STABLECOINS VERSUS SWIFT:

TRANSACTION COSTS, SPEED AND ADOPTION

IN INTERNATIONAL TRADE

A Predictive Benchmarking Framework

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ABSTRACT

Cross-border commercial payments remain among the most costly and opaque segments of international finance, imposing disproportionate burdens on small and medium-sized enterprises (SMEs) in emerging markets. The legacy SWIFT correspondent banking model entails multi-layered fees, foreign exchange (FX) spreads, and multiple-day settlement timelines, with all-in costs for emerging market SME transfers estimated at 2% - 4% of transaction value (IMF, 2023). This paper presents a research design and predictive framework for evaluating whether stablecoin payment rails could provide a viable alternative to SWIFT for SME cross-border trade payments in emerging markets.

Concurrently, US dollar-pegged stablecoins offer near-instant settlement and fractional transaction fees. Two hypotheses are advanced: first, that stablecoins offer materially lower all-in costs and faster settlement than SWIFT (H1); and second, that adoption is constrained primarily by regulatory uncertainty, institutional non-acceptance, and local currency liquidity barriers rather than technological limitations (H2). The paper employs a mixed-methods approach combining cost and speed benchmarking across five payment channels and three trade corridors (Turkey - Germany, Nigeria - United Kingdom, Argentina - Spain) and a Bass diffusion model to simulate adoption trajectories under alternative regulatory scenarios.

Keywords: stablecoins; SWIFT; correspondent banking; cross-border payments; SME trade finance; emerging markets; regulatory uncertainty; payment infrastructure; Bass diffusion model

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1. INTRODUCTION

1.1 Background and Problem Statement

The Society for Worldwide Interbank Financial Telecommunication (SWIFT), established in 1973, connects over 11,000 financial institutions globally, providing the messaging infrastructure through which the majority of international interbank transfers are coordinated (SWIFT, 2023). However, its underlying correspondent banking model - in which payment instructions traverse a chain of intermediary financial institutions, each maintaining bilateral nostro and vostro accounts - has remained architecturally unchanged for over five decades. The Bank for International Settlements Committee on Payments and Market Infrastructures (BIS CPMI, 2020) identified cross-border payments as structurally inefficient due to high costs, low speed, and limited transparency.

For small and medium-sized enterprises (SMEs) in emerging markets, these friction points act as severe non-tariff trade barriers. Compounding these inefficiencies is correspondent bank de-risking - the systemic withdrawal of banking relationships from peripheral corridors to minimize anti-money laundering and countering the financing of terrorism (AML/CFT) compliance costs (BIS, 2022).

Against this backdrop, blockchain-based payment infrastructure - specifically US dollar-pegged stablecoins - has emerged as a technologically mature and scalable alternative to correspondent banking for cross-border value transfer. Stablecoins, defined as digital tokens whose value is anchored to a reference asset such as the US dollar, have achieved significant global circulating supply and demonstrable use in cross-border value transfers in dollarized economies across Latin America, Sub-Saharan Africa, and Southeast Asia (Chainalysis, 2023). Settlement on efficient blockchain networks occurs in seconds, while all-in transaction costs remain a fraction of a percent.

Despite this, stablecoin integration into formal commercial trade finance remains marginal. The coexistence of a costly incumbent infrastructure and a technically capable, lower-cost alternative raise a fundamental empirical question: if the economic case for adoption is compelling, what accounts for the persistence of the adoption gap? This paper investigates that question, examining both the cost and speed performance of stablecoin rails relative to SWIFT and the institutional factors that constrain their uptake among SMEs in emerging markets.

1.2 Research Questions and Scope

This paper addresses three core questions:

1. RQ1: How do projected all-in transaction costs compare between stablecoin and SWIFT across the Turkey - Germany, Nigeria - United Kingdom, and Argentina - Spain trade corridors?
2. RQ2: How do end-to-end settlement speeds compare across these payment channels?
3. RQ3: What primary institutional or technical barriers are hypothesized to constrain formal B2B stablecoin adoption among SMEs in target jurisdictions?

The scope is strictly limited to commercial B2B cross-border trade transfers below €50 million turnover (EU SME standard). The analysis focuses on fully reserved, fiat-collateralized US dollar stablecoins - specifically USD Coin (USDC) - operating on the Ethereum, Solana, and Stellar networks. Algorithmic tokens and Central Bank Digital Currencies (CBDCs) are excluded.

2. LITERATURE REVIEW

2.1 Correspondent Banking Costs and the De-Risking Process

Cross-border bank transfers route through chains of intermediaries, each capturing operational fees, introducing settlement latency, and adding compliance friction (Duffie, 2019). World Bank metrics confirm global sub-$1,000 transfer costs average 6%–7%, while commercial SME transfers in emerging corridors consistently incur 2%–4% all-in costs (IMF, 2023). De-risking has transformed peripheral corridors into high-margin, near-monopolistic structures (BIS, 2022), creating acute trade finance rationing. Ultimately, this literature establishes that legacy banking friction and de-risking create the structural cost and access bottleneck that alternative payment rails like stablecoins must directly alleviate to satisfy H1.

2.2 Stablecoins as Payment Infrastructure

Monetary literature increasingly distinguishes stablecoins from speculative crypto-assets, defining fiat-backed tokens as private payment rails reliant on asset backing quality (Gorton & Zhang, 2021). High-performance public blockchains decouple payment utility from sovereign geography (Brunnermeier et al., 2019). By settling transactions with sub-second finality at fractional costs, alternative consensus mechanisms present a fundamental challenge to legacy clearinghouses. This body of work validates stablecoins as a technologically capable alternative for rapid, low-cost value transfer, laying the empirical foundations for testing their performance advantages against legacy networks.

2.3 SME Access to Trade Finance in Emerging Markets

Financing and settlement frictions disproportionately impact SMEs due to institutional scale asymmetries (Beck and Demirgüç-Kunt, 2006). The ADB (2023) trade finance gap survey highlights a persistent $2.5 trillion unmet demand, heavily concentrated in developing Asia and Sub-Saharan Africa. The International Finance Corporation (IFC, 2022) confirms that standard commercial banking setups prioritize large-volume multinational clients over low-margin, high-frequency SME payment paths. These empirical findings demonstrate that SME trade finance constraints stem from institutional exclusion, highlighting why emerging market businesses are driven to seek alternative settlement mechanisms.

2.4 Regulatory Fragmentation and Adoption Barriers

Superior technical or transaction efficiency does not guarantee market adoption if institutional alignment is lacking. Fatás & Weder di Mauro (2023) evaluate this dynamic through the framework of regulatory fragmentation within digital asset ecosystems.

While the European Union's Markets in Crypto-Assets (MiCA) regulation established definitive compliance requirements regarding reserves audits and AML governance, other major economic jurisdictions have taken different paths. Notably, the United States enacted the GENIUS Act on July 18, 2025, creating its first federal statutory framework for payment stablecoins. While this resolved historical federal ambiguity in the US market, it has also formalized structural differences between Western regulatory standards (e.g., EU MiCA and US federal frameworks) and developing market regimes.

Emerging market jurisdictions such as Nigeria, India, and China continue to enforce strict banking prohibitions or digital asset capital controls. Consequently, global regulatory fragmentation persists - shifting from legal ambiguity to multi-polar compliance regimes - which elevates cross-border counterparty risk and depresses formal B2B adoption regardless of microeconomic cost advantages (Fatás & Weder di Mauro, 2023). This literature confirms that institutional alignment and legal clarity – rather than technical performance alone – serve as primary binding constraints for formal B2B adoption, directly motivating H2.

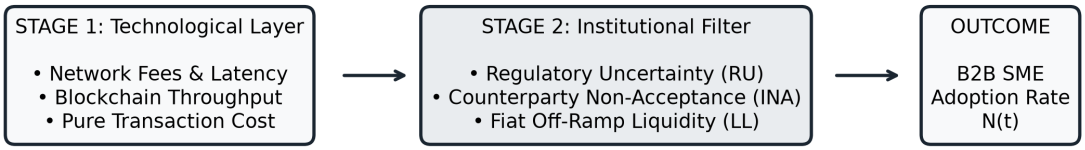
3. CONCEPTUAL FRAMEWORK AND HYPOTHESES

3.1 Conceptual Framework

The theoretical framework of this study models the international transaction mechanism as a two-stage process. The first stage isolates pure technological and transaction-cost variables, comparing the efficiency of legacy banking loops against decentralized ledgers. The second stage introduces an

institutional filter, analyzing why technically optimized frameworks fail to reach market equilibrium when subjected to regulatory, compliance, and liquidity boundaries. The framework posits that while the technical parameters of cost and speed satisfy the baseline conditions for stablecoins to serve as a viable alternative, the institutional layer functions as a binding macro-constraint that blocks formal market integration.

Figure 1: Two-Stage Conceptual Framework for Cross-Border Stablecoin Adoption



3.2 Hypotheses

- **Hypothesis 1 (H1):** *For emerging market SMEs, stablecoin rails are projected to offer significantly lower all-in transaction costs and accelerated settlement speeds compared to SWIFT correspondent banking.*
- **Hypothesis 2 (H2):** *Formal stablecoin adoption is hypothesized to be constrained primarily by regulatory uncertainty, corporate non-acceptance, and localized currency liquidity limitations, rather than technical performance.*

4. DATA AND METHODOLOGY

4.1 Variable Operationalization

- **All-in Cost Ratio *(ACR)*:** The total cost percentage of executing a transfer:

$$\text{ACR} = \frac{\text{Network Fee} + \text{On-Ramp Fee} + \text{Off-Ramp Fee} + \text{FX Conversion Spread}}{V} \times 100$$

where V = \$50,000 USD reference transaction volume. The \$50,000 reference value is selected as a representative invoice-level B2B transaction amount for SME trade finance in the target corridors, rather than an overall average across all SME payment types.

- **Regulatory Uncertainty Index *(RU)*:** Categorical metric: 0 = Clear legal framework (e.g. MiCA); 1 = Jurisdictional ambiguity; 2 = Formal banking prohibitions or digital asset restrictions.
- **Institutional Non-Acceptance Score *(INA)*:** 5-point Likert scale evaluating corporate counterparty and banking willingness to accept stablecoin.
- **Liquidity Limitation *(LL)*:** Percentage bid-ask slippage and fixed broker commissions incurred during local-fiat-to-USDC conversions at V = \$50,000.

4.2 Cost and Speed Benchmarking Protocol

The quantitative baseline benchmarks a standardized V = \$50,000 B2B trade across five channels: SWIFT, Wise Business, USDC-Ethereum (Layer-1), USDC-Stellar, and USDC-Solana. Bank data is compiled from corporate fee schedules and the World Bank database. Blockchain metrics are collected over a 30-day window via network explorers. For each corridor, the analysis will document the specific bank, payment-provider, exchange, or over-the-counter (OTC) quotation used to estimate transfer fees, FX spreads, on-ramp charges, and off-ramp charges, with all observations collected over the same 30-day period.

To evaluate institutional adoption constraints, the study designs a targeted survey instrument sampling 60 to 80 trade-active SMEs across the three target trade corridors (Turkey-Germany, Nigeria – UK, Argentina – Spain). Respondents are identified through regional SME trade association registries and commercial import/export databases. The structural survey measures four key dimensions: current cross-border payment friction points, self-reported Regulatory Uncertainty (*RU*), Institutional Non-Acceptance (*INA*), and willingness to adopt stablecoin settlement under alternative regulatory scenarios using 5-point Likert scales and categorical indicators.

4.3 Bass Diffusion Model Specification and Scenario Calibration

The adoption trajectory is modeled using the Bass (1969) diffusion framework, which decomposes cumulative adoption into an innovation effect – adoption driven by external factors such as regulatory signals, media coverage, and institutional endorsement, independent of prior adopters – and an imitation effect, where adoption is driven by word-of-mouth and observed peer usage among firms that have already adopted stablecoin payment rails.

$$f(t) = \frac{(p+q)^2}{p} \times \frac{e^{-(p+q)t}}{\left[1 + \frac{q}{p} e^{-(p+q)t}\right]^2}$$

where f(t) denotes the instantaneous fraction of the remaining market potential adopting stablecoin payment rails at time t, p is the coefficient of innovation, and q is the coefficient of imitation.

$$F(t) = \frac{1 - e^{-(p+q)t}}{1 + \frac{q}{p} e^{-(p+q)t}}$$

F(t) is the cumulative fraction of adopters at time t. The cumulative number of adopting SMEs is then $N(t) = m \times F(t)$, where m is the market potential – operationalized as the estimated population of trade-active SMEs across the Turkey, Nigeria, and Argentina corridors eligible for formal B2B stablecoin settlement, approximated from national SME registries and the ADB (2023) and IFC (2022) trade-finance-gap estimates for the three countries.

Parameters p and q are calibrated by analogy to comparable emerging-market fintech diffusion processes, principally mobile money and digital wallet adoption, for which empirical estimates typically cluster around p = 0.01–0.03 and q = 0.35–0.55 (Mahajan, Muller & Bass, 1990; Wright, 1999). The three regulatory scenarios examined in Section 5.3 are then operationalized as shifts in p and q rather than in m, since regulatory clarity is expected to affect the speed and social reinforcement of adoption rather than the size of the underlying addressable SME population:

- **Permissive scenario ($p \approx 0.025$, $q \approx 0.50$):** A MiCA/GENIUS Act-equivalent framework adopted globally by 2027 raises both coefficients: formal legal certainty triggers earlier adoption independent of peer behavior (p), while successful early adopters become visible, credible reference cases for peers (q).
- **Status quo scenario ($p \approx 0.012$, $q \approx 0.30$):** Persistent regulatory fragmentation keeps the innovation coefficient low and imitation effects muted, consistent with adoption remaining concentrated in informal peer-to-peer usage rather than in observable formal B2B transactions.
- **Restrictive scenario ($p \approx 0.005$, $q \approx 0.15$):** Additional prohibitions extending the pattern already observed in several emerging jurisdictions suppress both coefficients, as formal adoption becomes legally risky to disclose or reference publicly, weakening the imitation channel in particular.

These parameter values are treated as calibration priors, remaining within empirically observed ranges for emerging-market fintech diffusion, and can be updated as adoption data on stablecoin payment rails accumulates over time, consistent with standard practice of combining Bass-model priors with early-stage adoption evidence where historical diffusion data for the specific technology are not yet observable (Mahajan, Muller & Bass, 1990; Wright, 1999).

5. PROJECTED OUTCOMES AND DISCUSSION

5.1 Projected Cost and Speed Benchmarking

Under the proposed empirical design, testing H1 is expected to demonstrate that stablecoin rails operating on high-throughput networks (Stellar, Solana) reduce all-in transaction costs (*ACR)* significantly relative to SWIFT for a $50,000 transfer. The model is expected to show substantial cost reductions for stablecoin rails where compliant on-ramp and off-ramp liquidity is available at competitive spreads. Settlement timelines are projected to compress from 48-120 hours down to under ten seconds. Ethereum L1 transfers are expected to outperform SWIFT in terms of settlement speed (3-5 minutes) but are modeled to exhibit variable fee spikes during congestion periods.

Across the three corridors, cost savings are anticipated to be most pronounced in the Nigeria - United Kingdom corridor due to acute correspondent banking fees and de-risking-driven markups. Foreign exchange conversion spreads (*LL*) during local fiat-to-USDC conversion are expected to emerge as the primary residual cost component across all rails. If supported by the benchmarking data, these outcomes would support H1 and suggest that local on-ramp liquidity depth may be a more important constraint on cost efficiency than blockchain throughput.

5.2 Anticipated Adoption Barriers: Survey Hypotheses

In evaluating H2, the SME survey framework is designed to test whether institutional and regulatory barriers outweigh technical performance hurdles. Survey metrics are expected to show that Regulatory Uncertainty ($RU = 2$) and Institutional Non-Acceptance (*INA*) rank consistently above technical complexity or unfamiliarity.

Respondents in high-restriction markets are expected to report high informal peer-to-peer usage alongside minimal formal B2B invoice integration. The binary logistic regression is designed to test whether firm size is associated with adoption willingness and whether trade intensity and legal clarity are positively associated with adoption willingness. If supported by survey and regression data, these results would support H2 by suggesting that macro-institutional constraints are likely to play a larger role in the cross-border adoption gap than technical limitations.

5.3 Adoption Scenario Projections

The Bass diffusion model is calibrated to project three distinct 10-year adoption trajectories.

- **Permissive Scenario:** Widespread global regulatory alignment (e.g., MiCA and GENIUS Act equivalents adopted across major corridors by 2027) is projected to drive cumulative SME adoption along a rapid S-curve toward market saturation within 5 to 7 years.

- **Status Quo Scenario:** Persistent fragmentation is projected to limit growth to informal trade settlement paths.
- **Restrictive Scenario:** Expanding banking prohibitions are projected to result in an adoption plateau at minimal baseline levels.

The mathematical divergence between the permissive and status quo curves is intended to directly quantify the economic drag of regulatory fragmentation as a non-tariff barrier (Fatás & Weder di Mauro, 2023).

This research framework acknowledges three methodological boundary conditions: (1) operationalizing transaction volumes around a standardized V = \$50,000 invoice reference size, which may not capture micro-remittance dynamics; (2) focusing exclusively on three representative trade corridors; and (3) relying on mobile money and digital wallet diffusion analogies to calibrate Bass parameters prior to observational stablecoin B2B transaction data accumulation.

6. CONCLUSION

This paper presents a formal research design and predictive framework evaluating the economic and institutional dynamics of stablecoins versus SWIFT in SME trade finance. If empirically validated, the proposed methodology would establish that while stablecoins offer superior cost and speed profiles (supporting H1), commercial enterprise adoption remains bottlenecked by regulatory fragmentation, banking non-acceptance, and fiat off-ramp illiquidity (supporting H2).

If the proposed hypotheses are supported by empirical evidence, the findings would suggest that regulatory harmonization, rather than further technical iteration, could be a critical lever for improving cross-border trade efficiency for emerging-markets SMEs.

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