknown. Other known false strict requirements likewise dominate
- unresolved facts. An invalid cross-tenant candidate link is never a
- witness and leaves a possible-event flag within an eligible
- disclosure history. Zero-tolerance cardinality assertions apply to
- joins; duplicate links become sets and cannot multiply outcomes.
- Individual broken/conflicting keys are audited and quarantined as DC4
- specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000006/ contains

- provenance.json (semantic/execution-code, source/cohort and
- applicable ledger hashes, Python version, timestamp); diagnostics.csv
- (check,order,numerator,denominator,status,reason); disposition.json
- (atom,state or null,terminal or null,status,activation
- text/value,trace,reason,hashes); synthetic-checks.json (current
- synthetic proof and code hash). Numerical values are emitted only
- after a completed scientific state. Inactive or failed work emits
- disposition/provenance/diagnostics and no numerical tables.
- Registered numerical interfaces: release-candidate/receipt-bounds.csv
- (M, positive, certified_zero, unknown, Lr, Ur, continuity_state);
- release-candidate/known-receipt-delays.csv (interval, count).
- Restricted derivations: receipt-indicators.csv with the same receipt
- fields as Atom 5; receipt-audit.csv (a1,flag,optional count). Every
- completed Atom also writes restricted/field-missingness.csv
- (table,field,missing,rows), restricted/source-metadata.csv
- (tenant,metadata), restricted/result.json (reproducible complete
- module payload for downstream binding), and restricted/metrics.json
- when numerical public-candidate tables exist. CSV nested objects use
- JSON text; raw transaction values never enter World prose. The
- machine-checkable column index is execution/output-contract.yaml,
- subordinate to this protocol.

Figure 6 is implemented at prereg/paper/figures/figure6.py and consumes

- only its figures.yaml tables. The governed visualizer creates release
- -candidate/figure6.pdf after disclosure screening; the analysis
- dispatcher does not render or publish raw records. This replaces the
- SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without
- replacing estimands. Atom 1 composition remains a full table; other
- paired displays can occupy panels within one figure. Figure code
- calculates no new estimator. Empty, partial and unactivated inputs
- produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-f

- igure integration in figure_checks.py. Generated values, PDFs, PNGs
- and test logs stay outside the World. Tests include the independently
- specified decade between index effective date and termination; agreeem
- ents on both sides of termination; selection separately from timing;
- leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards;
- unknown versus false; source mismatch; cohort/bundle/cardinality
- invariance; classifications and receipt timing; exact integer
- thresholds; every mandatory branch; missing/partial/inactive plot
- inputs and long-label/close-endpoint geometry. Any failed
- prerequisite test stops data execution as no_result; a passing test
- does not establish actual APT0 availability or empirical validity.

Local states use the first matching registered region. Operational interr
 ↳ uptions, read/cast-contract errors, failed assertions and unresolved
 ↳ software defects are terminal no_result with no scientific state or
 ↳ estimate; missing data documented as an evidenced construct boundary
 ↳ follows that boundary region. Missing retention remains indicator unc
 ↳ ertainty, not a statistical null. Unrun members remain pending while
 ↳ predecessors may resolve and not_activated with trace at closeout.
 ↳ Report restrictions before compatible primary/supplementary Molecule
 ↳ clauses, then residual unresolved scope. No result licenses a new
 ↳ cohort, clock, code mapping, causal claim or unregistered estimator.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance
 ↳ revision v002; native schema version 1).

The same question, Atom IDs, result keys, activation, population,
 ↳ horizons, thresholds and finite-record inferential status are
 ↳ retained. These repairs implement the registered science; none was
 ↳ selected from empirical results.

Use explicit --world READ_ONLY_WORLD and --source-root EXECUTING_SRC with
 ↳ run_atom.py. The source root contains execution/ and paper/figures/;
 ↳ the World root contains atoms/, molecules/, prereg/. Never infer the
 ↳ deployed World from __file__. The dispatcher, saver and test runner
 ↳ propagate both roots. provenance.py hashes a fixed nonempty roster of
 ↳ executing Python sources, separately from immutable Atom/Molecule
 ↳ protocols and scientific/interface sources in the World. Missing
 ↳ files, stale/incomplete certificates or mismatched predecessor
 ↳ code/World/registration identity stop data access as operational
 ↳ no_result. Required certificate checks are unit_semantics,
 ↳ file_formats, copied_cli and runtime_figures, including 130.7 mm and
 ↳ 180 mm exports checked with validate_exports and the exact supplied
 ↳ fonts. Unit-only reports do not authorize bound data. Built-in
 ↳ --synthetic-fixture is mutually exclusive with --inputs and generates
 ↳ artificial records only; its disposition is not a production
 ↳ certificate. Pure in-memory functions are for synthetic/unit use; the
 ↳ governed entry point is the certificate-gated CLI. The complete test
 ↳ runner invokes copied source against a separate World using persisted
 ↳ predecessors, and also exercises the ordinary certified CSV-input CLI.
 All restricted CSV schemas, including zero-row scientific outputs, are fi
 ↳ xed in output-contract.yaml (interface 2). Optional audit values are
 ↳ empty cells in their declared columns, not omitted headers. An empty
 ↳ cohort, empty witness table or empty ledger-derived audit retains its
 ↳ scientific table schema. Failed/inactive work instead emits
 ↳ nonnumerical disposition and diagnostic files. Common restricted
 ↳ headers are field-missingness.csv(table,field,missing,rows) and
 ↳ source-metadata.csv(tenant,metadata);
 ↳ diagnostics.csv(check,order,numerator,denominator,status,reason) is
 ↳ fixed for all dispositions.

Raw provenance represents numeric NaN, +infinity and -infinity with
 ↳ distinct tagged scalar objects before JSON hashing; original strings
 ↳ remain strings. Duplicate/conflict audits remain deterministic and
 ↳ retain representational distinctions. Receipt normalization then
 ↳ converts all nonfinite/unparseable amounts to unknown under DC8, rega
 ↳ rdless of memory/CSV/Parquet representation. File representations may
 ↳ have different raw provenance hashes; they must produce equivalent
 ↳ scientific indicators and result states for semantically equivalent
 ↳ inputs. Unknown amounts are never zeros or dropped records. Known cos
 ↳ t/out-of-window events remain decisively irrelevant, while a definite
 ↳ positive witness dominates unresolved potentially positive events.

Publication assembly first reconciles with authoritative Molecule members
 ↳ hip. Partial previews list all seven members as observed dispositions
 ↳ or explicitly pending and label report_mode=partial_preview. Final
 ↳ closeout requires an explicit result/no_result for every activated
 ↳ member; it may derive inactive dispositions only from registered
 ↳ conditions and predecessor closure, preserving unknownness. A missing
 ↳ activated analysis prevents final closeout. Source boundaries and
 ↳ failed predecessors do not become negative evidence. Direct copied so
 ↳ urce-state columns have declared dependencies in output-contract.yaml
 ↳ and results-bindings.yaml. Suppressing Atom 3 also suppresses Atom 6
 ↳ continuity_state in table/metric presentation and receipt_continuity_
 ↳ scope, direct Atom 3 slots, and protected interpretation/trace
 ↳ material; independently releasable financial quantities remain
 ↳ subject to governed approval and complementary suppression.

Every figure implements the registered DataFrame API with no data reads
 ↳ or estimator. Runtime style_dir binds the supplied HelveticaNeue regu
 ↳ lar/medium/bold/italic TrueType files by exact path; missing required
 ↳ fonts fail, while style_dir=None is explicitly preview-only. Rerender
 ↳ both widths, enforce <=170 mm height, and retain vector/font/Unicode/
 ↳ page checks. The chart catalog and render-package layouts remain
 ↳ disabled; manuscript class and compiler-owned TeX/PDF checks remain i
 ↳ ntact. Tests include absent, partial, inactive/no_result inputs, long
 ↳ labels, nearby endpoints and both certain/possible overlap. Synthetic
 ↳ output remains outside the World and no manuscript slot is filled.

The receipt-bounds.csv continuity_state field and
 ↳ metrics.continuity_state are direct copies of atom-000003.state.
 ↳ Apply that source-state disclosure dependency even when Atom 6 itself
 ↳ is releasable. If the source state is unavailable in a partial
 ↳ preview, the copied slot is pending rather than guessed. No state
 ↳ copy changes financial selection or the receipt estimator.

V003 LEDGER REPRODUCTION REPAIR (same scientific amendment 2, no new
 ↳ result region).

Before calling analysis.atom6 or recomputing DC8 indicators, compare the
 ↳ current raw ledger fingerprint with Atom 5's frozen ledger_hash,
 ↳ separately from the non-ledger/cohort checks. If unequal, a nonempty
 ↳ verified_source_change_evidence citation may bind only a completed
 ↳ inspection proving the changed frozen ledger contract prevents
 ↳ reproducing the registered indicators. This satisfies this Atom's
 ↳ existing boundary predicate: return state=boundary, terminal=null,
 ↳ status=done, with no replacement estimates or numerical tables. An
 ↳ unexplained mismatch, incomplete/failed inspection or invalid
 ↳ citation binding is terminal=no_result, state=null. A matching ledger
 ↳ never becomes a boundary merely because a citation exists. Ordinary
 ↳ incomplete receipt observation follows DC8 uncertainty, not this
 ↳ route. Preserve Atom 5's M, indicators, state and saved bytes in
 ↳ every case; never refresh or substitute the snapshot.

For an evidenced mismatch, disposition.json and restricted/result.json
 ↳ carry a restricted source_change object with scope=ledger, the
 ↳ inspection citation, previous_ledger_hash and current_ledger_hash. It
 ↳ contains no receipt estimate and is not a release table. The analogou
 ↳ s non-ledger boundary route records source/cohort hash pairs and its
 ↳ citation. Citation binding is a planner attestation whose substantive
 ↳ evidence must be checked in the governed inspection; string presence
 ↳ alone is not empirical proof. The input interface rejects Boolean or
 ↳ unfinished-inspection objects in place of a citation. Tests use saved
 ↳ predecessor payloads, verify their digests, save the new disposition,
 ↳ assemble receipt slots and Molecule clauses, and check that neither
 ↳ boundary nor no_result emits a replacement receipt rate. All other
 ↳ scope, continuity and disclosure restrictions remain.

V004 direct closeout additionally reconciles independently bound actual
 ↳ and local source/cohort freezes and the applicable ledger freeze;
 ↳ incompatible snapshots cannot be composed into one reported study. A
 ↳ mismatch blocks publication assembly pending governed resolution,
 ↳ never changes a completed estimate or silently refreshes a
 ↳ predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific
 ↳ amendment 2).
 execution/README.md indexes this Atom's complete runnable command,
 ↳ analysis callable, exact inputs, outputs and synthetic checks. Shared
 ↳ implementations are used, not seven duplicate estimators. Standalone
 ↳ --dispatch-policy activation_respecting is the default and retains
 ↳ the activation expression above. An explicit --dispatch-policy direct
 ↳ attempts this selected Atom immediately, without waiting for outer
 ↳ activation. Runtime direct scheduling selects the first B members in
 ↳ Molecule membership order; budget is a dispatch choice recorded
 ↳ before execution, never chosen from results. No registered scientific
 ↳ question, local key, estimator, clock, threshold, conditional scope
 ↳ or graph edge changes.

Direct dispatch cannot waive input validity or conditional scientific
 ↳ meaning. Reuse actual supplied scientific predecessors and their
 ↳ frozen fingerprints; never replace a supplied no_result with a
 ↳ successful retry. If a predecessor record is absent, pending,
 ↳ not_activated or budget_unselected, registered DC1-DC8 constructions
 ↳ may be computed locally from genuinely supplied projections, using
 ↳ analysis.py and dispatch.local_inputs. Follow the source Atom
 ↳ activation references to order these calculations; they are internal
 ↳ evidence, not new experiments or accepted predecessor World Atoms.
 ↳ Also construct the shared cohort and broad indicators where this
 ↳ module requires them. Save each local calculation, source-protocol
 ↳ citation, frozen source/cohort/ledger identity, exact outputs and
 ↳ content digest in restricted/local-construction.json and
 ↳ local_evidence provenance. Never insert these calculations into the
 ↳ caller's prior results or the World roster. A source-protocol ID in
 ↳ that file is a citation, not a realized member record.

All supplied source/cohort and applicable ledger freezes remain binding.
 ↳ Promised but unavailable data, incomplete inspection, failed software
 ↳ or required predecessor no_result yields this Atom's operational
 ↳ no_result. Completed evidence establishing an existing boundary
 ↳ follows only that registered boundary region. If local or supplied
 ↳ evidence shows this Atom's conditional scientific scope is false or
 ↳ unresolved, complete it as the existing otherwise state, with the
 ↳ explicit conditional-scope reason and no numerical rate. In
 ↳ particular, direct dispatch cannot turn all_strict into the selected
 ↳ Atom 4 claim, material into the selected Atom 7 claim, or unavailable
 ↳ receipt support into a financial result. Otherwise does not assert a
 ↳ statistical null. Conditional scope is checked with the same
 ↳ registered expression, using actual or explicitly local evidence; no
 ↳ new graph is authored.

disposition.json, restricted/result.json and provenance.json record
 ↳ dispatch_policy and whether outer activation was bypassed; direct
 ↳ results record scientific_condition_value and local_evidence, and
 ↳ Atom 6 records source_state_origins. These are restricted execution
 ↳ metadata until disclosure approval. Local continuity is labeled as
 ↳ such in the receipt continuity slot; it never claims an accepted Atom
 ↳ 3 result. All source-dependent copies inherit source disclosure
 ↳ limits, including protected local copies. No local evidence may
 ↳ satisfy a missing predecessor World condition in a Molecule composite
 ↳ claim; restrictions always apply and standalone result slots remain
 ↳ scoped to their producing Atom.
 Publication closeout explicitly declares dispatch_policy and, for direct
 ↳ mode, B via budget. It lists all seven members: selected direct
 ↳ attempts retain done/otherwise/boundary/no_result; unselected members
 ↳ are budget_unselected, never falsely not_activated. Missing selected
 ↳ work blocks final closeout; true partial previews remain pending.
 ↳ Default activation-respecting closeout is unchanged. For every
 ↳ source-dependent slot apply disclosure suppression first, including
 ↳ protected source states; then the consuming Atom's
 ↳ no_result/not_activated/budget_unselected or completed
 ↳ boundary/otherwise; only an actually incomplete preview may use
 ↳ missing-source pending. A final active result lacking essential
 ↳ source/local evidence raises an error. The four reviewed closed
 ↳ inactive routes (empty cohort, evidenced cohort boundary, root
 ↳ no_result, continuity no_result) must never report pending or preview
 ↳ in these slots. Runnable tests are test_amendment.py,
 ↳ amendment_checks.py and the full test_synthetic.py entry point.

Registered question

Among distinct witnessed later agreements, what fraction has a positive classified receipt within one year of its effective date?

Disclosed amendment, scientific amendment 2, revision v004; native schema version 1. The operator reviewed a prior-run manuscript; this author received no empirical results. Prospective execution specification only. This Atom is pending; no APTO observation, numerical result or realized state is asserted. Its registration payload owns its protocol, activation and possible results.

atom-000007: Delayed recorded partners

AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible termination_date, breaking ties by exact lexicographic agreement_id. Set index_effective_date = a0.effective_date and t0 = a0.termination_date. Never set t0 from index_effective_date. A candidate event timestamp s = a1.effective_date must satisfy t0 < s; signature is a separate strict-only requirement. H1/H2/H3/H5 and the 31-day guard are measured from termination t0. Receipts alone use s as their one-year origin. All examples whose t0 was implicit use this explicit termination definition.

Status: exploratory descriptive and explicitly selected on Atom 2's primary outcome states. There is no holdout and no new confirmatory test. Population, exclusions, N, unit and t0 are exactly DC5. Keep every original disclosure, including insufficient five-year follow-up. No older-cohort restriction, longer search beyond five years, survival extrapolation or changed commercial-license/party coding. Outcome is the

difference in cumulative first broad-event indicators at H5 and H3; five-year existence is not a new termination episode.

Execute in order: 1. Reproduce original N and DC6 fields/candidates with additional permitted horizon H5, reading the same frozen snapshot only. No later data refresh. Preserve Atom 2's original three-year output; do not revise its recorded state using five-year observations. Operationally inaccessible fields are `no_result`, while insufficient follow-up creates `hi=1` as registered. 2. Apply the effective-date-only DC6 predicate at H5. Set raw H3 to the frozen Atom 2 indicator and raw H5 to this computation. Apply DC6 closure explicitly: $lo3=raw_lo3$; $lo5=\max(raw_lo3, raw_lo5)$; $hi3=\min(raw_hi3, raw_hi5)$; $hi5=raw_hi5$. Assert $0 \leq lo3 \leq hi3 \leq 1$, $0 \leq lo5 \leq hi5 \leq 1$, $lo3 \leq lo5$, $hi3 \leq hi5$. H3 must remain identical to Atom 2 because its same-snapshot candidate and coverage facts were already available; a change is a reproducibility defect and stops execution as `no_result` for governed correction. Preserve Atom 2's state. Late signatures do not produce late broad events; report chronology flags separately. 3. Use only the interval-based paired OUTER formulas $\delta_{lo}=\max(0, lo5-hi3)$ and $\delta_{hi}=\min(1, hi5-lo3)$. Optionally enumerate the marginally admissible mask of (Y3,Y5) in $\{(0,0), (0,1), (1,1)\}$ satisfying $lo3 \leq Y3 \leq hi3$ and $lo5 \leq Y5 \leq hi5$. Verify that the mask minimum/maximum of $Y5-Y3$ equals the formulas; an empty mask is an error. The mask is not a fully candidate-feasible set. Add no constraints from shared unknown identities, candidate dates or agreement overlap; these may make the outer bound conservative, not invalid. Every local result uses these formulas, never analyst-chosen tightening. A definite late effective-date witness plus certified $Y3=0$ yields $\delta_{lo}=1$. An unknown early history does not prove the first event was late. 4. Report $[L5, U5]$ and paired $[L\delta, U\delta]=[\sum(\delta_{lo})/N, \sum(\delta_{hi})/N]$. Cross-check cumulative bounds nondecreasing. The pooled difference $[L5-U3, U5-L3]$ may be wider than the paired result and is not substituted. Plot same-cohort H3 and H5 envelopes and paired increment, with unresolved shares and no school rankings. 5. The 0.05 increment is an author-set descriptive attention threshold, not a welfare SESOI, prespecified equivalence margin or empirical regularity. Equality enters `delayed_material` only if $L\delta=0.05$; $U\delta=0.05$ with lower below enters `delayed_unresolved`. No p-values or extension of follow-up to cross the threshold. Report all selected outcomes, not just delayed positives.

Synthetic checks: known event by H3 forces $\delta=0$ even with later additional contracts; known late event and certified no early event gives $\delta=1$; unknown early event plus known late witness allows δ in $[0,1]$; neither horizon observed gives ordered marginally admissible pairs and $[0,1]$ for δ , not a negative change; adding five-year positive rows cannot lower a cumulative indicator; repeated same-party contracts do not qualify; use leap-anniversary dates. Complete retained history with exactly one pre-H3 effective-date candidate of unresolved party disjointness and no other candidate yields $[lo3, hi3]=[0,1]$ and $[lo5, hi5]=[0,1]$, hence registered $\delta=[0,1]$; replicated over N this is `delayed_unresolved`, even though candidate-level optimization could force $\delta=0$. That optimization is forbidden here. The early-effective/late-signature synthetic case in Atom 2 yields $\delta=[0,0]$ under full support and `delayed_below` if replicated; a missing signature gives the same broad answer.

Verify closure and formulas exhaustively over every valid binary marginal input and every nonempty ordered mask. Consequences: every state provides a supplementary exploratory horizon statement only. Material at five years cannot overwrite an unresolved/low three-year primary result. No result activates a six-year search, receipt follow-up for newly found late agreements or causal claim.

Exact input fields and provenance: `disclosure(disclosure_id,date,category__anzsrc,disclosure_type_cls), disclosure_agreement(disclosure_id,agreement_id,role), agreement(agreement_id,agreement_local_id,type_cls,f agreement_counterparty(agreement_id,counterparty_id), counterparty(counterparty_id,counterparty_local_id)`. Use supplied schema-only.md lines 9–51 and 89–149, DC2. All are allowed APTO tables, physical lowercase. Frozen semantic coding is second-chances-termination-v3 plus provider dictionary hashes bound by Atom 1, DC3. No undocumented field or current status is substituted. Apply DC4: entity many-to-one assertions; distinct pair joins; party-set reduction before disclosure history joins; no cross-tenant joins or silent loss of dangling candidate links. Every reused derived table is reproduced from these projections and checked against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record descriptive estimand, not a sampled population or causal effect. No estimator standard errors, clustering-based p-values, confirmatory hypotheses or significance tests are registered (statistical multiplicity family size zero); no holdout is used. Shared agreements create dependence and unit multiplicity, which must be reported, not hidden with independent-Bernoulli intervals. Logical uncertainty from unresolved indicators is distinct from misclassification, population selection and construct uncertainty. No welfare SESOI or statistical-equivalence claim exists. Report exact fractions/bounds and thresholds as descriptive only. Never infer prevalence or precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema version 1): Invoke `prereg/execution/run_atom.py -atom atom-000007`; `analysis.atom7` implements this Atom, using `core.Records` and DC1–DC9. The authority remains this Atom protocol. Load the exact projections and metadata statuses described in `execution/input-interface.md`. All ten metadata inspections precede cohort freezing; no real class values, mounts or coverage are supplied by this draft. Missing production definitions are registered unresolved requirements, not permission to invent a default. The input adapter’s CSV/Parquet paths are governed bindings, not scientific choices. Keep the same input fingerprint and cohort hash across all descendants; ledger rows are read only by Atoms 5–6 and have a separate frozen hash. A changed frozen non-ledger source is operational `no_result` unless a completed, cited source-contract inspection establishes the boundary region specified here. Atom 5’s frozen population mismatch is operational `no_result`.

Ordered executable work is the numbered protocol above, implemented by `analysis.atom7`; construction and tri-valued predicates are `core.Records.select_indices/history/strict/receipts` as appropriate. As an explicit necessary-condition clarification, a known signature at or before index termination fails the strict requirement even when the later effective date is unknown; a missing signature remains unknown. Other known false strict requirements likewise dominate unresolved facts. An invalid cross-tenant candidate link is never a witness and leaves

a possible-event flag within an eligible disclosure history. Zero-tolerance cardinality assertions apply to joins; duplicate links become sets and cannot multiply outcomes. Individual broken/conflicting keys are audited and quarantined as DC4 specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000007/ contains provenance.json (semantic/execution-code, source/cohort and applicable ledger hashes, Python version, timestamp); diagnostics.csv (check,order,numerator,denominator,status,reason); disposition.json (atom,state or null,terminal or null,status,activation text/value,trace,reason,hashes); synthetic-checks.json (current synthetic proof and code hash). Numerical values are emitted only after a completed scientific state. Inactive or failed work emits disposition/provenance/diagnostics and no numerical tables. Registered numerical interfaces: release-candidate/late-bounds.csv (N, L3, U3, L5, U5, Ldelta, Udelta, unknown, delta_unknown, required_unresolved, available_unresolved, reachable, capped_unresolved). Restricted derivations: five-year-indicators.csv (d,lo3,hi3,lo5,hi5,delta_lo,delta_hi,mask). Every completed Atom also writes restricted/field-missingness.csv (table,field,missing,rows), restricted/source-metadata.csv (tenant,metadata), restricted/result.json (reproducible complete module payload for downstream binding), and restricted/metrics.json when numerical public-candidate tables exist. CSV nested objects use JSON text; raw transaction values never enter World prose. The machine-checkable column index is execution/output-contract.yaml, subordinate to this protocol.

Figure 7 is implemented at prereg/paper/figures/figure7.py and consumes only its figures.yaml tables. The governed visualizer creates release-candidate/figure7.pdf after disclosure screening; the analysis dispatcher does not render or publish raw records. This replaces the SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without replacing estimands. Atom 1 composition remains a full table; other paired displays can occupy panels within one figure. Figure code calculates no new estimator. Empty, partial and unactivated inputs produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-figure integration in figure_checks.py. Generated values, PDFs, PNGs and test logs stay outside the World. Tests include the independently specified decade between index effective date and termination; agreements on both sides of termination; selection separately from timing; leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards; unknown versus false; source mismatch; cohort/bundle/cardinality invariance; classifications and receipt timing; exact integer thresholds; every mandatory branch; missing/partial/inactive plot inputs and long-label/close-endpoint geometry. Any failed prerequisite test stops data execution as no_result; a passing test does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interruptions, read/cast-contract errors, failed assertions and unresolved software defects are terminal no_result with no scientific state or estimate; missing data documented as an evidenced construct boundary follows that boundary region. Missing retention

remains indicator uncertainty, not a statistical null. Unrun members remain pending while predecessors may resolve and not `_activated` with trace at closeout. Report restrictions before compatible primary/supplementary Molecule clauses, then residual unresolved scope. No result licenses a new cohort, clock, code mapping, causal claim or unregistered estimator.

Threshold-sensitivity output retains both raw `required_unresolved k` and `capped_unresolved = min(k,Q)`, together with available `_unresolved Q` and `reachable = (k<=Q)`. This preserves the registered cap and explicit unreachable distinction without changing adjudication. For Atom 2 these values are in `restricted/metrics.json`; `strict-bounds.csv` and `late-bounds.csv` include them in their registered candidate summary.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance revision v002; native schema version 1). The same question, Atom IDs, result keys, activation, population, horizons, thresholds and finite-record inferential status are retained. These repairs implement the registered science; none was selected from empirical results. Use explicit `-world READ_ONLY_WORLD` and `-source-root EXECUTING_SRC` with `run_atom.py`. The source root contains `execution/` and `paper/figures/`; the World root contains `atoms/`, `molecules/`, `prereg/`. Never infer the deployed World from **file**. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `-synthetic-fixture` is mutually exclusive with `-inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`; `diagnostics.csv(check,order,numerator,denominator,status,reason)` is fixed for all dispositions. Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown

amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events. Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label `report_mode=partial_preview`. Final closeout requires an explicit `result/no_result` for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in `output-contract.yaml` and `results-bindings.yaml`. Suppressing Atom 3 also suppresses Atom 6 `continuity_state` in `table/metric` presentation and `receipt_continuity_scope`, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression. Every figure implements the registered DataFrame API with no data reads or estimator. Runtime `style_dir` binds the supplied HelveticaNeue regular/medium/bold/italic TrueType files by exact path; missing required fonts fail, while `style_dir=None` is explicitly preview-only. Rerender both widths, enforce ≤ 170 mm height, and retain vector/font/Unicode/page checks. The chart catalog and render-package layouts remain disabled; manuscript class and compiler-owned TeX/PDF checks remain intact. Tests include absent, partial, inactive/`no_result` inputs, long labels, nearby endpoints and both certain/possible overlap. Synthetic output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual and local source/cohort freezes and the applicable ledger freeze; incompatible snapshots cannot be composed into one reported study. A mismatch blocks publication assembly pending governed resolution, never changes a completed estimate or silently refreshes a predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific amendment 2). `execution/README.md` indexes this Atom's complete runnable command, analysis callable, exact inputs, outputs and synthetic checks. Shared implementations are used, not seven duplicate estimators. Standalone `-dispatch-policy` `activation_respecting` is the default and retains the activation expression above. An explicit `-dispatch-policy` direct attempts this selected Atom immediately, without waiting for outer activation. Runtime direct scheduling selects the first B members in Molecule membership order; budget is a dispatch choice recorded before execution, never chosen from results. No registered scientific question, local key, estimator, clock, threshold, conditional scope or graph edge changes. Direct dispatch cannot waive input validity or conditional scientific meaning. Reuse actual supplied scientific predecessors and their frozen fingerprints; never replace a supplied `no_result` with a successful retry. If a predecessor record is absent, pending, not `activated` or `budget_unselected`, registered DC1–DC8 constructions may be computed locally from genuinely supplied projections, using `analysis.py` and `dispatch.local_inputs`. Follow the source Atom activation references to order these calculations; they are internal evidence, not new experiments or accepted predecessor World Atoms. Also construct the shared cohort and broad indicators where this module requires them. Save each

local calculation, source-protocol citation, frozen source/cohort/ledger identity, exact outputs and content digest in restricted/local-construction.json and local_evidence provenance. Never insert these calculations into the caller's prior results or the World roster. A source-protocol ID in that file is a citation, not a realized member record. All supplied source/cohort and applicable ledger freezes remain binding. Promised but unavailable data, incomplete inspection, failed software or required predecessor no_result yields this Atom's operational no_result. Completed evidence establishing an existing boundary follows only that registered boundary region. If local or supplied evidence shows this Atom's conditional scientific scope is false or unresolved, complete it as the existing otherwise state, with the explicit conditional-scope reason and no numerical rate. In particular, direct dispatch cannot turn all_strict into the selected Atom 4 claim, material into the selected Atom 7 claim, or unavailable receipt support into a financial result. Otherwise does not assert a statistical null. Conditional scope is checked with the same registered expression, using actual or explicitly local evidence; no new graph is authored. disposition.json, restricted/result.json and provenance.json record dispatch_policy and whether outer activation was bypassed; direct results record scientific_condition_value and local_evidence, and Atom 6 records source_state_origins. These are restricted execution metadata until disclosure approval. Local continuity is labeled as such in the receipt continuity slot; it never claims an accepted Atom 3 result. All source-dependent copies inherit source disclosure limits, including protected local copies. No local evidence may satisfy a missing predecessor World condition in a Molecule composite claim; restrictions always apply and standalone result slots remain scoped to their producing Atom. Publication closeout explicitly declares dispatch_policy and, for direct mode, B via budget. It lists all seven members: selected direct attempts retain done/otherwise/boundary/no_result; unselected members are budget_unselected, never falsely not_activated. Missing selected work blocks final closeout; true partial previews remain pending. Default activation-respecting closeout is unchanged. For every source-dependent slot apply disclosure suppression first, including protected source states; then the consuming Atom's no_result/not_activated/budget_unselected or completed boundary/otherwise; only an actually incomplete preview may use missing-source pending. A final active result lacking essential source/local evidence raises an error. The four reviewed closed inactive routes (empty cohort, evidenced cohort boundary, root no_result, continuity no_result) must never report pending or preview in these slots. Runnable tests are test_amendment.py, amendment_checks.py and the full test_synthetic.py entry point.

Complete registration fields

```
id: atom-000007
topic: Delayed recorded partners
atom_result: prereg
atom_strength: null
atom_shape: null
evidence_paths: []
concepts: []
literature: []
bonds: []
```

```

preregistration:
  version: 1
  mode: adaptive
  question: When the three-year range is low or unresolved, does extending
    the same histories to five years reveal additional later-party agreements?
  rationale: A longer window asks whether short-horizon conclusions leave
    substantively different delayed sequences unseen. It retains recent
    ↪ records
    as unknown rather than selecting older successful histories.
  assumption: Three-year information selects this analysis, and five-year
    coverage may be weaker. Same-cohort paired bounds can describe delayed
    recorded events but cannot establish a termination effect.
  target_strength: descriptive
  target_shape: temporal
  ratings:
    importance: 4
    novelty: 3
    feasibility: 3
    data_advantage: 4
    informativeness: 0.7
  tables:
    - DISCLOSURE
    - DISCLOSURE_AGREEMENT
    - AGREEMENT
    - AGREEMENT_COUNTERPARTY
    - COUNTERPARTY
  activation: (state(atom-000002) == "low_with_witness" OR state(atom-000002)
    == "low_no_witness" OR state(atom-000002) == "witnessed_uncertain" OR
    state(atom-000002) == "unresolved_no_witness")
  verdicts:
    - key: boundary
      region: Completed inspection proves frozen N or the required five-year
        event contract cannot be reproduced, rather than merely having
        ↪ incomplete
        follow-up.
      says: No extension result can be adjudicated under this contract. Recent
        right censoring by itself is uncertainty, not a boundary.
    - key: delayed_material
      region: N>0, computations complete, and paired increment lower bound
        ↪ Ldelta>=0.05,
        including equality.
      says: At least five additional percentage points of the same eligible
        cohort have their first qualifying recorded effective-date event after
        H3 and by H5 under the registered outer bound. This selected descriptive
        claim concerns effective timing, not signature, legal execution or
        ↪ technology
        use.
    - key: delayed_below
      region: N>0, computations complete and paired increment upper bound
        ↪ Udelta<0.05.
      says: The logical increment is below five percentage points through year
        five in this cohort. This is not evidence of no eventual transition
        or an economic null.
    - key: delayed_unresolved
      region: N>0, computations complete and Ldelta<0.05<=Udelta.
      says: The additional five-year information cannot classify the
        ↪ delayed-transition
        share relative to the author-set increment threshold.
    - key: otherwise
      region: otherwise

```

says: Completed evidence leaves this judgment unresolved. Report the
 ↳ unresolved
 scope; no negative or equivalent-effect claim is licensed.
 protocol: |
 AMENDMENT CLOCK: For every disclosure, select a0 by minimum eligible
 ↳ termination_date, breaking ties by exact lexicographic agreement_id.
 ↳ Set index_effective_date = a0.effective_date and t0 =
 ↳ a0.termination_date. Never set t0 from index_effective_date. A
 ↳ candidate event timestamp s = a1.effective_date must satisfy t0 < s;
 ↳ signature is a separate strict-only requirement. H1/H2/H3/H5 and the
 ↳ 31-day guard are measured from termination t0. Receipts alone use s
 ↳ as their one-year origin. All examples whose t0 was implicit use this
 ↳ explicit termination definition.

Status: exploratory descriptive and explicitly selected on Atom 2's prima
 ↳ ry outcome states. There is no holdout and no new confirmatory test.
 ↳ Population, exclusions, N, unit and t0 are exactly DC5. Keep every
 ↳ original disclosure, including insufficient five-year follow-up. No
 ↳ older-cohort restriction, longer search beyond five years, survival
 ↳ extrapolation or changed commercial-license/party coding. Outcome is
 ↳ the difference in cumulative first broad-event indicators at H5 and
 ↳ H3; five-year existence is not a new termination episode.

Execute in order:

1. Reproduce original N and DC6 fields/candidates with additional
 ↳ permitted horizon H5, reading the same frozen snapshot only. No later
 ↳ data refresh. Preserve Atom 2's original three-year output; do not
 ↳ revise its recorded state using five-year observations. Operationally
 ↳ inaccessible fields are no_result, while insufficient follow-up
 ↳ creates hi=1 as registered.
2. Apply the effective-date-only DC6 predicate at H5. Set raw H3 to the
 ↳ frozen Atom 2 indicator and raw H5 to this computation. Apply DC6
 ↳ closure explicitly: lo3=raw_lo3; lo5=max(raw_lo3,raw_lo5); hi3=min(ra
 ↳ w_hi3,raw_hi5); hi5=raw_hi5. Assert 0<=lo3<=hi3<=1, 0<=lo5<=hi5<=1,
 ↳ lo3<=lo5, hi3<=hi5. H3 must remain identical to Atom 2 because its
 ↳ same-snapshot candidate and coverage facts were already available; a
 ↳ change is a reproducibility defect and stops execution as no_result
 ↳ for governed correction. Preserve Atom 2's state. Late signatures do
 ↳ not produce late broad events; report chronology flags separately.
3. Use only the interval-based paired OUTER formulas delta_lo=max(0,lo5-h
 ↳ i3) and delta_hi=min(1,hi5-lo3). Optionally enumerate the marginally
 ↳ admissible mask of (Y3,Y5) in {(0,0),(0,1),(1,1)} satisfying
 ↳ lo3<=Y3<=hi3 and lo5<=Y5<=hi5. Verify that the mask minimum/maximum
 ↳ of Y5-Y3 equals the formulas; an empty mask is an error. The mask is
 ↳ not a fully candidate-feasible set. Add no constraints from shared
 ↳ unknown identities, candidate dates or agreement overlap; these may
 ↳ make the outer bound conservative, not invalid. Every local result
 ↳ uses these formulas, never analyst-chosen tightening. A definite late
 ↳ effective-date witness plus certified Y3=0 yields delta_lo=1. An
 ↳ unknown early history does not prove the first event was late.
4. Report [L5,U5] and paired [Ldelta,Udelta]=[sum(delta_lo)/N,sum(delta_h
 ↳ i)/N]. Cross-check cumulative bounds nondecreasing. The pooled
 ↳ difference [L5-U3,U5-L3] may be wider than the paired result and is
 ↳ not substituted. Plot same-cohort H3 and H5 envelopes and paired
 ↳ increment, with unresolved shares and no school rankings.

5. The 0.05 increment is an author-set descriptive attention threshold,
 → not a welfare SESOI, prespecified equivalence margin or empirical
 → regularity. Equality enters delayed_material only if Ldelta=0.05;
 → Udelta=0.05 with lower below enters delayed_unresolved. No p-values
 → or extension of follow-up to cross the threshold. Report all selected
 → outcomes, not just delayed positives.

Synthetic checks: known event by H3 forces delta=0 even with later
 → additional contracts; known late event and certified no early event
 → gives delta=1; unknown early event plus known late witness allows
 → delta in [0,1]; neither horizon observed gives ordered marginally
 → admissible pairs and [0,1] for delta, not a negative change; adding
 → five-year positive rows cannot lower a cumulative indicator; repeated
 → same-party contracts do not qualify; use leap-anniversary dates.
 → Complete retained history with exactly one pre-H3 effective-date
 → candidate of unresolved party disjointness and no other candidate
 → yields [lo3,hi3]=[0,1] and [lo5,hi5]=[0,1], hence registered
 → delta=[0,1]; replicated over N this is delayed_unresolved, even
 → though candidate-level optimization could force delta=0. That
 → optimization is forbidden here. The early-effective/late-signature
 → synthetic case in Atom 2 yields delta=[0,0] under full support and
 → delayed_below if replicated; a missing signature gives the same broad
 → answer. Verify closure and formulas exhaustively over every valid
 → binary marginal input and every nonempty ordered mask. Consequences:
 → every state provides a supplementary exploratory horizon statement
 → only. Material at five years cannot overwrite an unresolved/low
 → three-year primary result. No result activates a six-year search,
 → receipt follow-up for newly found late agreements or causal claim.

Exact input fields and provenance:
 → disclosure(disclosure_id,date,category_anzsrc,disclosure_type_cls),
 → disclosure_agreement(disclosure_id,agreement_id,role),
 → agreement(agreement_id,agreement_local_id,type_cls,field_of_use_cls,e
 → ffective_date,expiration_date,termination_date,sign_date),
 → agreement_counterparty(agreement_id,counterparty_id),
 → counterparty(counterparty_id,counterparty_local_id). Use supplied
 → schema-only.md lines 9-51 and 89-149, DC2. All are allowed APT0
 → tables, physical lowercase. Frozen semantic coding is
 → second-chances-termination-v3 plus provider dictionary hashes bound
 → by Atom 1, DC3. No undocumented field or current status is
 → substituted. Apply DC4: entity many-to-one assertions; distinct pair
 → joins; party-set reduction before disclosure history joins; no
 → cross-tenant joins or silent loss of dangling candidate links. Every
 → reused derived table is reproduced from these projections and checked
 → against its predecessor provenance and frozen N.

Inference, uncertainty and scope: apply DC9. This is a finite-record
 → descriptive estimand, not a sampled population or causal effect. No
 → estimator standard errors, clustering-based p-values, confirmatory
 → hypotheses or significance tests are registered (statistical
 → multiplicity family size zero); no holdout is used. Shared agreements
 → create dependence and unit multiplicity, which must be reported, not
 → hidden with independent-Bernoulli intervals. Logical uncertainty from
 → unresolved indicators is distinct from misclassification, population
 → selection and construct uncertainty. No welfare SESOI or
 → statistical-equivalence claim exists. Report exact fractions/bounds
 → and thresholds as descriptive only. Never infer prevalence or
 → precision from schema.

IMPLEMENTED AMENDMENT INTERFACE (scientific amendment 2, native schema
 ↳ version 1):
 Invoke prereg/execution/run_atom.py --atom atom-000007; analysis.atom7
 ↳ implements this Atom, using core.Records and DC1-DC9. The authority
 ↳ remains this Atom protocol. Load the exact projections and metadata
 ↳ statuses described in execution/input-interface.md. All ten metadata
 ↳ inspections precede cohort freezing; no real class values, mounts or
 ↳ coverage are supplied by this draft. Missing production definitions
 ↳ are registered unresolved requirements, not permission to invent a
 ↳ default. The input adapter's CSV/Parquet paths are governed bindings,
 ↳ not scientific choices. Keep the same input fingerprint and cohort
 ↳ hash across all descendants; ledger rows are read only by Atoms 5-6
 ↳ and have a separate frozen hash. A changed frozen non-ledger source
 ↳ is operational no_result unless a completed, cited source-contract
 ↳ inspection establishes the boundary region specified here. Atom 5's
 ↳ frozen population mismatch is operational no_result.

Ordered executable work is the numbered protocol above, implemented by
 ↳ analysis.atom7; construction and tri-valued predicates are
 ↳ core.Records.select_indices/history/strict/receipts as appropriate.
 ↳ As an explicit necessary-condition clarification, a known signature
 ↳ at or before index termination fails the strict requirement even when
 ↳ the later effective date is unknown; a missing signature remains
 ↳ unknown. Other known false strict requirements likewise dominate
 ↳ unresolved facts. An invalid cross-tenant candidate link is never a
 ↳ witness and leaves a possible-event flag within an eligible
 ↳ disclosure history. Zero-tolerance cardinality assertions apply to
 ↳ joins; duplicate links become sets and cannot multiply outcomes.
 ↳ Individual broken/conflicting keys are audited and quarantined as DC4
 ↳ specifies, not automatic tenant failures.

Complete current output layout: governed evidence/atom-000007/ contains
 ↳ provenance.json (semantic/execution-code, source/cohort and
 ↳ applicable ledger hashes, Python version, timestamp); diagnostics.csv
 ↳ (check,order,numerator,denominator,status,reason); disposition.json
 ↳ (atom,state or null,terminal or null,status,activation
 ↳ text/value,trace,reason,hashes); synthetic-checks.json (current
 ↳ synthetic proof and code hash). Numerical values are emitted only
 ↳ after a completed scientific state. Inactive or failed work emits
 ↳ disposition/provenance/diagnostics and no numerical tables.
 ↳ Registered numerical interfaces: release-candidate/late-bounds.csv
 ↳ (N, L3, U3, L5, U5, Ldelta, Udelta, unknown, delta_unknown,
 ↳ required_unresolved, available_unresolved, reachable,
 ↳ capped_unresolved). Restricted derivations: five-year-indicators.csv
 ↳ (d,lo3,hi3,lo5,hi5,delta_lo,delta_hi,mask). Every completed Atom also
 ↳ writes restricted/field-missingness.csv (table,field,missing,rows),
 ↳ restricted/source-metadata.csv (tenant,metadata), restricted/result.j
 ↳ son (reproducible complete module payload for downstream binding),
 ↳ and restricted/metrics.json when numerical public-candidate tables
 ↳ exist. CSV nested objects use JSON text; raw transaction values never
 ↳ enter World prose. The machine-checkable column index is
 ↳ execution/output-contract.yaml, subordinate to this protocol.

Figure 7 is implemented at prereg/paper/figures/figure7.py and consumes
 → only its figures.yaml tables. The governed visualizer creates release
 → -candidate/figure7.pdf after disclosure screening; the analysis
 → dispatcher does not render or publish raw records. This replaces the
 → SOURCE draft's Parquet/SVG packaging with CSV/PDF interfaces without
 → replacing estimands. Atom 1 composition remains a full table; other
 → paired displays can occupy panels within one figure. Figure code
 → calculates no new estimator. Empty, partial and unactivated inputs
 → produce explicitly labeled unavailability, never guessed values.

Synthetic coverage is runnable in execution/test_synthetic.py, with per-f
 → igure integration in figure_checks.py. Generated values, PDFs, PNGs
 → and test logs stay outside the World. Tests include the independently
 → specified decade between index effective date and termination; agreem
 → ents on both sides of termination; selection separately from timing;
 → leap anniversaries; open-gap/end-exclusive overlap; 30/31-day guards;
 → unknown versus false; source mismatch; cohort/bundle/cardinality
 → invariance; classifications and receipt timing; exact integer
 → thresholds; every mandatory branch; missing/partial/inactive plot
 → inputs and long-label/close-endpoint geometry. Any failed
 → prerequisite test stops data execution as no_result; a passing test
 → does not establish actual APTO availability or empirical validity.

Local states use the first matching registered region. Operational interr
 → uptions, read/cast-contract errors, failed assertions and unresolved
 → software defects are terminal no_result with no scientific state or
 → estimate; missing data documented as an evidenced construct boundary
 → follows that boundary region. Missing retention remains indicator unc
 → ertainty, not a statistical null. Unrun members remain pending while
 → predecessors may resolve and not_activated with trace at closeout.
 → Report restrictions before compatible primary/supplementary Molecule
 → clauses, then residual unresolved scope. No result licenses a new
 → cohort, clock, code mapping, causal claim or unregistered estimator.

Threshold-sensitivity output retains both raw required_unresolved k and c
 → apped_unresolved = min(k,Q), together with available_unresolved Q and
 → reachable = (k<=Q). This preserves the registered cap and explicit
 → unreachable distinction without changing adjudication. For Atom 2
 → these values are in restricted/metrics.json; strict-bounds.csv and
 → late-bounds.csv include them in their registered candidate summary.

V002 REVIEW REPAIR CONTRACT (scientific amendment 2, pre-acceptance
 → revision v002; native schema version 1).
 The same question, Atom IDs, result keys, activation, population,
 → horizons, thresholds and finite-record inferential status are
 → retained. These repairs implement the registered science; none was
 → selected from empirical results.

Use explicit `--world READ_ONLY_WORLD` and `--source-root EXECUTING_SRC` with `run_atom.py`. The source root contains `execution/` and `paper/figures/`; the World root contains `atoms/`, `molecules/`, `prereg/`. Never infer the deployed World from `__file__`. The dispatcher, saver and test runner propagate both roots. `provenance.py` hashes a fixed nonempty roster of executing Python sources, separately from immutable Atom/Molecule protocols and scientific/interface sources in the World. Missing files, stale/incomplete certificates or mismatched predecessor code/World/registration identity stop data access as operational `no_result`. Required certificate checks are `unit_semantics`, `file_formats`, `copied_cli` and `runtime_figures`, including 130.7 mm and 180 mm exports checked with `validate_exports` and the exact supplied fonts. Unit-only reports do not authorize bound data. Built-in `--synthetic-fixture` is mutually exclusive with `--inputs` and generates artificial records only; its disposition is not a production certificate. Pure in-memory functions are for synthetic/unit use; the governed entry point is the certificate-gated CLI. The complete test runner invokes copied source against a separate World using persisted predecessors, and also exercises the ordinary certified CSV-input CLI. All restricted CSV schemas, including zero-row scientific outputs, are fixed in `output-contract.yaml` (interface 2). Optional audit values are empty cells in their declared columns, not omitted headers. An empty cohort, empty witness table or empty ledger-derived audit retains its scientific table schema. Failed/inactive work instead emits nonnumerical disposition and diagnostic files. Common restricted headers are `field-missingness.csv(table,field,missing,rows)` and `source-metadata.csv(tenant,metadata)`; `diagnostics.csv(check,order,numerator,denominator,status,reason)` is fixed for all dispositions.

Raw provenance represents numeric NaN, +infinity and -infinity with distinct tagged scalar objects before JSON hashing; original strings remain strings. Duplicate/conflict audits remain deterministic and retain representational distinctions. Receipt normalization then converts all nonfinite/unparseable amounts to unknown under DC8, regardless of memory/CSV/Parquet representation. File representations may have different raw provenance hashes; they must produce equivalent scientific indicators and result states for semantically equivalent inputs. Unknown amounts are never zeros or dropped records. Known cost/out-of-window events remain decisively irrelevant, while a definite positive witness dominates unresolved potentially positive events.

Publication assembly first reconciles with authoritative Molecule membership. Partial previews list all seven members as observed dispositions or explicitly pending and label `report_mode=partial_preview`. Final closeout requires an explicit `result/no_result` for every activated member; it may derive inactive dispositions only from registered conditions and predecessor closure, preserving unknownness. A missing activated analysis prevents final closeout. Source boundaries and failed predecessors do not become negative evidence. Direct copied source-state columns have declared dependencies in `output-contract.yaml` and `results-bindings.yaml`. Suppressing Atom 3 also suppresses Atom 6 continuity_state in table/metric presentation and receipt_continuity_scope, direct Atom 3 slots, and protected interpretation/trace material; independently releasable financial quantities remain subject to governed approval and complementary suppression.

Every figure implements the registered DataFrame API with no data reads
 ↳ or estimator. Runtime style_dir binds the supplied HelveticaNeue regu-
 ↳ lar/medium/bold/italic TrueType files by exact path; missing required
 ↳ fonts fail, while style_dir=None is explicitly preview-only. Rerender
 ↳ both widths, enforce <=170 mm height, and retain vector/font/Unicode/
 ↳ page checks. The chart catalog and render-package layouts remain
 ↳ disabled; manuscript class and compiler-owned TeX/PDF checks remain i-
 ↳ ntact. Tests include absent, partial, inactive/no_result inputs, long
 ↳ labels, nearby endpoints and both certain/possible overlap. Synthetic
 ↳ output remains outside the World and no manuscript slot is filled.

V004 direct closeout additionally reconciles independently bound actual
 ↳ and local source/cohort freezes and the applicable ledger freeze;
 ↳ incompatible snapshots cannot be composed into one reported study. A
 ↳ mismatch blocks publication assembly pending governed resolution,
 ↳ never changes a completed estimate or silently refreshes a
 ↳ predecessor.

V004 DISPATCH AND PRESENTATION REPAIR (engineering revision; scientific
 ↳ amendment 2).

execution/README.md indexes this Atom's complete runnable command,
 ↳ analysis callable, exact inputs, outputs and synthetic checks. Shared
 ↳ implementations are used, not seven duplicate estimators. Standalone
 ↳ --dispatch-policy activation_respecting is the default and retains
 ↳ the activation expression above. An explicit --dispatch-policy direct
 ↳ attempts this selected Atom immediately, without waiting for outer
 ↳ activation. Runtime direct scheduling selects the first B members in
 ↳ Molecule membership order; budget is a dispatch choice recorded
 ↳ before execution, never chosen from results. No registered scientific
 ↳ question, local key, estimator, clock, threshold, conditional scope
 ↳ or graph edge changes.

Direct dispatch cannot waive input validity or conditional scientific
 ↳ meaning. Reuse actual supplied scientific predecessors and their
 ↳ frozen fingerprints; never replace a supplied no_result with a
 ↳ successful retry. If a predecessor record is absent, pending,
 ↳ not_activated or budget_unselected, registered DC1-DC8 constructions
 ↳ may be computed locally from genuinely supplied projections, using
 ↳ analysis.py and dispatch.local_inputs. Follow the source Atom
 ↳ activation references to order these calculations; they are internal
 ↳ evidence, not new experiments or accepted predecessor World Atoms.
 ↳ Also construct the shared cohort and broad indicators where this
 ↳ module requires them. Save each local calculation, source-protocol
 ↳ citation, frozen source/cohort/ledger identity, exact outputs and
 ↳ content digest in restricted/local-construction.json and
 ↳ local_evidence provenance. Never insert these calculations into the
 ↳ caller's prior results or the World roster. A source-protocol ID in
 ↳ that file is a citation, not a realized member record.

All supplied source/cohort and applicable ledger freezes remain binding.

- Promised but unavailable data, incomplete inspection, failed software
- or required predecessor no_result yields this Atom's operational
- no_result. Completed evidence establishing an existing boundary
- follows only that registered boundary region. If local or supplied
- evidence shows this Atom's conditional scientific scope is false or
- unresolved, complete it as the existing otherwise state, with the
- explicit conditional-scope reason and no numerical rate. In
- particular, direct dispatch cannot turn all_strict into the selected
- Atom 4 claim, material into the selected Atom 7 claim, or unavailable
- receipt support into a financial result. Otherwise does not assert a
- statistical null. Conditional scope is checked with the same
- registered expression, using actual or explicitly local evidence; no
- new graph is authored.

disposition.json, restricted/result.json and provenance.json record

- dispatch_policy and whether outer activation was bypassed; direct
- results record scientific_condition_value and local_evidence, and
- Atom 6 records source_state_origins. These are restricted execution
- metadata until disclosure approval. Local continuity is labeled as
- such in the receipt continuity slot; it never claims an accepted Atom
- 3 result. All source-dependent copies inherit source disclosure
- limits, including protected local copies. No local evidence may
- satisfy a missing predecessor World condition in a Molecule composite
- claim; restrictions always apply and standalone result slots remain
- scoped to their producing Atom.

Publication closeout explicitly declares dispatch_policy and, for direct

- mode, B via budget. It lists all seven members: selected direct
- attempts retain done/otherwise/boundary/no_result; unselected members
- are budget_unselected, never falsely not_activated. Missing selected
- work blocks final closeout; true partial previews remain pending.
- Default activation-respecting closeout is unchanged. For every
- source-dependent slot apply disclosure suppression first, including
- protected source states; then the consuming Atom's
- no_result/not_activated/budget_unselected or completed
- boundary/otherwise; only an actually incomplete preview may use
- missing-source pending. A final active result lacking essential
- source/local evidence raises an error. The four reviewed closed
- inactive routes (empty cohort, evidenced cohort boundary, root
- no_result, continuity no_result) must never report pending or preview
- in these slots. Runnable tests are test_amendment.py,
- amendment_checks.py and the full test_synthetic.py entry point.

Registered question

When the three-year range is low or unresolved, does extending the same histories to five years reveal additional later-party agreements?

Disclosed amendment, scientific amendment 2, revision v004; native schema version 1. The operator reviewed a prior-run manuscript; this author received no empirical results. Prospective execution specification only. This Atom is pending; no APTO observation, numerical result or realized state is asserted. Its registration payload owns its protocol, activation and possible results.