



CROSS-DOMAIN RISK INTELLIGENCE

Cross-Domain *Transmission Channels*

A practical model for tracing how a single shock moves between market, credit, liquidity, insurance, operational, climate & ESG, and strategic & emerging risk — and what that means for capital, underwriting, and disclosure.

SEVEN DOMAINS. ONE COUNSEL.

EXECUTIVE SUMMARY

Most enterprise risk frameworks classify risk into siloed taxonomies — market, credit, liquidity, insurance — and stop there. The interesting question is not what category a risk belongs to. It is how a shock that originates in one domain transmits into the others, where it amplifies, where it accumulates, and where it eventually decays. This paper sets out the Abgalis position on cross-domain transmission: what the channels are, why insurers consistently underweight them, and what changes when you make those channels first-class objects in the risk model.

§ 1

The siloed model is incomplete

Open the risk register of any large insurer and you will find seven or eight headline categories — insurance, credit, market, operational, group, conduct, strategic, climate — each with a sub-taxonomy, an owner, and a quarterly committee. Each is treated, in the modelling layer, as a separate distribution. Aggregation happens through a correlation matrix calibrated to historical co-movement, or through a copula chosen to capture mild tail dependency.

This works — until it doesn't. The patterns insurers have found difficult to explain in the past decade share a common structure. A peril event arrives in one domain; the loss it triggers there is modelled and reserved; but the second-order consequences in adjacent domains arrive months later, with no reservation, no capital allocation, and frequently no owner. The insurer has accounted for the shock as an insurance loss while the same shock is simultaneously generating a credit migration in the bond portfolio, an operational continuity failure in the reinsurance recoverable, and a regulatory letter that constrains the next year's underwriting.

THE UNMODELLED SECOND-ORDER

The point is not that insurers are unaware of these adjacencies. They are aware. The point is that adjacency is treated narratively in the ORSA and quantitatively nowhere. The capital model still aggregates seven distributions through a correlation matrix that was calibrated when the seven were largely independent.

§ 2

The seven domains, restated

Abgalis organises the enterprise into seven domains — chosen because each has a coherent transmission identity, not because seven is a tidy number:

DOMAIN 1**Market**

Interest-rate, spread, equity, currency and property exposure across the asset portfolio; ALM and matching-adjustment sensitivity.

DOMAIN 2**Credit**

Counterparty default in invested assets, sovereign drift, reinsurance recoverable risk, broker counterparty.

DOMAIN 3**Liquidity**

Stressed cash-flow coverage, collateral and margin calls, mass-lapse scenarios, liquidity fungibility across entities and currencies.

DOMAIN 4**Insurance**

Underwriting losses, reserve volatility, accumulation, claims inflation. The portfolio's primary loss-generating layer.

DOMAIN 5**Operational**

People, process, systems, third-party concentration, cyber, data integrity, conduct failure.

DOMAIN 6**Climate & ESG**

Physical primary & secondary perils, transition asset re-pricing, climate litigation, nature dependency.

DOMAIN 7**Strategic & Emerging**

Business-model shift, reputational, geopolitical, technological, regulatory novelty — risks not yet in the standard taxonomy.

The seven are not orthogonal, and the framework does not pretend they are. They are deliberately overlapping in the same way the body's organ systems overlap — coherent enough to be reasoned about separately, transmissive enough that a shock to one is felt in all the others.

§ 3**What a transmission channel is**

A transmission channel is the route by which a shock in one domain becomes loss, capital pressure, or constraint in another. It is the thing risk frameworks have always implicitly relied on — pre-2008 capital models implicitly assumed credit and market shocks would cross-pollinate; SS5/25 implicitly assumes climate shocks would propagate through insurance balance sheets; the Lloyd's RDS schedule implicitly assumes operational and reinsurance shocks would compound — without ever modelling the route.

A channel has three observable properties:

- **A direction.** Channels are not symmetric. A climate physical shock transmits to insurance and operational quickly, to credit and regulatory more slowly, and to programme via the reinsurance recoverable trail. The reverse — a regulatory shock transmitting back to climate — is rare on the loss side but common on the disclosure side.
- **A latency.** Some channels move within days (a hurricane landfall creates an insurance loss and a programme drawdown almost simultaneously). Others take quarters (the same hurricane shifts cat-bond pricing and reinsurance renewal terms a year later). The capital model needs to know the difference.
- **An amplification or attenuation factor.** Some channels deliver less than 100% of the original shock to the receiving domain — friction, mitigation, hedging dampens the signal. Others deliver more — concentration, leverage, or feedback loops amplify it.

None of this is novel as observation. What is novel is the choice to *model the channels as objects* rather than absorb them silently into a correlation coefficient.

§ 4

Why correlation matrices keep failing

The standard rebuttal to channel modelling is that the correlation matrix already does this — high correlation between climate and operational under stress is what the matrix captures. The rebuttal is incomplete in three ways.

Reason one: correlations are calibrated on the wrong regime

Correlation matrices are calibrated on historical co-movement of losses. Outside of stress, the seven domains genuinely *are* close to independent — a normal-quarter operational loss has no climate signal in it, a normal-quarter credit migration has no insurance signal. The matrix learns from the calibration period that the domains are loosely coupled, then aggregates as if that coupling held in the tail. It does not.

Reason two: correlation has no direction or latency

A symmetric correlation coefficient cannot express "climate transmits to operational within 48 hours but operational transmits back to climate over 18 months." It collapses both directions and all timing into a single number. The result is a model that is right on average and wrong precisely when the timing matters — which is during stress.

Reason three: correlation conflates channel with co-cause

Two domains can be correlated because a third factor causes both (interest rates moving simultaneously hits insurance reserve discounting and credit valuation). Or because one channel transmits the shock from one to the other. The capital model treats both cases identically. The risk-management response should be different — in the first case, hedge the third factor; in the second, harden the channel.

A correlation matrix tells you that two domains move together. A channel tells you why, in which direction, and how long the lag is. The first answer earns you regulatory tolerance. The second earns you operational decisions.

§ 5

What the Abgalis Engine adds

The Abgalis Engine is the cross-domain intelligence layer of the platform. It treats transmission channels as first-class entities — each channel has an identity, a direction, a latency, and a structural transmission characteristic that can be calibrated, monitored and stress-tested. The Engine sits underneath ICRIP, the Integrated Climate Risk Intelligence Platform, and powers the cross-domain views that distinguish Abgalis from single-domain analytics vendors.

What the Engine produces is not a new capital number that competes with the standard formula. It produces a structured account of *where* a shock travels and *when*, which the existing capital infrastructure can consume in three ways:

1. **Stress-test design.** A channel-aware stress test starts from a single shock — say, a category-five Atlantic hurricane in a specific landfall corridor — and traces, with explicit latency, the resulting loss profile across all seven domains. The output is a multi-domain time-indexed cash-flow rather than a point-estimate aggregate.
2. **Reverse stress.** Channel structure inverts cleanly. Given a binding capital outcome — for instance, breach of MCR within 18 months — the Engine identifies the minimum-magnitude originating shocks across all seven domains that produce that outcome via traceable channels.
3. **Disclosure narrative.** ISSB, CSRD, TNFD, SS5/25, DORA — the disclosure regimes increasingly ask insurers to describe, not just quantify, how risks transmit through the business. A channel model produces that narrative as a by-product of the quantitative work.

The Engine itself rests on a body of patent-pending methodology that Abgalis does not disclose externally. What this paper describes is the surface — the channels, their properties, and their use in capital and disclosure work. The internals are reserved.

§ 6

Practical implications for capital, underwriting and disclosure

Capital

For internal-model firms, channel modelling fits naturally inside the dependency module of the SCR architecture. It does not replace the diversification benefit calculation; it constrains it. Specifically, it rules out diversification credit between domains where the channel structure shows the apparent independence is an artefact of the calibration window. We expect this to reduce headline diversification benefit modestly — single-digit percentages on the SCR, in the cohort we have modelled — while increasing the defensibility of what remains.

Underwriting

The pricing layer benefits less directly. The first-order use is in accumulation and aggregate-exposure monitoring, where channel structure surfaces concentrations that single-domain accumulation does not see — for example, a portfolio with low geographic concentration in physical climate exposure but high concentration in the operational continuity of the third-party catastrophe-claims handler. The second-order use is in structuring — knowing the channel latencies improves the choice of attachment, exhaustion and reinstatement on outwards programmes.

Disclosure

This is the area in which channel modelling pays back fastest. The shift from cause-based to consequence-based disclosure, signalled across multiple 2025–26 supervisory texts, asks the regulated entity to describe how a generic shock would propagate through its specific business. A pre-built channel map answers that question without bespoke effort each cycle.

§ 7

What this is not

It is worth being explicit about what cross-domain transmission modelling is *not*.

- It is not a replacement for the SCR standard formula or for an internal model. Both remain. Channel modelling is a structural complement that sits in the dependency layer.
- It is not a forecasting tool. The Engine does not predict that the next shock will originate in a specific domain. It traces what happens once a shock has originated.
- It is not a ratings or an opinion product. Abgalis does not rate insurers and does not opine on solvency.
- It is not a black box. Every channel in the framework can be inspected, calibrated against a firm's own data, challenged, and overridden in the firm's own ORSA narrative.

§ 8

How to engage

Insurers and reinsurers exploring channel-aware risk infrastructure typically engage with Abgalis through one of three routes:

1. **Diagnostic — six weeks.** A targeted assessment of the firm's existing dependency model and a channel-mapped overlay against the seven domains, sized to the firm's portfolio.
2. **Pilot — one quarter.** A scoped channel build for one originating-shock pathway (typically a primary climate physical event), instrumented for ORSA, reverse stress, and disclosure narrative use.
3. **Integrated programme.** Full channel coverage across the seven domains, integrated with the firm's capital and stress infrastructure, run jointly with the firm's internal team.

None of the three requires the firm to disclose proprietary capital-model internals. Abgalis works on either side of the firm's own model boundary.

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ABOUT ABGALIS

Abgalis is a climate and cross-domain risk intelligence platform for insurers and reinsurers. The name draws from the Sumerian *Abgal* — the seven divine sages sent by Enki to counsel the earliest kings of civilisation — re-instantiated as seven cooperating analytical domains. The civilisation that invented the insurance contract, the actuarial table, and the systematic record of risk.

TRADEMARKS & METHODOLOGY IP

References in this paper to Abgalis frameworks — the **Abgalis Engine™** (Abgalis's cross-domain transmission framework), **ICRIP™** (Integrated Climate Risk Intelligence Platform), and **The Cascade™** (Abgalis's monthly intelligence brief) — are trade marks of Abgalis Ltd, used and explained inline. The internal mathematical methodology is reserved to Abgalis Ltd and is not disclosed in this document. Reproduction outside Abgalis requires written permission.

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FROM §1 — THE SILOED MODEL IS INCOMPLETE

THE SERIES

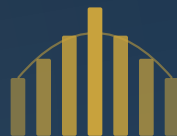
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Seven Domains. One Counsel.

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