

derien

A Market Structure for FX Pricing Under Internal Settlement

White Paper
February 2026

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Abstract

Global foreign exchange pricing remains structurally expensive despite decades of competition, technological progress, and market fragmentation. This persistence is not the result of insufficient liquidity, inadequate competition, or outdated infrastructure. It is the direct consequence of a market structure in which price discovery and settlement are separated, and in which intermediaries are compensated through friction rather than efficiency.

derien is an institutional price discovery system designed to operate where traditional FX market structures cannot. It provides order matching and price formation for foreign exchange markets expressed and settled in stablecoin-denominated units while remaining deliberately non-custodial, non-retail, and non-intermediating. By constraining its role to price discovery alone, derien removes the economic necessity for spreads and transaction fees at the point of execution.

When settlement and custody are internalized elsewhere in the system, pricing economics move below the observable market. In this regime, competition is expressed through tighter prices rather than higher fees, and liquidity concentrates around execution quality rather than access or intermediation. The result is a market in which trading activity is not taxed, but rewarded, and in which FX conversion costs compress as a structural outcome rather than a discretionary pricing choice.

derien operates as the institutional execution layer within a broader architecture in which regulated entities handle custody, settlement, and client interaction. This separation of concerns is intentional. It allows derien to remain outside direct regulatory authorization requirements while enabling regulated distribution and settlement to occur through licensed counterparties. The system is designed such that regulatory obligations attach to custody and client relationships, not to price discovery itself.

The economic center of gravity in this architecture is custody rather than transaction volume. FX demand is mandatory and repetitive, driven by operational necessity rather than speculation. When conversion friction approaches zero, balances cease to churn across venues and instead accumulate where pricing is consistently best. Over time, custody becomes persistent, compounding, and durable, while transactional volume becomes a secondary effect rather than the primary business driver.

This paper describes the structural failures of existing FX market design, the conditions under which pricing can compress sustainably, and the architecture through which derien enables that outcome. It is not a product announcement or a roadmap. It defines the invariant principles, constraints, and boundary conditions of a system in which FX pricing

converges toward zero as a consequence of internal settlement economics and incentive alignment.

The execution layer has been implemented and validated under sustained institutional-scale load, processing approximately 12 million orders per second with deterministic multi-currency closure. The architecture reflects an operational separation of execution, settlement, and distribution, implemented as production-ready infrastructure rather than a conceptual proposal.

Executive Summary

This paper describes a market structure in which foreign exchange pricing compresses as a mechanical consequence of internal settlement.

Key points:

- Traditional FX remains expensive because price discovery and settlement are separated
- When settlement is internal, pricing economics move below execution
- In this regime, execution can remain neutral and spreads compress structurally
- Custody persistence, not trading volume, becomes the dominant scaling variable
- Issuer economics can fund distribution without distorting price discovery
- Multi-currency implied-N resolution allows residual-free internal settlement at scale
- The architecture does not require global adoption and can deploy incrementally
- Incumbents cannot replicate incrementally without dismantling friction-based revenue

If these conditions hold, FX pricing converges toward zero as a structural outcome rather than a discretionary pricing choice.

1a What This Paper Assumes

The structure described in this paper follows mechanically if three conditions hold:

- FX friction is structural, not technological
- Settlement economics must move inside price formation
- Persistent custody, not transaction volume, is the dominant scaling variable

If these conditions are accepted, neutral execution, issuer-funded pricing, and structural compression of FX costs follow as consequences of market design rather than discretionary policy.

If they do not hold, FX pricing remains structurally extractive regardless of improvements in execution technology or competition.

This paper therefore does not propose a new venue. It describes the market structure that emerges when settlement is internalized and execution remains neutral.

1b Internal Settlement Changes What a Market Is

Traditional foreign exchange markets are organized around independent currency pairs.

Each currency pair:

- is priced independently
- is matched independently
- and is reconciled through arbitrage

Consistency between markets is restored **after execution**.

This model works because settlement is external. Temporary inconsistencies can exist because value transfer occurs outside the pricing system and is resolved later.

When settlement becomes internal, this structure breaks.

A system that:

- holds balances across multiple currencies
- executes conversion internally
- and settles atomically

cannot rely on:

- arbitrage
- delayed reconciliation
- or sequential execution

All currency relationships must hold **simultaneously at execution**.

This changes the problem from matching markets to resolving a system.

1c Pair-Based FX vs System Resolution

Each pair is matched locally. Consistency across pairs is restored afterward through arbitrage.

In this structure:

- EUR/USD is priced independently
- USD/JPY is priced independently
- EUR/JPY is enforced indirectly through arbitrage

This architecture makes the currency pair the fundamental unit of FX.

Internal settlement changes this.

When balances exist simultaneously across multiple currencies within a shared system, consistency can no longer be enforced after execution.

It must hold at execution.

Instead of matching pairs independently, the system must resolve a shared currency state:

EUR · USD · JPY · GBP · CHF

Prices are no longer discovered pair-by-pair but emerge from a simultaneous resolution of all currency relationships.

In this model:

- pairs become projections of a global state
- liquidity is shared across all currencies
- arbitrage is no longer required to enforce consistency
- conversion becomes a state transition rather than a bilateral trade

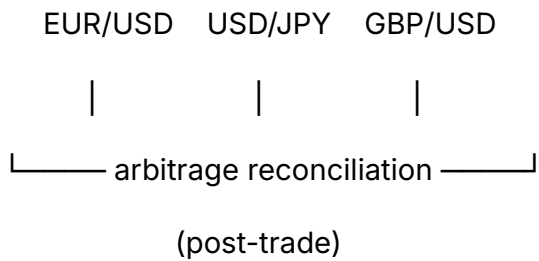
This is the structural shift from pair-based matching to system resolution.

The mechanism that enables this is implied N resolution, which allows closures to form across any number of currencies simultaneously, rather than restricting matching to predefined pairs or triangular paths.

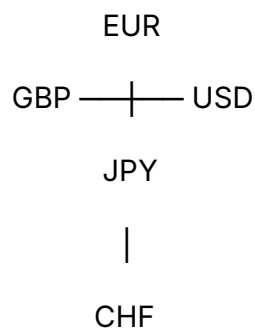
This shift can be visualized as a transition from sequential pair matching to simultaneous multi-currency state resolution.

1d Implied-N System Resolution (Conceptual)

Traditional pair-based matching resolves relationships sequentially:



Simultaneous multi-currency state resolution:



Orders across multiple currencies are resolved into a single closed state at execution.

Example:

Orders:

- buy EUR/USD
- sell GBP/USD
- buy GBP/JPY
- sell CHF/JPY
- sell EUR/CHF

Traditional matching:

- executes sequentially
- produces residual imbalance
- requires arbitrage to restore consistency

Internal settlement resolution:

- evaluates all relationships simultaneously
- resolves all constraints at execution

- produces a deterministic final state
- leaves no residual imbalance

This is not improved matching. It is a different class of market.

In an internally settled system:

- prices must remain globally consistent at execution
- arbitrage is no longer required to enforce relationships
- liquidity emerges from aggregate demand rather than provision
- conversion becomes a state transition rather than a trade

Under these conditions, FX stops behaving as a set of independent markets.

It becomes a single system that must remain internally consistent at all times.

This is the structural shift that allows execution to become neutral, pricing to compress structurally, and liquidity to become endogenous.

derien is designed to operate under this model.

It does not rely on arbitrage, sequential matching, or external reconciliation. It resolves multi-currency demand simultaneously, producing residual-free settlement with deterministic finality.

Under these conditions, foreign exchange ceases to operate as a set of independent markets and instead becomes continuous internal financial infrastructure.

1e Execution System Implementation Status

The architecture described in this paper is implemented, not conceptual. The institutional execution layer and its associated integration stack have been built, integrated, and validated under production-equivalent conditions.

The core matching engine operates under strict FIFO (price–time) priority and has been exercised under sustained load and stress scenarios involving very large volumes of order flow. Institutional routing and pre-trade risk enforcement have been integrated via CQG, with external technical participation in stress validation. Programmatic access via FIX, REST, and WebSocket interfaces has been implemented and exercised alongside institutional connectivity.

Digital asset custody integration was completed and validated in coordination with an institutional custody provider, including deposit detection, withdrawal orchestration, treasury workflows, and reconciliation against an internal ledger of record. Fiat banking rails were integrated and exercised to support deposits, withdrawals, attribution, and reconciliation.

Extended user acceptance testing was conducted over a prolonged period under production-equivalent configuration. During this validation phase, no critical failures were observed in core execution behavior. Issues identified were resolved within the testing cycle.

As a result, the primary technological and execution risks associated with building an institutional-grade price discovery layer have been materially reduced. Remaining gating factors relate to regulatory activation and commercial deployment rather than core system feasibility.

2. The Structural Failure of Global FX

Global foreign exchange markets are among the most liquid and technologically advanced financial markets in existence. Trillions of dollars change hands daily across a dense network of banks, brokers, venues, and payment systems. Despite this scale and competition, FX conversion remains persistently expensive for businesses and institutions whose demand for FX is operational rather than speculative.

This persistence is often attributed to surface explanations: insufficient competition, outdated infrastructure, regulatory burden, or the cost of risk capital. None of these explanations survive scrutiny. FX is already among the most competitive markets globally. Infrastructure has been modernized repeatedly. Capital is abundant. Yet spreads and fees remain embedded at every point where currencies are converted.

The failure is structural.

2.1 Price Discovery Is Not the Problem

FX pricing itself is not inefficient. For major currency pairs, price discovery is continuous, competitive, and highly refined. Interbank markets, electronic communication networks, and proprietary trading systems continuously compress prices toward marginal cost.

The problem is not that prices cannot be discovered efficiently.

The problem is that **efficient prices cannot be delivered cheaply once settlement is externalized.**

Every FX conversion requires not only a price, but the movement of value across balance sheets, jurisdictions, and settlement systems. Where settlement is external, fragmented, or delayed, pricing must incorporate the cost of capital, credit exposure, operational risk, and balance-sheet usage associated with that movement. These costs are not optional. They must be recovered somewhere in the system.

As a result, FX venues do not monetize price discovery. They monetize **the act of conversion itself**.

2.2 Competition Cannot Eliminate Structural Costs

In a market where intermediaries are paid when money moves, competition does not eliminate costs; it redistributes them.

Lower explicit fees are offset by wider spreads.

Tighter spreads are offset by balance-sheet constraints, routing inefficiencies, or settlement fees.

Innovations in execution quality reduce one form of friction only for another to reappear downstream.

This is not a failure of market discipline. It is the natural outcome of a system in which settlement occurs outside the pricing venue and is funded implicitly through trading activity.

So long as conversion requires:

- prefunded nostro accounts,
- credit intermediation,
- correspondent banking chains,
- or delayed settlement finality,

FX pricing must include compensation for those constraints. No amount of venue-level competition can remove them, because the economics sit **below** the venue.

2.3 FX Demand Is Mandatory and Repetitive

Unlike speculative trading, FX demand for businesses is non-discretionary. Firms convert currencies to pay suppliers, employees, taxes, and operating expenses. These conversions recur continuously and predictably.

This characteristic should, in theory, reduce risk and compress pricing. Predictable flow is lower risk than speculative flow. Yet in practice, predictable FX demand is penalized rather than rewarded.

The reason is structural: predictable flow still requires settlement across fragmented systems. Even when demand is known in advance, value must still traverse external rails, consume balance sheet, and incur operational overhead. Predictability does not eliminate these costs; it merely makes them easier to forecast.

As a result, recurring operational FX demand becomes a stable source of extraction rather than a basis for pricing efficiency.

2.4 Settlement Sits Outside the Market

Modern FX venues are pricing engines, not settlement systems. They discover prices, match orders, and hand off obligations to external infrastructures for completion.

This separation is treated as a technical detail. In reality, it is the defining constraint of FX economics.

When settlement sits outside the market:

- pricing venues cannot internalize value transfer,
- balances must churn across institutions,
- and intermediaries are compensated for facilitating movement rather than minimizing it.

In such a system, reducing friction is not aligned with revenue. Friction is the revenue.

2.5 The Consequence: Friction Is Inevitable

The persistence of FX costs is therefore not a market failure in the conventional sense. It is the equilibrium outcome of a structure in which pricing and settlement are disjoint.

As long as:

- settlement is external,
- custody is fragmented,

- and intermediaries earn revenue from movement,

FX costs cannot compress to zero. They can only be shifted, obscured, or temporarily subsidized.

Any system that claims to eliminate FX friction without altering this structure must ultimately reintroduce it elsewhere.

The implication is unavoidable:

If FX pricing is to compress structurally, settlement economics must move inside the system that forms prices.

3. When Settlement Is Internal, Economics Move Below the Market

The economics of FX pricing change fundamentally when settlement is no longer external to price discovery. Once value transfer occurs inside the system that forms prices, the costs traditionally embedded in spreads and fees no longer need to be recovered through trading activity. Instead, they are absorbed at the level of balance management and settlement finality.

This shift does not improve pricing incrementally.

It repositions where economics reside in the stack.

The settlement units used in this architecture are incidental to the economic structure; the critical condition is internal settlement with finality, not the representation of currency itself. These units are not structurally required to be stablecoins. Any instrument supporting persistent custody, deterministic transfer, and internal settlement finality satisfies the condition. The economics described are therefore independent of a specific issuer or asset class.

3.1 External Settlement Forces Economics Upward

When settlement is external, every FX trade creates obligations that must be discharged across institutional boundaries. These obligations consume balance sheet, introduce credit exposure, and require operational coordination across time and jurisdiction.

Because these costs are incurred *after* price formation, they must be anticipated *before* execution. The result is that pricing is pushed upward to compensate for settlement risk, capital usage, and operational uncertainty.

In this regime:

- spreads subsidize balance-sheet usage,
- fees compensate for delayed finality,
- and execution quality is secondary to settlement convenience.

Pricing venues cannot escape this logic. Even the most efficient matching engine must price in the cost of what happens next.

3.2 Internal Settlement Pulls Economics Downward

When settlement is internal, obligations do not traverse external balance sheets at the point of execution. Value is transferred within a shared accounting and custody context, and finality is achieved without correspondent chains or bilateral credit extension.

In this regime, settlement ceases to be a downstream cost driver and becomes an internal state transition.

As a result:

- execution no longer needs to pre-fund external risk,
- pricing no longer needs to subsidize balance-sheet friction,
- and spreads are no longer the primary revenue mechanism.

Economics move **below** the market — into custody, balance persistence, and settlement gravity rather than execution flow.

3.3 Price Discovery Becomes a Pure Competitive Function

Once settlement costs are internalized, price discovery can operate without distortion. Participants compete solely on price quality rather than on their ability to intermediate settlement.

In such a system:

- tighter pricing attracts flow,

- increased flow deepens liquidity,
- deeper liquidity further tightens pricing.

This feedback loop is not promotional or discretionary. It is mechanical. Competition is no longer constrained by the need to recover settlement costs through execution.

Trading activity becomes a means of improving prices rather than a source of extraction.

3.4 Why Trading Can Be Rewarded

In traditional FX venues, trading must be taxed because it is the only observable point at which costs can be recovered. When settlement is external, there is no alternative.

When settlement is internal, this constraint disappears.

The system no longer depends on transaction volume to fund its operation. Instead, economics accrue from balances held and from the efficiency with which those balances are settled internally. Execution can therefore be priced at zero — or even negatively — without undermining sustainability.

Negative fees are not a pricing strategy.

They are a consequence of internal settlement economics.

3.5 Custody, Not Volume, Becomes the Center of Gravity

In an internally settled system, value scales with balances held rather than trades processed. Balances persist. Volume is episodic.

As conversion friction approaches zero, there is no incentive to churn balances across venues. Holding multiple currencies ceases to be punitive. Over time, funds accumulate where pricing is consistently best and settlement is final.

This produces a qualitative shift:

- custody becomes durable and compounding,
- execution volume becomes a secondary effect,
- and marginal cost per additional balance approaches zero.

Once this threshold is crossed, economics become non-linear. The system no longer needs to grow transactionally to remain viable.

3.6 The Structural Consequence

This is the inflection point that conventional FX market design cannot reach.

As long as settlement remains external, pricing must recover friction.

When settlement is internal, pricing no longer needs to do so.

There is no hybrid equilibrium. Systems either externalize settlement and tax trading, or internalize settlement and allow pricing to compress structurally.

This is the condition under which FX costs can converge toward zero without subsidy or fragility.

4. derien: The Institutional Price Discovery Layer

derien is designed as a narrowly scoped execution system whose sole function is price discovery. It exists to form prices where settlement economics have already moved below the market, not to intermediate value, custody assets, or manage client relationships.

This constraint is intentional. It defines both the system's capabilities and its regulatory posture.

4.1 A Deliberately Limited Role

derien performs order matching and price formation for foreign exchange markets using stablecoin-denominated settlement units. It does not custody assets, does not handle fiat, does not onboard clients, and does not intermediate credit.

All participant balances, settlement obligations, and regulatory responsibilities are handled outside derien by regulated counterparties operating within established supervisory frameworks.

By limiting its scope to execution alone, derien avoids embedding settlement, balance-sheet usage, or regulatory obligations into the pricing layer. This separation preserves execution determinism and allows price discovery to operate without distortion from downstream considerations.

4.2 What derien Does Not Do

The absence of certain functions is as important as the presence of others.

derien:

- does not hold client assets,
- does not maintain customer accounts,
- does not face retail users,
- does not process deposits or withdrawals,
- does not provide credit, leverage, or internalization,
- and does not act as principal or counterparty.

These exclusions are not transitional. They are structural.

They ensure that derien remains an execution venue rather than a financial intermediary, and that regulatory obligations attach where custody, settlement, and client interaction actually occur.

4.3 Execution Without Settlement Friction

Because derien does not intermediate settlement, it does not price settlement risk into execution. Orders are matched according to deterministic rules based solely on price and time priority.

Execution outcomes are therefore independent of:

- custody arrangements,
- banking relationships,
- or participant balance sheet structure.

This decoupling allows derien to operate as a neutral pricing surface. Liquidity providers compete on price quality alone, and takers route flow to where execution is consistently best.

4.4 Institutional-Only Participation

Access to derien is restricted to professional and institutional participants operating through approved settlement and custody providers. derien does not face end users directly and does not provide consumer-facing interfaces.

This design choice serves two purposes.

First, it aligns execution behavior with institutional expectations around determinism, auditability, and risk control.

Second, it ensures that regulatory responsibility for onboarding, disclosure, safeguarding, and suitability resides with licensed entities whose role is explicitly client-facing.

4.5 Separation of Concerns as Market Structure

The separation between execution, settlement, and distribution is not an implementation detail. It is the core market-structure decision that enables pricing to compress without fragility.

By isolating price discovery from balance-sheet usage and regulatory obligations:

- execution can remain neutral,
- incentives can remain aligned,
- and pricing can reflect competition rather than intermediation cost.

derien does not attempt to be a complete FX platform.

It is the execution layer within a system where settlement economics have already been internalized elsewhere.

4.6 Implications for Pricing and Incentives

Within this structure, execution pricing becomes an emergent property rather than a policy choice. Because derien does not rely on transaction fees to fund settlement or custody, it does not require spreads or fees to sustain operation.

Pricing outcomes — including the possibility of zero or negative execution fees — arise from competition among participants whose incentives are aligned with tighter markets, not from discretionary subsidy.

This does not require derien to promise pricing outcomes. It only requires that execution remain neutral and unconstrained by settlement economics.

4.7 Technology Status and Validation

The execution layer described above is operationally instantiated rather than theoretical.

A proprietary matching engine enforcing strict price–time priority has been built and integrated with institutional trading infrastructure. Pre-trade risk gating is enforced upstream through established institutional risk systems, ensuring that only risk-approved flow enters the execution pipeline.

Integration with CQG provides institutional routing, standardized order semantics, and externally validated stress testing. Programmatic access through FIX, REST, and WebSocket interfaces has been implemented and exercised under sustained load, ensuring consistent behavior across access paths.

Post-trade state management is coordinated through an internal ledger serving as the system of record. Digital asset custody and fiat banking integrations were completed and validated under production-equivalent conditions, including reconciliation and exception handling workflows. Execution behavior is decoupled from settlement timing, allowing deterministic price discovery independent of downstream custody or banking latency.

Extended validation under high-volume stress conditions including multi-currency order flow, concurrent routing, and continuous settlement-state resolution materially reduced the risk that the execution system cannot operate at institutional standards. The architectural separation of execution, risk enforcement, and settlement orchestration further reduces fragility by preventing external dependencies from compromising price formation.

The structure described in this paper therefore reflects an implemented and validated system design rather than a purely conceptual market proposal.

4.7.1 Operational Validation Metrics

The execution layer has been validated under sustained institutional-scale load using commodity server infrastructure.

Observed performance characteristics:

- Sustained throughput: **~12 million orders per second**
- Internal matching latency (in-memory): **~12 nanoseconds**
- Currency coverage: **155 currency pairs**
- Resolution model: **simultaneous multi-currency implied-N closure**
- Residual imbalance: **none observed**
- Settlement outcome: **deterministic closed-state resolution**
- Implied pricing: **no synthetic implieds published**
- Arbitrage condition: **positive-closure only**
- Infrastructure: **off-the-shelf servers, no specialized acceleration**

All observed order states resolved into closed multi-currency cycles with deterministic finality and no residual mismatch. Performance was achieved using standard commodity hardware, indicating production-replicable scalability rather than laboratory optimization.

Observed performance metrics reflect internal stress testing under production-equivalent conditions using commodity hardware. Results are representative of architecture-level capability rather than benchmark-optimized laboratory configuration.

4.8 Scale, Throughput, and Settlement Resolution at Global Dimensionality

The economic implications of internal settlement are conceptually straightforward.

The engineering implications are not.

At limited scale, internal settlement can appear to be a ledgering, routing, or workflow problem. This is true only in trivial corridor configurations where currency paths, participant relationships, and notional sizes remain bounded.

At global scale, the problem changes category.

As the number of currencies, corridors, counterparties, and concurrent flows expands, internal settlement becomes a high-dimensional state resolution problem rather than a simple transaction-processing problem.

Under these conditions, conventional approaches begin to fail structurally.

Fixed-path routing assumptions become unstable. Path enumeration grows combinatorially. Predefined notionals cease to clear consistently. Residual imbalances accumulate. Fragmentation is reintroduced upstream through externalization, delay, or forced inventory absorption.

These are not implementation defects. They are the natural consequences of attempting to apply corridor-scale architecture to global monetary flow.

This is the point at which throughput, scale, and settlement resolution become inseparable.

The challenge is no longer merely matching price and volume. It is the continuous and deterministic resolution of a multi-currency state across a large and evolving network of obligations.

This is where derien's architecture becomes decisive.

Derien has been designed not only as a price-discovery layer, but as a settlement-native high-throughput infrastructure layer capable of continuous residual-free resolution across large currency networks.

At the core of this capability is derien's implied N settlement resolution architecture, which allows path depth, effective volume, and final state to emerge endogenously from the matching and settlement process itself rather than being imposed ex ante.

Traditional FX matching operates on currency pairs. Every order belongs to a book containing exactly two currencies. Matching occurs only when an opposite order exists within the same pair. This is $N=2$, and it defines the architecture of modern FX markets.

Triangular arbitrage extends this to $N=3$, but only externally. A trader observes inconsistencies across three books and closes the loop manually. The matching system itself still operates strictly on pairs.

Implied N resolution removes this constraint. Orders are not treated as belonging to isolated books but as components of a shared multi-currency state. The algorithm searches for closures across the full order state, regardless of path length, and resolves all participating currencies simultaneously.

Pair-based matching produces residual obligations that must exit to external rails. Implied N resolution produces a closed state. All currencies net internally. Settlement becomes a consequence of resolution rather than a separate process.

This resolution architecture allows the system to support:

- continuous multi-dimensional internal conversion
- endogenous path discovery
- atomic state resolution
- residual-free settlement transitions
- deterministic finality under high concurrency
- very high throughput under sustained load

This capability is materially different from traditional implied logic restricted to fixed-leg or triangular path assumptions.

The challenge, however, is not merely theoretical design, but operational replication at scale.

While the high-level architecture of internal settlement can be conceptually described, the failure modes that emerge under global dimensionality cannot be inferred from design alone.

At sustained high throughput, previously latent constraints emerge across concurrency control, deterministic ordering, residual mismatch resolution, recovery logic, and state reconciliation.

These are not visible at corridor scale and frequently remain undiscovered until production-equivalent load conditions are reached.

The practical barrier is therefore not architectural awareness, but the cumulative resolution of scale-discovered failure modes.

This materially differentiates *derien* from consultant-led or internal build efforts that begin from a blueprint but have not yet traversed the operational learning curve required for stable global deployment.

The practical consequence is that internal settlement remains stable as dimensionality and volume increase, rather than degrading into residual mismatch, delayed netting, or externalized friction.

Throughput and implied N resolution are therefore not implementation details.

They are the enabling conditions under which internal settlement can function as global financial infrastructure.

Without this scale-native resolution layer, the economic benefits described in this paper cannot persist beyond limited corridor deployments.

With it, price discovery, liquidity concentration, and balance persistence can scale together as a single coordinated system.

In this sense, *derien* is not merely an execution venue.

It is the infrastructure layer that allows money movement to transition from fragmented external settlement into continuous internal state resolution.

That is the condition under which foreign exchange can experience a true VoIP moment for money.

5. Regulated Distribution and Settlement

The compression of FX pricing described in prior sections does not occur within the execution layer alone. It depends on regulated entities that custody assets, manage settlement, and maintain client relationships. These functions are deliberately external to

derien and are performed by licensed counterparties operating within established regulatory frameworks.

This allocation of responsibilities is not an implementation convenience. It is the condition that allows execution to remain neutral while settlement becomes internalized elsewhere in the system.

5.1 Separation Between Execution and Client Relationship

derien does not contract with end users, hold customer balances, or provide access to fiat rails. All client-facing activity occurs through regulated distribution entities that are responsible for onboarding, disclosures, safeguarding, and compliance obligations.

These entities act as principals to their clients and as participants within the execution layer. From the perspective of derien, they are market participants. From the perspective of regulators, they are the accountable financial institutions.

This separation ensures that:

- client protection obligations attach where clients are actually served,
- execution remains agnostic to jurisdictional requirements,
- and regulatory oversight is applied to custody and settlement rather than to price formation.

5.2 Internal Settlement Without Execution Intermediation

Settlement occurs within regulated custody and treasury systems operated by licensed entities. Value transfer is internalized at that level rather than routed across external correspondent chains at each execution event.

Because settlement is managed within a controlled custody context:

- balances can persist across currencies,
- conversions do not require repeated movement across institutions,
- and finality is achieved without execution-layer intervention.

Execution produces price discovery and matched obligations. Settlement resolves those obligations within regulated balance sheets. The two processes are coordinated but not conflated.

5.3 Distribution as a Liquidity Anchor

Regulated distributors aggregate recurring, operational FX demand from businesses and institutions. This demand is predictable, non-speculative, and repetitive.

When routed into a neutral execution layer:

- it anchors liquidity,
- reduces adverse selection,
- and supports tighter pricing.

This effect does not require execution to favor any participant. It emerges from the quality and persistence of flow itself.

Distribution therefore serves a dual role:

- it fulfills regulatory and client-facing requirements,
- and it supplies the execution layer with economically grounded liquidity that improves price discovery.

5.4 Regulatory Obligations Attach Where Economics Accrue

In this architecture, regulatory responsibility aligns with economic substance.

Entities that:

- custody assets,
- manage settlement,
- and maintain client relationships

are the entities that hold licenses, perform compliance, and bear supervisory obligations.

The execution layer:

- does not hold assets,
- does not intermediate credit,
- and does not manage client risk.

As a result, it does not accumulate regulatory obligations unrelated to its function. This allocation mirrors established market structure in other asset classes, where exchanges discover prices and clearing members settle obligations.

5.5 Jurisdictional Neutrality by Design

Because execution is separated from custody and client interaction, the system can operate across jurisdictions without requiring execution-layer licensing in each market.

Regulated distributors operate under the laws and supervisory regimes applicable to their jurisdictions. Execution remains consistent and neutral regardless of where distribution occurs.

This allows regulatory engagement to proceed incrementally and locally, without fragmenting liquidity or compromising execution quality.

5.6 Economic Consequence

By confining execution to price discovery and allocating settlement and distribution to regulated entities, the system achieves two outcomes simultaneously:

- FX pricing can compress structurally without relying on subsidy or opacity.
- Regulatory obligations are satisfied without contaminating the execution layer with balance-sheet or jurisdictional constraints.

This is not regulatory avoidance.
It is regulatory alignment.

Execution, settlement, and distribution each perform a single role, and regulation attaches to the role that carries economic and fiduciary responsibility.

5.7 Initial Deployment Configuration

The architecture described does not require global adoption at inception. Deployment can begin with a limited set of currencies, participants, and settlement providers while preserving the structural properties of internal settlement and neutral execution.

An initial deployment configuration is expected to include:

- A limited currency set sufficient to support multi-currency closure
- One or more regulated custody and settlement providers
- Institutional participants operating through those providers
- Recurring operational FX demand routed via regulated distributors
- Execution restricted to professional counterparties

Under these conditions, implied-N resolution functions across the active currency set, and pricing emerges from simultaneous multi-currency demand rather than pair-based liquidity provision. Additional currencies, distributors, and custody providers can be introduced incrementally without altering execution behavior or requiring structural migration.

Because settlement remains internal to participating custody environments, balances persist across currencies from inception. This allows custody accumulation, pricing compression, and liquidity concentration to emerge at limited scale rather than requiring global network effects.

The system therefore does not depend on universal adoption. It can begin with a constrained institutional deployment and expand by adding currencies, participants, and settlement providers while maintaining deterministic execution and residual-free multi-currency resolution.

6. Issuer-Funded Pricing and the Inversion of FX Venue Economics

Traditional FX venues are funded by trading activity. Fees, spreads, and access costs are levied at the point of execution because it is the only place where value can be extracted reliably. This funding model is not a choice; it is imposed by external settlement and fragmented custody.

When settlement is internalized and custody becomes persistent, this constraint disappears.

6.1 Traders Are Not the Customer

In FX markets, traders do not create demand. They intermediate it.

The underlying demand for FX originates with businesses and institutions that must convert currencies to operate. This demand is non-discretionary, repetitive, and economically motivated. Traders compete to service this demand, but they do not generate it.

Treating traders as the customer misprices the system. It incentivizes venues to tax price discovery rather than to improve it.

In an internally settled architecture, the objective of execution is not to monetize flow, but to minimize the cost of fulfilling unavoidable conversion demand. Price discovery is therefore a service to the system, not a product sold to participants.

6.2 Issuers Fund Distribution, Not Execution

In this architecture, the entities that benefit from distribution are not traders, but issuers whose liabilities are held, settled, and transacted within the system.

When balances persist:

- issuer liabilities remain outstanding,
- yield accrues to the issuer,
- and distribution becomes economically valuable.

Funding execution through issuer economics aligns incentives correctly. Issuers pay to ensure their units are liquid, widely held, and efficiently convertible. This spend is not a subsidy; it is a distribution cost that replaces marketing, incentives, and fragmented liquidity programs.

Execution pricing tightens as a result of this alignment, not because fees are waived, but because execution no longer bears the burden of funding settlement or distribution.

6.3 Why Negative Fees Can Exist Without Fragility

In conventional venues, negative fees imply subsidy. Someone must lose money for someone else to trade.

In an internally settled system, this inference is incorrect.

When economics accrue from balances rather than transactions:

- execution does not need to be self-funding,

- trading does not need to be taxed,
- and price discovery can be rewarded rather than charged.

Negative execution fees do not represent a loss.

They represent the redistribution of issuer-funded economics toward tighter markets.

This redistribution is sustainable precisely because it is anchored in custody, not volume. It scales with balances held, not with the frequency of trading.

6.4 Pricing Improves With Use

Because issuer-funded economics reward price discovery rather than access, the system exhibits a reinforcing dynamic:

- rewarded flow attracts liquidity,
- increased liquidity tightens pricing,
- tighter pricing concentrates flow,
- concentrated flow deepens liquidity.

This is not a growth tactic. It is a mechanical outcome of aligning funding with the economic beneficiaries of the system.

As pricing improves with use, there is no incentive to route elsewhere. Fragmentation collapses not through exclusivity, but through superior execution quality.

6.5 Execution Neutrality Is Preserved

Crucially, issuer-funded pricing does not grant issuers control over execution.

Execution rules remain neutral, deterministic, and participant-agnostic. Issuer economics influence incentives at the system level, not allocation at the order level.

Liquidity providers compete on price. Takers route on quality. Issuers benefit from tighter markets without interfering in execution outcomes.

This preserves the integrity of price discovery while allowing economics to flow from the correct source.

6.6 Structural Implication

By removing traders as the revenue source and relocating economics to custody and issuance, FX venue incentives invert.

Execution ceases to be extractive.
Price discovery ceases to be taxed.
Liquidity ceases to fragment.

The system no longer asks:

“How do we charge for trading?”

It asks:

“How do we minimize the cost of unavoidable conversion?”

That shift is what allows FX pricing to compress structurally without subsidy, distortion, or fragility.

7. Custody as the Dominant Scaling Variable

Financial market infrastructure is commonly evaluated through transactional metrics: volume processed, trades executed, or notional turned over. These metrics are appropriate in systems where revenue is extracted at the point of transaction. They are misleading in systems where economics accrue from balances held.

In an internally settled FX architecture, custody — not volume — is the primary state variable.

7.1 Volume Is Transient; Balances Persist

Transaction volume is episodic. It fluctuates with market conditions, risk appetite, and macro events. Custody, by contrast, is durable. Once balances settle within a system that offers neutral pricing and finality, they tend to remain.

This distinction is critical.

Volume reflects activity.
Custody reflects trust, utility, and economic gravity.

Systems optimized for volume must continuously stimulate activity to sustain economics. Systems optimized for custody benefit from persistence rather than churn.

7.2 Why Free Conversion Causes Money to Stop Moving

In conventional FX systems, holding multiple currencies is punitive. Each conversion incurs explicit or implicit cost, encouraging balances to be consolidated and moved only when necessary.

When conversion friction approaches zero, this incentive reverses.

Holding becomes neutral.

Movement becomes optional rather than forced.

As a result, balances cease to churn across venues and instead accumulate where:

- pricing is consistently best,
- settlement is final,
- and conversion is not penalized.

This behavior is not induced by lock-in or exclusivity. It emerges naturally when leaving provides no economic advantage.

7.3 Custody Compounds Without Proportional Cost

The marginal cost of additional balances in an internally settled system is negligible. Core infrastructure costs are largely fixed. Incremental custody does not require proportional increases in staffing, capital, or operational complexity.

This produces asymmetric scaling:

- early custody supports baseline operation,
- additional custody improves economics,
- and the system becomes increasingly resilient as balances grow.

Once a threshold is reached, sustainability no longer depends on transactional intensity. Survival becomes cheap. Scale becomes optional rather than existential.

7.4 Why Volume Becomes a Secondary Effect

As custody accumulates, transactional volume becomes an outcome rather than a driver.

Balances generate flow when economic activity requires it. That flow is routed through the system because pricing quality is consistently superior, not because activity is incentivized artificially.

In this regime:

- higher volume improves pricing but is not required for survival,
- lower volume does not threaten viability,
- and growth is measured by balance persistence rather than turnover.

This inversion explains why systems built on custody can tolerate flat or volatile volume while systems built on fees cannot.

7.5 Non-Linear Economics at Modest Scale

Once custody reaches sufficient scale, economics become non-linear.

Incremental balances:

- add yield or settlement efficiency,
- deepen liquidity,
- and reinforce price quality,

without imposing commensurate cost.

This non-linearity is not an upside case. It is the baseline behavior of a system whose economics are anchored in balances rather than transactions.

7.6 Market Structure Consequence

When custody is the dominant scaling variable, the objectives of the system change.

The system no longer optimizes for:

- maximizing trades,
- encouraging churn,

- or monetizing volatility.

It optimizes for:

- minimizing forced movement,
- preserving balance persistence,
- and improving price quality over time.

This is why execution can remain neutral, pricing can compress structurally, and economics can remain sustainable without taxing activity.

Custody is not a feature of the system.

It is the emergent outcome of neutral pricing and internal settlement.

8. Why This Structure Cannot Be Copied Incrementally

The architecture described in this paper does not compete with existing FX venues on features, pricing tactics, or execution speed. It competes on where economics reside. That distinction determines whether imitation is economically feasible on an incremental basis.

The limitation facing incumbents is not technological.

It is economic.

8.1 Incumbent FX Economics Depend on Friction

Banks, brokers, and FX venues derive revenue from one or more of the following:

- transaction fees,
- embedded spreads,
- balance-sheet usage,
- float and settlement latency,
- or privileged access to flow.

These revenue sources are not incidental. They fund core operations, regulatory capital requirements, and risk management. Removing friction removes revenue.

As a result, incumbents cannot reduce FX costs beyond a certain point without undermining their own economic viability.

8.2 Incremental Improvements Do Not Change the Structure

Incumbents frequently introduce improvements:

- tighter quoted spreads,
- faster execution,
- internal netting,
- or selective rebates.

These measures optimize within the existing structure. They do not alter it.

Settlement remains external.

Custody remains fragmented.

Pricing must still recover friction.

As long as these conditions hold, FX costs can be redistributed but not eliminated. Incremental improvements slow extraction; they do not remove it.

8.3 Why Removing Fees Breaks Incumbent Models

In a fee-funded venue, execution is the revenue source. Removing fees requires replacing that revenue elsewhere.

For incumbents, there is nowhere else for it to go.

- Custody is already priced.
- Balance-sheet usage is already monetized.
- Settlement float is already allocated.

Attempting to fund execution from balances would require incumbents to relinquish existing revenue streams tied to those balances. This is not a marginal adjustment; it is a structural rewrite of the business.

As a result, free or negative execution pricing is incompatible with incumbent economics. It cannot be adopted experimentally without destabilizing the system.

8.4 Internal Settlement Is Economically Incompatible With Intermediation

Internalizing settlement requires treating balances as a shared state rather than as bilateral obligations. This approach reduces balance-sheet usage, compresses spreads, and eliminates many sources of intermediation revenue.

For incumbents, internal settlement would:

- reduce demand for correspondent banking,
- reduce float-based revenue,
- and reduce the value of proprietary distribution.

These are not inefficiencies to be optimized away. They are profit centers.

8.5 Neutral Execution Undermines Access-Based Advantage

Many FX venues derive advantage from privileged access:

- proprietary liquidity pools,
- client internalization,
- or opaque routing.

Neutral execution eliminates these advantages. Liquidity competes solely on price quality. Access confers no preferential outcome.

For incumbents whose differentiation depends on access, neutrality is not an upgrade. It is a threat.

8.6 The Structural Barrier

The core barrier to replication is therefore not intellectual property, speed, or capital.

It is economic incompatibility with incremental migration.

To copy this structure, an incumbent would need to:

- abandon transaction-based revenue,
- internalize settlement without monetizing friction,
- and accept that custody, not flow, is the primary economic driver.

Doing so would require dismantling existing business models before a replacement had reached scale.

This is a difficult migration path for incumbents operating under existing revenue models.

In addition to structural incompatibility with incumbent economics, replication requires multi-layer integration across institutional trading infrastructure, pre-trade risk systems, custody providers, and banking rails. These integrations are non-trivial and require extended validation under production-equivalent conditions. The execution and integration stack described herein reflects coordinated technical development, institutional certification, and sustained stress validation. Reproducing this state is not a matter of fee adjustment or incremental venue redesign; it requires rebuilding the architecture from first principles while achieving institutional interoperability and operational stability.

8.7 Structural Implication

The system described here does not win by being better at the incumbent game. It wins by changing the game.

Incumbents face difficulty following incrementally because each step toward neutrality reduces existing revenue before replacement economics reach scale.

This asymmetry is why the structure can coexist with incumbents initially, and why competition does not force convergence.

Neutral pricing is not defensible through regulation or exclusivity. It is defensible because it is incompatible with extractive models.

9. Boundary Conditions and Failure Modes

The structure described in this paper is not universally applicable. Its sustainability depends on specific economic and operational conditions. Stating those conditions explicitly is necessary to distinguish structural inevitability from overgeneralization.

This section defines the boundaries within which the system functions as described, and the circumstances under which it would fail.

9.1 Internal Settlement Is a Hard Requirement

The model depends on settlement occurring within a shared custody and accounting context. If settlement is externalized — whether through correspondent chains, bilateral credit exposure, or delayed finality — pricing economics are forced back into execution.

Under such conditions:

- spreads reappear,
- fees become necessary,
- and neutral pricing cannot be sustained.

Internal settlement is therefore not an optimization. It is a prerequisite.

9.2 Custody Must Be Persistent, Not Transient

The system assumes that balances remain within the settlement environment across time rather than being continuously withdrawn after execution.

If participants systematically externalize balances:

- custody economics collapse,
- issuer-funded distribution loses its foundation,
- and execution must again fund itself through trading activity.

The system does not coerce balance persistence. It relies on neutral pricing and finality to make persistence the rational choice. If those conditions fail, custody will not accumulate.

9.3 Issuer Economics Must Exist and Be Durable

Issuer-funded pricing assumes that liabilities held within the system generate economic value for issuers over time. If issuer economics are:

- insufficient,
- unstable,
- or withdrawn,

then funding for execution incentives disappears.

In that scenario, execution pricing must revert toward neutrality or positive fees. The system remains operable, but pricing compression halts.

This is not a catastrophic failure. It is a reversion toward conventional equilibrium.

Asset-level failures or instability affect individual settlement instruments but do not alter the underlying market structure described here.

9.4 Execution Neutrality Cannot Be Compromised

The integrity of the system depends on execution remaining neutral, deterministic, and participant-agnostic.

If execution outcomes are influenced by:

- issuer preferences,
- bilateral relationships,
- or discretionary routing,

price discovery degrades, trust erodes, and liquidity fragments.

Execution neutrality is not a feature that can be partially relaxed. It must hold universally or not at all.

9.5 Regulatory Misallocation Creates Fragility

The architecture assumes that regulatory obligations attach to custody, settlement, and client relationships — not to execution.

If regulatory requirements are misapplied to the execution layer, forcing it to:

- intermediate settlement,
- manage client balances,
- or assume fiduciary responsibility,

The separation of concerns collapses and execution inherits constraints it was designed to avoid.

This does not invalidate the model. It reintroduces the same structural limitations the model is intended to remove.

9.6 Liquidity Without Economic Demand Is Insufficient

The system relies on economically motivated FX demand rather than speculative volume.

If liquidity is driven primarily by:

- transient incentives,
- opportunistic arbitrage,
- or non-economic flow,

pricing quality may appear strong temporarily but will not persist.

Predictable, operational FX demand is the anchor. Without it, the system behaves like any other trading venue.

9.7 No Middle Equilibrium

There is no stable intermediate state between external settlement with extractive pricing and internal settlement with neutral execution.

Attempts to combine:

- partial internalization,
- selective fee waivers,
- or discretionary incentives

result in fragility rather than sustainability.

The system either internalizes settlement fully and allows pricing to compress structurally, or it does not.

9.8 Structural Implication

The model does not claim universal applicability or guaranteed outcomes. It claims conditional inevitability.

If:

- settlement is internal,
- custody is persistent,
- issuer economics fund distribution,
- execution remains neutral,
- and regulatory obligations attach correctly,

then FX pricing will compress structurally.

If these conditions do not hold, it will not.

There is no softer version of the result.

10. The Forced Binary

Foreign exchange pricing does not converge toward zero through incremental competition, better interfaces, or marginal efficiency gains. It converges only when the economics that fund the system move below the point of execution.

As long as settlement is external, FX pricing must recover friction.

As long as pricing must recover friction, FX costs persist.

There is no intermediate equilibrium in which settlement remains fragmented and pricing nonetheless compresses sustainably. Attempts to achieve that outcome produce temporary subsidies, opaque cross-charges, or hidden forms of extraction that ultimately reassert themselves.

When settlement is internal and custody is persistent, the constraints reverse. Execution no longer funds settlement. Trading no longer funds infrastructure. Pricing becomes a competitive outcome rather than a revenue mechanism.

In this regime:

- price discovery is rewarded rather than taxed,
- liquidity concentrates where execution quality is highest,
- and balances accumulate where conversion is not punitive.

This does not require promotional pricing or regulatory exception. It follows mechanically from the relocation of economics within the system.

The architecture described in this paper does not claim to eliminate FX costs by decree. It identifies the only structure under which those costs can collapse without fragility.

Either FX remains structurally expensive, or it compresses this way.

There is no third outcome.
