

Article

Gold Price Transmission and Tail Risk in a Frontier Commodity Market: Evidence from Vietnam

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Abstract

Vietnam's domestic gold price has persistently exceeded the world price by a wide margin, even as recent reforms have begun to relax the state's historical monopoly over gold-bar production and imports. This paper asks why the gap persists, and whether it is confined to normal market conditions or extends into periods of extreme price movement. Using daily data spanning 2 January 2019 to 31 July 2026 (1856 trading days), covering the reform introduced by Decree No. 232/2025/ND-CP we decompose the domestic premium into a currency component and a pure physical-gold component, and use a copula-based framework to separately assess average price linkage and tail (extreme-event) co-movement between the domestic and world markets. Domestic gold bars traded at an average premium of 16.0% over import-parity world prices, of which 13.8 percentage points reflect the physical-gold component driven by constrained arbitrage, while currency factors account for only about 2 percentage points. The average linkage between the two markets is weak, indicating persistent segmentation, and this segmentation extends into the tails of the distribution for most of the sample. The premium itself carries substantial latent risk: a reversion to price parity would imply a one-off loss of about 9.6% of value, roughly eight to ten times the historical one-day 5% Value-at-Risk. Following the reform's effective date, however, we find early evidence of emerging co-movement specifically in extreme upside price movements, even though the physical premium itself has not yet narrowed—consistent with a reform that has been enacted in law but remains at an early stage of operational implementation. The results indicate that administrative restrictions on the physical gold supply chain, rather than currency controls, are the principal source of Vietnam's persistent gold-price gap, with direct implications for how the ongoing liberalization process should be sequenced.

Keywords: gold market; price transmission; tail risk; copula; CoVaR; GJR-GARCH; market segmentation; gold premium; frontier market; Vietnam



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1. Introduction

The law of one price holds that, in competitive markets without transaction costs, trade barriers, or information asymmetries, an identical commodity should trade at the same price across markets once prices are expressed in a common currency (Mankiw 2011). Because gold is readily standardized, highly liquid, and traded globally, it is often regarded as a natural setting in which to test this principle. The Vietnamese market, however, presents a striking paradox: for many years, domestic gold prices—particularly those of

SJC gold bars—have remained substantially above world gold prices after conversion at the prevailing exchange rate.

This price gap has not been confined to short episodes driven by supply-demand fluctuations or market sentiment; rather, it has persisted for years. According to the data used in this study, between 2019 and 2026, domestic gold prices exceeded converted world prices by an average of approximately 16.0%, with the premium surpassing 40% at certain points. Such a large and persistent gap cannot be explained solely by slow arbitrage adjustment. It also indicates that the channel for physical arbitrage has been constrained or rendered largely ineffective. Vietnam therefore offers a distinctive research setting: when a commodity market is segmented from the global market not by geography but by institutional and administrative barriers, how is global price risk transmitted to the domestic market?

The central argument of this paper is that the segmentation of Vietnam's gold market stems primarily from bottlenecks in physical arbitrage rather than from investors' complete inability to access international price signals. The licensing regime for gold imports and the state monopoly over gold-bar production have restricted the movement of physical gold from international markets into the domestic market for the purpose of exploiting price differentials. Consequently, SJC gold-bar prices tend to reflect domestic supply-demand conditions and the degree of physical scarcity created by the supply-management regime more strongly than they otherwise would.

This does not mean, however, that the domestic market is informationally isolated. Vietnamese investors continue to monitor international gold prices through news, exchange-rate movements, converted world prices, and informal cross-border channels not recognized under Vietnamese law as legitimate investment routes; these can shape sentiment and expectations but cannot increase the domestic supply of gold bars or directly narrow the SJC–world price gap. The segmentation examined in this paper is thus a segmentation of physical gold flows—particularly the importation and circulation of gold bars—rather than of information or investor expectations.

The coexistence of physical segmentation and informational-financial connectivity gives rise to the central research question. Gold is a classic safe-haven asset (Baur and Lucey 2010; Baur and McDermott 2010; Reboredo 2013); global shocks, especially during periods of heightened uncertainty, may therefore continue to influence the sentiment and behavior of domestic investors. Yet when the physical gold market is strongly segmented, average price transmission may be weak or may not be clearly captured by conventional linear models. More importantly, dependence may emerge only in the tails of the distribution—that is, during episodes of extreme volatility. Accordingly, this paper examines not only average price transmission between the world and domestic gold markets, but also tail dependence and the potential transmission of extreme risk.

Vietnam's institutional setting makes this case particularly valuable from an empirical perspective. Decree No. 24/2012/ND-CP (Government of Vietnam 2012) established a tightly controlled framework for the gold-bar market, under which the state controlled the production of SJC gold bars and restricted gold imports. In practice, this regime weakened the physical arbitrage channel and allowed the domestic-world price differential to persist. In 2025, Decree No. 232/2025/ND-CP removed the legal monopoly over SJC gold-bar production. By the end of the sample period, however, the licensing of gold imports and gold-bar production for new market participants had not yet been fully implemented. The 2025 reform thus created an unusual setting: the legal framework changed, but the physical arbitrage channel had not yet been effectively reopened. The gap between policy announcement and policy implementation therefore constitutes an important identification feature of the research design.

This paper lies at the intersection of four strands of literature. The first concerns the law of one price, limits to arbitrage, and commodity-market segmentation. Studies of gold-market premiums and discounts in China and India have documented persistent gaps between domestic and international gold prices, but they have generally focused on describing the size of those gaps rather than modeling the risks they generate. The second strand examines price transmission and asymmetric adjustment, often illustrated by the “rockets and feathers” metaphor, whereby prices rise rapidly when input costs increase but decline more slowly when input costs fall (Bacon 1991). Most of this literature, however, focuses on conditional mean effects rather than tail dependence. The third strand concerns systemic risk, tail dependence, and risk spillovers measured through copulas, CoVaR, and Δ CoVaR (Adrian and Brunnermeier 2016). These tools are widely used in finance, but they have rarely been applied to the separation between the domestic and global markets for the same commodity in a frontier-market setting. The fourth strand treats regulation as a force that shapes market prices and risks. In Vietnam, rigorous academic research on the gold market remains relatively limited, particularly research that considers an announced but incompletely implemented reform as a potential source of risk.

Comparison with China and India helps clarify the mechanism specific to Vietnam. Both countries are major gold markets, but the sources of their domestic-international price differentials differ. India has relied primarily on import duties, so domestic gold prices retain a relatively transparent link to world prices through a pricing structure that adds taxes and related costs to the international benchmark. By contrast, in markets constrained by import quotas or licensing arrangements, this relationship can weaken substantially. In this sense, Vietnam may be viewed as a limiting case of a binding quota regime: domestic prices reflect not only movements in world gold prices but also the degree of physical scarcity created by the supply-management system.

This paper makes three contributions to the literature. First, it provides evidence on tail risk in a frontier commodity market in which the same asset—gold—is priced differently in domestic and international markets. Using copula models and bidirectional Δ CoVaR, the study evaluates whether extreme shocks in the world gold market are transmitted to Vietnam’s physical gold market. Second, the paper repositions regulation and non-price allocation mechanisms as sources of risk in commodity markets and examines the 2025 reform through a comparison between tariff-based and quota-based regimes. Third, the study proposes a premium-at-risk stress test to quantify potential losses if the domestic gold premium were to revert toward parity with the world price. This represents a form of discontinuous adjustment risk that conventional VaR or GARCH models based on daily volatility may fail to capture fully.

The study tests four main hypotheses. First, average transmission from world gold prices to domestic gold prices is weak, and the price gap does not close rapidly, reflecting persistent barriers to arbitrage. Second, despite weak average transmission, extreme movements in world gold prices may still spill over to the domestic market through tail dependence. Third, any risk spillovers may be asymmetric across the world-to-Vietnam and Vietnam-to-world directions, as well as between the lower and upper tails. Fourth, if the 2025 reform remained largely an announcement and had not yet been fully implemented, the market’s tail-risk dynamics may not have changed materially.

The empirical findings reveal a more complex picture than initially expected. The evidence supports the hypothesis of segmentation at the mean: the relationship between world and domestic gold prices is relatively weak, consistent with a market in which arbitrage is constrained. However, the expected tail dependence is not clearly supported over the full sample. This suggests that Vietnam’s gold market may be segmented not only under normal conditions but also during extreme states. Results suggesting reverse-

direction risk spillovers should likewise be interpreted cautiously, as they may reflect heavy-tailed distributions and heterogeneous volatility rather than evidence that Vietnam leads world gold prices. Notably, tail dependence appears to have increased following the 2025 reform; however, because the post-reform period is short, this result should be treated only as preliminary exploratory evidence. Finally, the premium-at-risk stress test indicates that the greatest risk in Vietnam's gold market lies not in day-to-day price volatility but in the possibility of a discrete and abrupt adjustment in the domestic premium.

The remainder of the paper is organized as follows. Section 2 presents the institutional background of Vietnam's gold market. Section 3 describes the data and variables. Section 4 introduces the empirical methodology, including the GJR-GARCH model with skewed Student-t innovations, copula selection, bidirectional ΔCoVaR estimation, and the premium-at-risk stress test. Section 5 reports the empirical results. Section 6 discusses the findings in relation to international experience, particularly that of China and India. Section 7 concludes and presents the main policy implications.

2. Institutional Background

Gold occupies a distinctive place in Vietnam's economic life. At the household level, it is not only a widely held store of value but also a hedge against inflation and, during certain historical periods, a quasi-monetary unit of account in high-value transactions, particularly real estate. This dual character—as both a commodity and a financial asset—has made the gold market a recurring target of state intervention.

The history of gold-market management in Vietnam reveals a consistent pattern: administrative measures designed to stabilize the market remain strongly constrained by supply-and-demand conditions and the broader macroeconomic environment. In other words, gold-price volatility and episodes of market instability are not merely sources of macroeconomic disruption; in many cases, they are also symptoms of pre-existing macroeconomic imbalances (Huỳnh and Nguyễn 2024). Understanding the market segmentation and tail-risk behavior examined in this study therefore requires placing SJC gold bars within the specific institutional setting that created and sustained their distinctive market position.

2.1. From Liberalization to Decree 24: The Formation of a Segmented Market

Vietnam's gold policy has repeatedly shifted between liberalization and control. Decree No. 174/1999/ND-CP (Government of Vietnam 1999) opened the way for financial institutions to act as intermediaries in gold transactions. Liberalization was extended further in the mid-2000s, when the State Bank of Vietnam permitted gold trading through overseas accounts under Decision No. 03/2006/QĐ-NHNN (State Bank of Vietnam 2006).

The period of macroeconomic instability from 2008 to 2011, however, reversed this trend. Against a backdrop of high inflation, large trade deficits, mounting exchange-rate pressure, and both domestic and external imbalances, the authorities progressively closed financial channels for gold trading. Domestic gold exchanges and overseas gold accounts were terminated under Notice No. 369/TB-VPCP of 2009 and Circular No. 10/2010/TT-NHNN. Gold mobilization and lending by credit institutions were subsequently discontinued under Circular No. 11/2011/TT-NHNN, effectively removing gold from the balance sheets of the banking system (Huỳnh and Nguyễn 2024).

This tightening process culminated in Decree No. 24/2012/ND-CP (Government of Vietnam 2012), which established the gold-management regime examined in this study. Decree 24 created a state monopoly over the physical gold supply chain in two respects. First, the State Bank of Vietnam became the sole authority permitted to import raw gold. Second, SJC became the state-recognized dominant gold-bar brand, while new SJC bars could be produced only through occasional orders placed by the State Bank.

The official objective of Decree 24 was to curb the “goldisation” of the economy—that is, excessive reliance on gold as a store of value, which weakened the role of the Vietnamese dong, obstructed monetary-policy transmission, and placed pressure on the exchange rate and foreign-exchange reserves (Trần 2026). Judged against this narrow objective, Decree 24 achieved an important success: gold was removed from bank credit activities and ceased to pose a direct balance-sheet risk to the formal financial system. From a market perspective, however, three persistent consequences remained: a large and durable gap between domestic and international gold prices, gold smuggling, and recurring episodes of gold-market fever (Huỳnh and Nguyễn 2024).

2.2. *The Anatomy of the Premium: A Physical-Delivery Quota, Not a Capital Control*

The persistence of the SJC premium is central to this paper’s identification strategy, and its institutional source is worth stating precisely. Under Decree 24, the domestic premium did not arise from a restriction on the capital account or on currency convertibility. It arose from a binding quantity constraint on physical delivery: with imports monopolized by the SBV and bar production confined to intermittent, brand-restricted SJC batches, the supply of authorized bullion could not respond elastically to domestic demand. When world prices or domestic demand rose, the fixed physical supply forced the SJC bar to clear at a level increasingly detached from the import-parity price, opening a premium that at times exceeded 15–20 percent. The wedge is thus best read as a quota-driven, physical-blockage premium rather than a monetary or capital-controls phenomenon.

This interpretation has two important analytical implications. First, because the institutional restriction applies directly to physical gold bars rather than to the value of gold in general, the SJC price series is structurally separated from the world gold market. This provides the basis for the market-segmentation hypothesis tested in the empirical analysis. Second, because Decree 24 removed gold from the formal financial system, the remaining channels through which Vietnamese investors can express global risk expectations or obtain exposure to international gold prices—such as foreign reference instruments, the foreign-exchange market, international gold contracts, cross-border trading platforms, or digital assets—operate largely outside the domestic physical gold-bar market. These channels do not fully substitute for physical gold transactions, but they may absorb part of global financial shocks. This helps explain why SJC gold-bar returns may remain relatively detached from world gold prices in the tails of the distribution.

2.3. *Decree 232/2025 and the Regime Break*

The gold-management regime established under Decree 24 was formally revised by Decree No. 232/2025/ND-CP, signed on 26 August 2025 and effective from 10 October 2025 (Government of Vietnam 2025). The decree amended Decree 24 and abolished the state monopoly on gold-bar production.

In place of the monopoly regime, Decree 232 introduced a licensing framework. Under this system, the State Bank may authorize eligible enterprises with minimum charter capital of VND 1 trillion and commercial banks with minimum charter capital of VND 50 trillion to produce gold bars and to import and export raw gold. Gold-bar production was reclassified as a conditional business activity. The legal definition of a gold bar was also broadened to include bars bearing the brands of newly licensed institutions rather than being limited exclusively to SJC.

Decree 232 also formally recognized account-based gold transactions and gold derivatives, while requiring gold transactions valued at VND 20 million or more to be settled through bank accounts. Implementing guidance was issued in Circular No. 34/2025/TT-NHNN (State Bank of Vietnam 2025a, 2025b), which took effect on the same date as Decree

232. Initial assessments indicated that several large commercial banks and major gold companies, including SJC, DOJL, and PNJ, were likely to satisfy the licensing requirements.

In economic terms, Decree 232 directly targets the bottleneck identified in Section 2.2: the physical-delivery constraint. By allowing licensed institutions to import raw gold and produce gold bars, the reform has the potential to relax the supply quota that lies at the core of the SJC premium. Accordingly, 10 October 2025 provides a natural institutional break point for the structural analysis of tail dependence.

Within the study period, however, the reform remained at an early stage. Licensing procedures, the allocation of import quotas, and the effective entry of new producers were still being implemented. The post-break period should therefore not be interpreted as a fully operational new market regime, but rather as an early transition in which institutional constraints had begun to loosen without yet being fully removed.

2.4. The Reform Vision: A National Gold Exchange and the International Comparative Framework

Decree 232 should be viewed as one step in a broader transition from direct administrative control towards market-based oversight. Alongside the amendment of Decree 24, the Government directed relevant agencies to study the establishment of a national gold exchange. Such an exchange is intended to centralize trading, generate a transparent benchmark price, and provide regulators with real-time market data (Trần 2026).

The model most frequently referenced in Vietnamese policy discussions is the Shanghai Gold Exchange, established in 2002 under the supervision of the People's Bank of China. Its core logic may be described as “centralization for control”: physical gold trading is allowed to operate actively, but transactions are channeled through a centrally supervised venue, while supply remains regulated through import quotas (Trần 2026).

This comparison highlights the distinctive nature of Vietnam's premium. China manages the gap between domestic and international gold prices mainly through import quotas linked to the Shanghai Gold Exchange, whereas India relies primarily on import duties. In both markets, the domestic premium generally fluctuates within a few percentage points. Before the 2025 reform, Vietnam combined a monopoly over raw-gold imports with a monopoly over the gold-bar brand, creating a substantially tighter quantitative constraint. This helps explain why the SJC premium could remain much larger than those observed in China and India.

The distinction between tariff-based and quota-based mechanisms therefore directly shapes how Vietnam is positioned in the international comparison. The SJC premium reflects not only transaction costs or tax differentials, but also an institutionally constrained structure of physical supply. The gradual easing of this constraint under Decree 232 constitutes a major institutional change and provides the identification basis for the structural tests of price transmission and tail dependence presented in the empirical sections of the study.

3. Data

3.1. Sample and Sources

We construct a daily dataset spanning 2 January 2019 to 31 July 2026, covering 1856 trading days. The sample is partitioned at the effective date of Decree 232/2025/ND-CP, 10 October 2025, into a pre-reform regime (2 January 2019–9 October 2025, $n_1 = 1655$) and a post-reform regime (10 October 2025–31 July 2026, $n_2 = 201$). The two regimes are analyzed both jointly and separately, so that the structural-break hypothesis (H4) can be tested against the change in tail dependence across the monopoly and licensing frameworks described in Section 2. The counts n_1 and n_2 above are price-level (and premium-level) observation counts by regime; the return series used in the GARCH and copula analysis

has 1855 observations in total, one fewer than the 1856 price levels, because the first calendar day of the sample (2 January 2019) yields a price but no return. This single missing observation falls in the pre-reform regime (1654 pre-reform returns; Table 1), while the post-reform return count is unaffected (201 in both the price-level and return series): the first post-reform return is computed using the last pre-reform price as its reference but is dated and classified as a post-reform observation.

Table 1. Descriptive statistics by regime.

Statistic	World r_t (pre)	World r_t (post)	SJC r_t (pre)	SJC r_t (post)	π_t^{phys} (pre)	π_t^{phys} (post)
N	1654	201	1654	201	1655	201
Mean	0.076	0.015	0.082	−0.003	13.824	13.468
Std. dev.	1.034	1.899	0.823	1.700	11.421	3.062
Skewness	−0.237	−1.471	0.499	−0.689	0.376	0.138
Ex. kurtosis	3.339	8.610	27.013	5.687	−0.974	1.519
Min	−5.107	−12.410	−8.413	−8.651	−3.086	1.330
Max	6.564	5.905	8.220	6.133	42.133	23.476
Zero-return share (%)	0.1	0.0	17.0	9.0	—	—
Jarque–Bera	783.8	693.3	50,358.4	286.8	104.4	20.0
ADF	−12.019	−6.409	−11.306	−7.058	−1.554	−3.192
ARCH-LM(5)	67.7	13.3	52.4	45.9	1621.8	116.5

Notes: Returns are $100 \times$ daily log differences in prices; the 09:00 ICT SJC sell (ask) quote is paired with the 05:00 ICT world snapshot. π_t^{phys} is the import-parity physical premium of Section 3.3. Jarque–Bera, ADF, and ARCH-LM report test statistics. “—” denotes not applicable.

Two gold price series are drawn from FiinPro. The international price is the XAU/USD spot quote (source: Investing.com), snapshotted at 05:00 Vietnam time (ICT, UTC + 7); at that hour the print effectively embeds the preceding North American session, so the daily international observation dated t reflects information through the close of $t - 1$ in New York. The domestic price is the bullion quote of Saigon Jewelry Company (SJC), Ho Chi Minh city, Vietnam, for which the buy and sell legs share a common timestamp and are updated twice daily, at 09:00 and 17:00 ICT, on business days (Monday–Friday). The USD/VND exchange rate is the Vietcombank commercial sell rate. Global variables—the CBOE Gold ETF Volatility Index (GVZ) and the U.S. Dollar Index (DXY)—are obtained from Investing.com. For international benchmarking (Section 3.5), we use the World Gold Council (WGC) local-price premium series for China and India.

3.2. Timing Alignment and Price Conventions

Because the international and domestic series are sampled at different hours, the alignment convention is consequential for the dependence estimates and is stated explicitly. For the daily domestic observation, we use the 09:00 SJC sell (ask) quote. This is the tightest contemporaneous match to the 05:00 international snapshot: it is set roughly four hours later on the same calendar day, so the domestic quote responds to a world price that is already in its information set, while minimizing contamination of the contemporaneous pairing by intraday global moves that would otherwise inflate measured dependence. The alternative 17:00 quote sits twelve hours after the international snapshot and partly absorbs that day’s later global session, which would blur the contemporaneous alignment; we therefore adopt the 09:00 quote throughout. The morning convention also aligns the gold pairing with the morning Vietcombank sell rate used in the premium decomposition.

Two features of the SJC quote require explicit treatment. First, because SJC administers its price rather than repricing continuously, the quote is frequently left unchanged; such an unchanged value is a genuine (sticky) administered price rather than a data artifact and enters the series as an exact zero return, so we report the share of zero-return days by regime

(Table 1). This point mass is a substantive feature of the price-setting mechanism, not a data artifact, and it cannot be represented by a continuous marginal distribution: because standardized residuals are computed as $z = (r - \mu)/\sigma$, the time-varying conditional mean and volatility map an exact-zero return to a different standardized value on each day, so the zero-return mass does not appear as a literal numerical tie in the standardized residuals—but it remains an atom in the underlying conditional distribution of returns, which no continuous parametric law, including the skewed-Student-t, can reproduce. We therefore model the domestic return as a two-part (atom-at-zero) mixture: a discrete point mass with regime-specific probability, combined with a continuous component, and construct copula pseudo-observations via the distributional transform (Rüschendorf 2009; Genest and Nešlehová 2007), which spreads the atom's probability mass uniformly across its cumulative-probability interval. For the continuous component of the domestic margin specifically, we further depart from a parametric skewed-Student-t law and instead use a rank-based empirical CDF of the GARCH-standardized residuals on non-zero-return days (Genest et al. 1995), since no single parametric family adequately fits the domestic continuous component across the full sample (Section 5.2); the world margin, which is well fit by the parametric skewed-Student-t, retains the parametric transform. The adequacy of each transform is assessed by the diagnostics reported in Section 5.2 (Nelsen 2006).

Second, FiinPro returns NULL when SJC issues no quote, which occurs almost exclusively on Vietnamese public holidays—most visibly the multi-day Tết closure—when the market is not trading. Because the SJC quote is an administered posted price that stays in force while the market is closed, we treat a NULL as the continued persistence of the most recent quote and fill it by last-observation-carried-forward (LOCF) rather than deleting the date, thereby preserving an unbroken daily calendar. This is the natural extension of the treatment of unchanged quotes above: a holiday is simply an interval over which the administered price does not change, so a carried-forward value enters the series as an additional zero return and is counted as such in the zero-return shares reported in Table 1. The same LOCF convention is applied to the small number of missing world-price snapshots that fall on global-market holidays. Because Vietnamese and international holidays seldom coincide, on domestic non-trading days the (flat) carried-forward SJC quote is paired with a still-moving world price; this reflects the administered, non-continuous nature of the domestic quote rather than a data artifact, and such observations are few ($N_{\text{LOCF}} \approx 55$ domestic dates, $\approx 2.8\%$ of the sample).

3.3. Returns and the Premium Decomposition

Log returns are computed as $r_t = 100 \times (\ln P_t - \ln P_{t-1})$ for the international and domestic price series and for the exchange rate.

The domestic–international premium is central to the paper and is constructed from an import-parity benchmark. Converting the world price to a domestic-currency, per-*tael* basis requires the unit factor $\kappa = 37.5/31.1035 = 1.20565$ Troy ounces per *tael* (lượng). Defining the parity price

$$S_t^* = G_t \cdot E_t \cdot \kappa,$$

where G_t is the world price (USD/oz) and E_t the USD/VND sell rate, the (log) physical, blocked-arbitrage premium is the residual wedge that the exchange rate cannot explain,

$$\pi_t^{\text{phys}} = \ln S_t - \ln S_t^* = \ln S_t - \ln G_t - \ln E_t - \ln \kappa.$$

Netting the wedge at the observed commercial exchange rate isolates the component attributable to the physical-delivery constraint—the monopoly importer, single-brand

bottleneck of Section 2.2—rather than to currency movements. Separately, we define a currency premium as the gap between the commercial and central-bank USD/VND rates,

$$\pi_t^{\text{fx}} = \ln E_t^{\text{VCB}} - \ln E_t^{\text{central}},$$

capturing any capital-account or currency-scarcity contribution. The two log premia sum exactly by construction; converting to arithmetic percentages for reporting (Table 1, Section 5.1) therefore combines the two components multiplicatively rather than additively, $1 + P_{\text{total}} = (1 + P_{\text{phys}})(1 + P_{\text{fx}})$; the arithmetic percentages reported below do not sum exactly to the total premium (the gap is a small interaction term) and should be read as approximate, not exact additive, contributions. This decomposition operationalizes the paper's central institutional claim: that the SJC premium is overwhelmingly a physical-blockage phenomenon (π^{phys}), with the currency channel (π^{fx}) small—distinguishing Vietnam's arrangement from a capital-controls interpretation.

3.4. Marginal Specification

Prior to the copula stage, each return series is filtered through a univariate model of its conditional mean and conditional variance. We adopt an AR(1) mean and a GJR-GARCH(1,1) variance with skewed-Student-t innovations, applied identically to the world and domestic series:

$$r_t = \mu + \phi r_{t-1} + \varepsilon_t, \quad \varepsilon_t = \sigma_t z_t, \quad z_t \sim \text{skew-}t(\nu, \xi),$$

$$\sigma_t^2 = \omega + (\alpha + \gamma \mathbb{I}\{\varepsilon_{t-1} < 0\})\varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2.$$

The AR(1) term absorbs the mild serial correlation induced by discretely updated, administered quotes; the asymmetry term γ captures the leverage effect in gold volatility; and the skewed-Student-t innovation accommodates the heavy tails and skewness documented in Section 3.6. Model adequacy—the absence of residual autocorrelation and ARCH, and a uniform probability integral transform—is verified by the diagnostics reported in Section 5.

We deliberately estimate these marginals without exogenous regressors, with one narrow exception described below. The copula and the ΔCoVaR statistics derived from it are intended to characterize the full realized co-movement of the two markets; pre-filtering the marginals with common global factors would remove part of the very dependence the analysis is designed to measure, and would render the tail-spillover estimates conditional on a particular control set. Moreover, because the world price is expressed in domestic-currency terms—converted to VND at the Vietcombank rate for parity comparability (Section 3.3)—exchange-rate variation is common to both legs by construction, so a separate first-difference FX control is neither necessary nor cleanly identified.

Global variables that plausibly drive both markets, notably the U.S. Dollar Index (DXY) and the CBOE Gold ETF Volatility Index (GVZ), are therefore used to interpret and contextualize the estimated spillovers rather than entered as in-model controls. The standardized residuals from the fitted marginals are mapped to uniform pseudo-observations through the marginal-specific transform of Section 3.2—parametric for the world series, semi-parametric with an atom-at-zero treatment for the domestic series—and carried forward to the copula stage. The narrow exception to the no-exogenous-regressors rule concerns a domestic-market event unrelated to the gold-market reform: in early-to-late July 2026, a domestic diamond-trading investigation widened to include SJC and briefly affected liquidity in Ho Chi Minh City. Because this episode falls inside the extended post-reform window, we include an indicator for the affected trading days (22–31 July 2026) as an exogenous regressor in the domestic mean and variance equations for the post-reform regime only, so that this idiosyncratic, non-reform shock does not contaminate the marginal

fit or the downstream tail-dependence estimates for that regime; we verify the robustness of the post-reform findings to this episode directly in Section 5.

3.5. Comparative Premium Series

To benchmark the magnitude of the Vietnamese wedge (Section 6), we assemble contemporaneous local-price premium series for China and India from the World Gold Council. Each series is the five-day moving-average local-versus-international premium expressed in US dollars per ounce—for China the Shanghai Gold Exchange price and for India the MCX price, each measured against the LBMA international benchmark—which we convert to percentage terms by dividing by the contemporaneous world price, so that the figures are directly comparable with the domestic premium constructed above. These economies bracket the two dominant management instruments: China administers the domestic–world gap primarily through import quotas channeled via the Shanghai Gold Exchange, whereas India relies primarily on an import tariff. Both typically sustain premia of only a few percent, providing the comparative frame against which Vietnam’s substantially larger, quota-plus-monopoly premium is interpreted.

3.6. Descriptive Statistics

Table 1 reports summary statistics for the return and premium series by regime.

The domestic return series shows a far higher zero-return share than the world series (17.0% vs. 0.1% pre-reform), reflecting SJC’s administered price-setting, alongside pronounced excess kurtosis (27.0 pre-reform); both motivate the atom-at-zero and semi-parametric treatment of the domestic marginal detailed in Section 3.2. Volatility roughly doubles post-reform in both series. ADF tests decisively reject a unit root in all return series, while the physical premium is highly persistent (ADF does not reject), consistent with treating it as a slow-moving wedge. ARCH-LM statistics confirm strong conditional heteroskedasticity, motivating the GJR-GARCH specification.

4. Methodology

4.1. Empirical Strategy

We quantify transmission and tail risk between the world and domestic gold markets with a two-stage copula–GARCH design estimated by the method of inference functions for margins (IFM). In the first stage, each return series is filtered through a univariate conditional-volatility model, and its standardized residuals are mapped to the unit interval by the marginal-specific transform of Section 3.2 (parametric for the world series, semi-parametric for the domestic series). In the second stage, the dependence structure is modeled by a bivariate copula fitted to these pseudo-observations, from which we recover coefficient-implied tail-dependence measures and a copula-based, bidirectional ΔCoVaR tail-spillover statistic. The framework is applied to the full sample and separately to the pre- and post-reform regimes split at the Decree 232/2025 effective date (10 October 2025). All estimation is carried out in R using the rugarch and VineCopula packages (Ghalanos 2026; Nagler et al. 2025; R Core Team 2026), with a fixed random seed for reproducibility; the tail level is set to $q = 0.05$ throughout.

4.2. Conditional Marginals

The marginal models are the AR(1)–GJR-GARCH(1,1) (Glosten et al. 1993) specifications with skewed-Student-t innovations (Fernández and Steel 1998; Hansen 1994) set out in Section 3.4, estimated identically in mean and variance specification for the world and domestic series (with the narrow post-reform exogenous-regressor exception noted in Section 3.4), though the construction of the copula pseudo-observations differs across the

two margins as detailed below. From each fitted marginal $i \in \{\text{world}, \text{dom}\}$ we retain the conditional volatility path $\hat{\sigma}_{i,t}$, the standardized residuals $\hat{z}_{i,t} = \hat{\varepsilon}_{i,t} / \hat{\sigma}_{i,t}$, and the estimated shape and skewness parameters $(\hat{\nu}_i, \hat{\xi}_i)$. The pseudo-observations that enter the copula are the parametric transforms

$$u_{i,t} = F_{\text{skt}}(\hat{z}_{i,t}; \hat{\nu}_i, \hat{\xi}_i),$$

where F_{skt} is the skewed-Student-t CDF. This construction is retained for the world margin. For the domestic margin, because of the administered-price point mass documented in Section 3.2, we instead construct the domestic pseudo-observations from an atom-at-zero mixture combined with a rank-based empirical CDF of the non-zero-return standardized residuals (Genest et al. 1995), applied identically to the pre- and post-reform regimes so that the structural-break comparison (H4) is not confounded by a change in marginal-estimation method across regimes; full details are given in Section 3.2. Marginal adequacy is assessed by Ljung–Box tests on $\hat{z}_{i,t}$ and $\hat{z}_{i,t}^2$, an ARCH-LM test, and a Kolmogorov–Smirnov test of the $u_{i,t}$ against uniformity (the PIT test); because a poorly specified marginal would distort the pseudo-observations, the PIT results are reported and their implications for the copula stage discussed in Section 5.

4.3. Mean Linkage and Segmentation (H1)

Market segmentation (H1) is evaluated through the strength of contemporaneous co-movement in the mean. We report the Pearson correlation $\rho_P(r_{\text{world}}, r_{\text{dom}})$ and the rank-based Kendall correlation $\tau_K(r_{\text{world}}, r_{\text{dom}})$. Under integration, these should be large and positive; weak linkage—low ρ_P and τ_K —is read as evidence of a segmented domestic market, consistent with the physical-delivery bottleneck of Section 2.

4.4. Copula Selection and Tail Dependence (H2)

The bivariate dependence between u_{world} and u_{dom} is modeled by a parametric copula $C(u, v)$ selected by the Akaike Information Criterion over the full family set (elliptical and Archimedean, including rotations). Selection is performed independently on the full, pre-, and post-reform samples, so that the functional form is free to change across regimes (Joe 1997; Nelsen 2006; Patton 2006; Genest and Favre 2007; Aas et al. 2009). From the selected family and its parameters, we recover the lower and upper tail-dependence coefficients

$$\lambda_L = \lim_{q \rightarrow 0^+} \Pr(U_{\text{dom}} \leq q \mid U_{\text{world}} \leq q), \quad \lambda_U = \lim_{q \rightarrow 1^-} \Pr(U_{\text{dom}} > q \mid U_{\text{world}} > q).$$

Hypothesis H2—joint extreme co-movement—is assessed by whether λ_L and λ_U are bounded away from zero; coefficients at or near zero indicate that the two markets remain disconnected even in the tails.

4.5. Bidirectional Tail Spillover: ΔCoVaR (H3)

To measure directional tail spillover, we construct a copula-based ΔCoVaR (Girardi and Ergün 2013; Reboredo and Ugolini 2015). Let the source market U and the response market V have selected copula C , and let $h(v \mid u) = \partial C(u, v) / \partial u = \Pr(V \leq v \mid U = u)$ denote the copula h -function, which we evaluate by central numerical differentiation of the copula CDF. For a distress event in the source market— U at its q -quantile—the response market's conditional VaR in copula scale, v^* , solves $h(v^* \mid u = q) = q$; the corresponding benchmark, with the source at its median, v^0 , solves $h(v^0 \mid u = 0.5) = q$. Both roots are obtained by univariate root-finding. Mapping back to the return scale through the response marginal and scaling by its conditional volatility gives the daily spillover series

$$\Delta\text{CoVaR}_{U \rightarrow V, t} = \hat{\sigma}_{V,t} \left[F_{\text{skt},V}^{-1}(v^*) - F_{\text{skt},V}^{-1}(v^0) \right],$$

where $F_{\text{skt},V}^{-1}$ is the response marginal's quantile function. The statistic is computed in both directions—world $\rightarrow$ domestic (response marginal = domestic) and domestic $\rightarrow$ world (response marginal = world). Directional asymmetry (H3) is tested with a two-sample Kolmogorov–Smirnov comparison of the distributions of $|\Delta\text{CoVaR}_{\text{world} \rightarrow \text{dom}}|$ and $|\Delta\text{CoVaR}_{\text{dom} \rightarrow \text{world}}|$; a significant difference indicates that tail stress transmits more strongly in one direction than the other.

4.6. Structural-Break Analysis (H4)

Hypothesis H4 asks whether the reform produces a structural break in market integration. We distinguish the Decree 232/2025 announcement (26 August 2025) from its effective date (10 October 2025) and take the latter as the break point τ . Two complementary tests are applied. First, a two-sample Kolmogorov–Smirnov test compares the distribution of $|\Delta\text{CoVaR}_{\text{world} \rightarrow \text{dom}}|$ before and after τ . Second, we compare the tail-dependence coefficients λ_L, λ_U estimated on the pre- and post-reform subsamples (Section 4.4); the emergence of nonzero upper tail dependence after τ would signal a shift toward joint extreme co-movement. Because the post-reform window is short, these results are interpreted with the reduced-power caveat noted in Section 3.

4.7. Premium-at-Risk

Beyond return-based tail risk, the administered premium embeds a latent jump risk that conventional volatility measures do not capture. We define the premium-at-risk as the one-off loss a domestic holder would sustain if the pure-gold premium π^{phys} were to revert fully to import parity, equal to the prevailing premium at the end of the sample. To gauge its severity, we benchmark it against the historical one-day 5% Value-at-Risk of domestic returns, estimated as the empirical 5% quantile of $r_{\text{dom},t}$ —consistent with the $q = 0.05$ tail level used throughout—and report the ratio of the premium-at-risk to this daily VaR. A ratio substantially above one indicates a reversion jump far larger than any single-day loss anticipated by standard market-risk measures.

5. Results

We report results for the full sample and, where the reform is at issue, for the pre- and post-reform regimes split at 10 October 2025. Throughout, the hypotheses follow the paper's numbering—H1 (segmentation), H2 (tail dependence), H3 (directional asymmetry), H4 (structural break).

5.1. The Premium and Its Decomposition

Over the full sample the domestic SJC bar trades at a mean FX-inclusive premium of 16.01% over the import-parity world price. Decomposing this wedge (Section 3.3) shows that it is overwhelmingly a physical, blocked-arbitrage phenomenon: the pure gold premium averages 13.79%, while the currency component contributes only 1.96%—about one-eighth of the total. Figure 1 traces the three series through time. The premium is negligible in 2019, widens dramatically from 2020 to a peak near 40–45% in mid-2022 as the Decree 24 monopoly binds against surging demand, and remains elevated and volatile thereafter, with the gold component tracking the total almost one-for-one and the currency component a thin, slow-moving band.

The decomposition is especially informative across the reform. The pure physical premium is essentially unchanged—13.82% pre-reform versus 13.47% post-reform—whereas the currency premium widens from 1.60% to 4.94%, so that the entire increase in the total premium (15.63% to 19.07%) is attributable to the exchange-rate channel rather than to any easing of the physical bottleneck. On the evidence of this window, Decree 232/2025 has

not yet compressed the blocked-arbitrage wedge that motivates the paper, consistent with a reform that is announced and nascently implemented rather than fully operational.

Premium decomposition: total = gold + FX

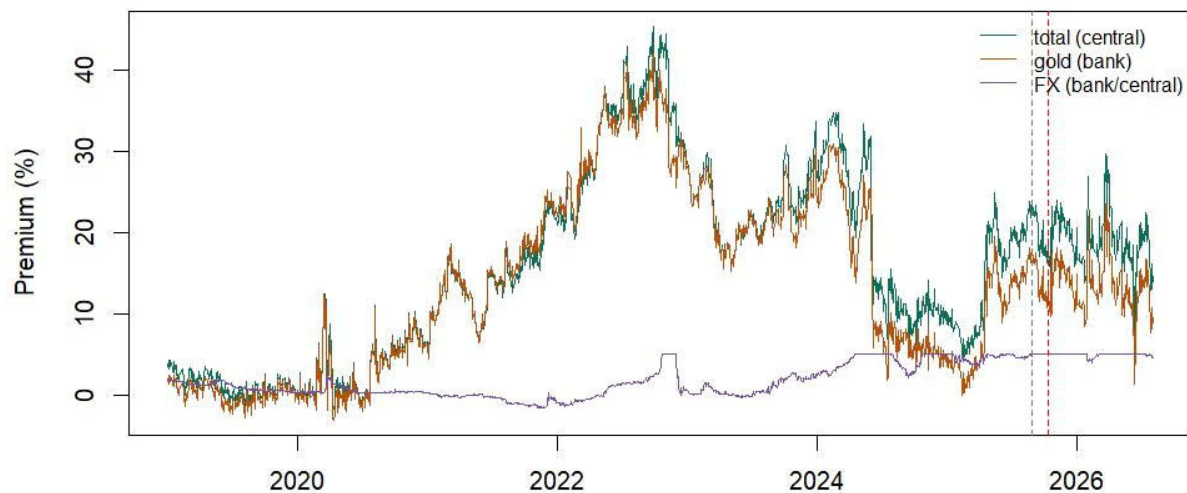


Figure 1. Premium decomposition, 1 January 2019–31 July 2026. The three series are the total FX-inclusive premium (“total, central”), the pure physical-gold premium (“gold, bank”), and the currency component (“FX, bank/central”), as decomposed in Section 3.3. The two vertical dashed lines mark the announcement of Decree 232/2025/ND-CP (26 August 2025) and its effective date (10 October 2025), which defines the pre-/post-reform split used throughout Section 5. Authors’ calculations based on FiinPro (domestic and world gold prices) and Vietcombank (USD/VND commercial exchange rate); see Section 3.1.

5.2. Marginal Estimates and Diagnostics

Table 2 reports the marginal diagnostics. The world series is well specified under the parametric skewed-Student-*t* model: it is mildly right-skewed (0.926), has a shape parameter of 4.39 (finite but heavy kurtosis), and its probability integral transform is not rejected as uniform (PIT-KS $p = 0.625$). The domestic series is more problematic under the same parametric specification. Investigating the rejection revealed two distinct sources. First, a discrete point mass of exact-zero returns (17.0% pre-reform, 9.0% post-reform; Section 3.6) cannot be reproduced by any continuous marginal; we address this with the atom-at-zero mixture and distributional-transform construction of Section 3.2. Second, even after isolating the zero-return mass, the continuous component of the domestic margin still failed the PIT test in the pre-reform regime specifically (KS $p < 0.001$ on non-zero-return days), which diagnostic checks attributed to a small number of genuine extreme-return days over the six-year pre-reform window (excess kurtosis of 27.0) rather than to data errors or estimation non-convergence; no single parametric family fit the domestic continuous component adequately across the full pre-reform span. We therefore adopt the semi-parametric construction of Section 3.2 (rank-based empirical CDF of the standardized residuals) for the domestic margin, applied identically to both regimes. Under this construction the domestic pseudo-observations are uniform by design (Genest et al. 1995), so the reported PIT-KS statistics (Table 2) are close to unity and are not an independent specification check; the informative diagnostic is instead the serial independence of the resulting pseudo-observations, assessed by the Ljung–Box test, which is not rejected in either regime (pre-reform $p = 0.497$; post-reform $p = 0.383$), confirming that the GARCH filter adequately removes volatility clustering and that no residual dependence structure remains that should properly belong in the mean or variance equation rather than the copula.

Table 2. Marginal estimates and diagnostics (skewed-Student-t).

Series	Skewness	Shape (df)	PIT-KS p
World	0.926	4.39	0.625
Domestic (SJC), pre-reform †	—	—	1.0000
Domestic (SJC), post-reform †	—	—	1.000

Notes: † For the semi-parametric domestic marginal, pseudo-observations are uniform by construction (Genest et al. 1995); the PIT-KS statistic is reported for comparability with the world margin but is not an independent specification check under this construction. The informative diagnostic for the domestic margin is instead the Ljung–Box test for serial independence of the resulting pseudo-observations (pre-reform $p = 0.497$; post-reform $p = 0.383$; not tabulated), which is not rejected in either regime.

5.3. Segmentation (H1)

The mean linkage between the two markets is weak. The Pearson correlation of world and domestic returns is 0.284 and the rank-based Kendall correlation only 0.161—far below the near-unit co-movement that integration would imply. H1 is therefore supported: the domestic bar is largely disconnected from the world price in the mean, as expected under a quota-blocked physical arbitrage.

5.4. Tail Dependence (H2)

Table 3 reports the copula selected by AIC and its implied tail-dependence coefficients under the corrected marginal specification (Sections 3.2 and 5.2). The pre-reform regime is best described by the Gaussian copula, with both tail-dependence coefficients equal to zero: over the pre-reform window, the two markets exhibit no asymptotic joint extremes. H2—that the two markets co-move in the tails—is accordingly not supported for the pre-reform regime considered on its own: the domestic market was disconnected from the world not only on average but also, and more strikingly, during extreme events, so that global gold shocks did not reliably transmit into SJC tail losses prior to the reform. Pooling the full sample yields a small but non-zero upper-tail coefficient (BB1 copula, $\lambda_U = 0.159$); because this full-sample figure mechanically blends the pre-reform absence of tail dependence with the post-reform change documented below, the pre/post comparison is the more informative test of H2 and is discussed under H4.

Table 3. Copula selection and tail dependence by regime.

Regime	Copula Family	λ_L	λ_U
Full	BB1	0.002	0.159
Pre-reform	Gaussian	0.000	0.000
Post-reform	Gumbel	0.000	0.308
Post-reform, excluding diamond-episode window ‡	Gumbel	0.000	0.319

Notes: ‡ Robustness check excluding the 22–31 July 2026 trading days affected by an unrelated domestic diamond-market episode (Section 3.4); tail dependence is materially unchanged relative to the row above, indicating the post-reform finding is not driven by this episode (Section 5.7).

5.5. Directional Asymmetry (H3)

The bidirectional ΔCoVaR ($q = 0.05$) is asymmetric: the mean absolute spillover is 0.468 in the world-to-domestic direction and 0.723 in the domestic-to-world direction, and a Kolmogorov–Smirnov test rejects equality of the two distributions decisively ($D = 0.674$, $p \approx 0$). The asymmetry is thus statistically clear, but its direction is the reverse of the economically natural prior that the large global market should dominate the small frontier one. We caution against a literal reading. The ΔCoVaR magnitude is scaled by the conditional volatility of the response market (Section 4.5), and world returns are the more volatile of the two (Table 1); the same copula-implied quantile shift therefore maps into a larger

move when the world series is the response, mechanically inflating the domestic-to-world figure. This scaling effect makes the reversal most plausibly an artifact of response-side volatility rather than evidence that the Vietnamese market drives the world price; notably, the direction and approximate magnitude of the asymmetry are essentially unchanged whether the pre-reform marginal is estimated under the parametric skewed-Student- t specification or the semi-parametric specification adopted in Section 3.2, which weighs against marginal misspecification as the explanation and in favor of the response-side volatility-scaling account above. We accordingly record H3 as mixed: asymmetry is present, but its sign is not interpretable as a causal direction.

Figure 2 plots the world_to_domestic spillover series. Its mean is modest, but it dips sharply during global stress episodes—COVID-19 in early 2020, the mid-2020 and 2022 turbulence, and repeated 2024–2026 episodes—reaching -2.5 to -3.5 on the worst days—including a cluster of sharp dips in the final weeks of the extended sample, discussed further under the robustness checks in Section 5.7—indicating that although average tail transmission is weak, individual crises can still open transient spillover channels.

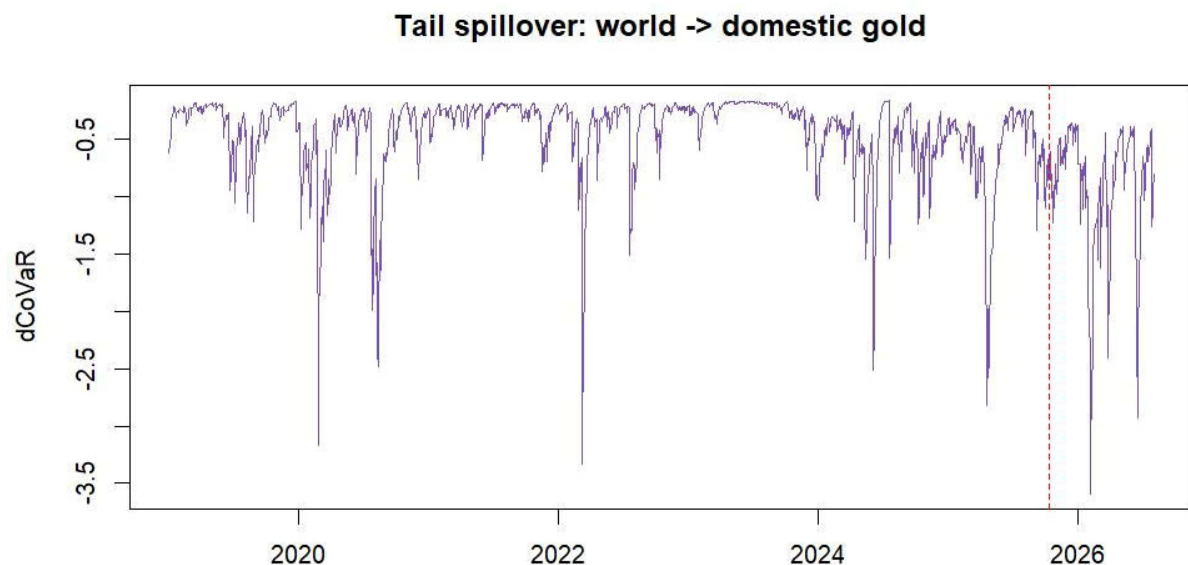


Figure 2. World-to-domestic tail spillover (ΔCoVaR , $q = 0.05$), 1 January 2019–31 July 2026, computed from the copula fitted separately in each regime (Section 4.5). The vertical dashed line marks the effective date of Decree 232/2025/ND-CP (10 October 2025). Because the copula is estimated separately, but as a static object, within each regime, day-to-day movement in the series shown here is driven by the conditional volatility of the domestic (response) market rather than by time variation in the copula parameters; see the discussion of this point in Section 5.5. Authors' calculations; underlying data as in Figure 1.

5.6. Structural Break at the Reform (H4)

Two tests point to a change in integration around the reform, but their evidential weight differs. First, mean absolute world-to-domestic ΔCoVaR rises from 0.396 pre-reform to 1.064 post-reform, with a Kolmogorov–Smirnov test overwhelmingly rejecting equality ($p = 3.86 \times 10^{-129}$). Second, and more cleanly, upper tail dependence appears post-reform for the first time: the selected copula switches from Gaussian to Gumbel and λ_U rises from 0.000 to 0.308, while λ_L remains zero. On its face this indicates that the two markets began to co-move in the upper tail after October 2025—the opposite of the null that an announced-but-unenforced reform would leave the structure unchanged. H4 (no break) is therefore not supported.

Two qualifications temper this conclusion. The ΔCoVaR increase is confounded with a general rise in volatility—both series' standard deviations roughly double post-reform

(Table 1)—and because the statistic scales with volatility, part of the doubling reflects a more turbulent regime rather than stronger dependence per se; the scale-free λ_U is the more reliable evidence. Even so, λ_U is estimated on 201 post-reform observations, so the Gumbel fit and the 0.308 coefficient still warrant caution given the regime's short span. We subject the finding to two further checks. First, because the post-reform window coincides with an unrelated domestic diamond-market episode (Section 3.4), we re-estimate the post-reform copula excluding the affected trading days entirely (22–31 July 2026); upper-tail dependence is materially unchanged ($\lambda_U = 0.319$ excluding the window versus 0.308 including it; Table 3), indicating the post-reform finding reflects the reform period generally rather than this one episode. Second, the corresponding event-dummy coefficients entered directly into the domestic GARCH mean and variance equations for the post-reform regime are not individually significant ($p = 0.52$ and $p = 1.00$ respectively)—unsurprising given only eight trading days are flagged—so we treat the direct exclusion test above, rather than the dummy coefficients themselves, as the relevant robustness evidence. We read H4 as indicating a genuine, robustness-checked, but still short-sample rise in tail integration around the reform.

5.7. Robustness Checks

Beyond the diamond-window exclusion test reported under H4, we assess robustness along two further dimensions. First, the pre-reform baseline is re-estimated under an alternative start date for the pre-reform window (1 February 2019), close to but not identical to the 2 January 2019 start used in the main specification; segmentation (H1) and the premium-at-risk estimate below are materially unchanged across both start dates (Kendall's $\tau \approx 0.16$ in both cases). Because the post-reform window is identical by construction across the two runs, this check speaks to the robustness of the pre-reform baseline rather than to the post-reform tail-dependence finding, which is addressed separately by the diamond-window exclusion test. Second, the semi-parametric domestic marginal (Section 3.2) is applied identically to both regimes specifically so that the H4 pre/post comparison is not confounded by a change in estimation method; as reported in Section 5.2, moving from the original parametric specification to the corrected semi-parametric one leaves the sign and approximate magnitude of all four hypothesis tests unchanged, with the semi-parametric specification yielding a somewhat stronger post-reform upper-tail estimate ($\lambda_U = 0.308$ versus 0.267 under a parametric skewed-Student-t domestic marginal).

5.8. Premium-at-Risk: Empirical Estimates

Finally, the premium itself carries a latent jump risk that daily volatility measures overlook. At the end of the sample the pure gold premium stands at 9.6% of price; a full reversion to import parity would impose a one-off loss of that magnitude on a domestic holder. Benchmarked against the historical one-day 5% Value-at-Risk of domestic returns (−1.11%), this reversion loss is roughly 8.6 times the worst daily loss anticipated by a conventional VaR. The dominant risk in holding SJC gold is thus not day-to-day price fluctuation but the possibility of a discrete premium collapse—precisely the kind of policy-contingent jump that Decree 232/2025 makes newly relevant, and that standard market-risk measures, calibrated to the placid administered price path, systematically understate.

6. Discussion

The results presented in Section 5 reveal three key characteristics of the Vietnamese gold market. First, domestic gold prices have only a relatively weak correlation with world gold prices. Second, dependence at the extremes of the distribution is absent under normal, pre-reform conditions, but a modest upper-tail dependence emerges in the post-

reform window, a change that survives the robustness checks reported in Section 5.7. Third, the domestic physical gold premium remains unusually large, while its response to recent reforms has been limited. Placing these findings in an international comparative context helps explain why Vietnam's gold premium remains high and suggests a possible adjustment trajectory as market liberalization continues.

6.1. The Premium in International Perspective

Vietnam's physical gold premium is of a different order of magnitude from those observed in comparable Asian gold markets. During the 2019–2026 period, data from the World Gold Council show that the average domestic gold premium was only about 0.4% in China and close to zero in India (averaging approximately -0.2%) (World Gold Council 2026); in both markets, the premium generally fluctuated within a range of a few percentage points. By contrast, Vietnam's pure physical premium averaged 13.8%, approximately 35 times the level observed in China and far above that recorded in India. This difference suggests that the premium stems not only from domestic gold demand but also directly from the design of the supply-management mechanism. China organizes physical gold trading through the Shanghai Gold Exchange and controls supply through import quotas, whereas India relies primarily on import duties. Despite using different policy instruments, both systems retain a degree of supply flexibility, helping domestic gold prices track international prices relatively closely. Under Decree 24/2012, by contrast, Vietnam simultaneously controls raw-gold imports and concentrates gold-bar production in a single brand. The combination of quantitative restrictions and brand exclusivity limits the supply response, creating conditions for the price differential to remain both large and persistent (Hoàng 2025; Nguyễn 2025).

The case of India is particularly noteworthy because it shows that a high import duty does not necessarily translate into a large premium. When India increased its gold import tariff from 6% to 15% in May 2026, domestic gold prices rose by approximately 13%; however, gold traded domestically at a discount to the import-parity price rather than at a higher premium. The price increase encouraged profit-taking and expanded the supply of recycled gold in the market (Chacko 2026). A tariff therefore shifts the domestic price level without necessarily segmenting the market, whereas Vietnam's monopoly restricts the quantity of authorized bullion and creates a persistent price wedge. The distinction between tariffs, quotas, and monopolies is therefore central to explaining Vietnam's high premium. From a policy perspective, this finding implies that removing the production and import monopoly, rather than adopting a monetary or exchange-rate measure, is the policy lever most likely to reduce the premium sustainably.

6.2. Segmentation, Tail Behavior, and the Reform Trajectory

The weak linkage at the center of the distribution and the absence of tail dependence are consistent with a market segmented by monopoly and quota restrictions. This finding also accords with earlier evidence from Vietnam. Using an EGARCH model with monthly data, Duc and Dat (2025) showed that the transmission of world gold prices to domestic gold prices weakened significantly after the issuance of Decree 24, reflecting the growing separation between the two markets. The present study extends that result in two respects. First, domestic gold-bar returns do not share the tail losses observed in the global market. Second, the high premium embeds the risk of an abrupt correction when supply constraints are relaxed or pricing mechanisms change. These features are difficult to detect using only linear, symmetric, or mean-based models.

The comparative framework also provides a basis for assessing the trajectory of the reform process. The emergence of upper-tail dependence after October 2025—which, as

reported in Section 5.7, is not an artifact of the unrelated domestic diamond-market episode that fell within the same window—may represent an early sign of a shift from direct administrative control towards a supervised market mechanism. Such a model resembles the Shanghai Gold Exchange, where physical gold trading is centrally organized while imports and supply remain regulated through licensing and quotas. If Vietnam follows a comparable path—through licensed imports and, ultimately, a national gold exchange—international evidence suggests that the physical premium should narrow towards the low single-digit levels observed in China, while co-movement with the world price should increase. This convergence has not yet occurred: the pure physical premium remained essentially unchanged over the reform period, declining only from 13.82% to 13.47%. The market therefore appears to be at an early stage of transition, displaying renewed tail dependence that has not yet translated into a meaningful reduction in the premium.

7. Conclusions

This paper examines price transmission and tail risk between the global gold market and Vietnam's domestic gold market over the January 2019–July 2026 period, including the issuance of Decree 232/2025, which initiated reforms to the monopoly mechanism governing SJC gold bars. Using a copula–GARCH framework, combined with bidirectional tail-spillover measures and a decomposition of the domestic price differential into currency and physical components, the study yields three main findings. First, the domestic gold market is only weakly connected to the global market on average, with a Pearson correlation coefficient of 0.28. Second, this relationship is largely absent in the tails of the distribution under normal, pre-reform conditions, though a modest and robustness-checked upper-tail dependence emerges post-reform (Section 5.7). Third, domestic gold prices exhibit an average premium of 16.0%, of which 13.8 percentage points are attributable to the pure physical component, while the currency component accounts for only about 2 percentage points. Although tail spillovers display statistical asymmetry, the evidence is insufficient to support a causal interpretation. Notably, upper-tail dependence emerges for the first time after the reform, while the physical premium remains virtually unchanged. This suggests that the reform process has begun but is still at an early stage and has not yet produced a material change in price levels. The current premium also entails the risk of an abrupt correction: if domestic gold prices return to parity, investors could incur a one-off loss of approximately 9.6% of value, around 8.6 times the historical one-day 5% Value-at-Risk. Overall, Vietnam's gold premium appears to arise primarily from restrictions on physical supply created by the administrative monopoly, rather than from monetary factors or capital controls.

7.1. Policy Implications

These findings have three important implications for the ongoing reform process and its oversight. First, because the premium is driven mainly by constraints on physical supply, the most effective policy lever is liberalization of gold imports and production—in line with the direction of Decree 232/2025—rather than intervention in the exchange rate or capital account. Second, the separation between domestic gold prices and the international reference value has both benefits and costs. On the one hand, it sustains monopoly rents and allows domestic prices to deviate substantially from fundamental value; on the other, gold holding serves a longstanding cultural and household-savings function in Vietnam, allowing households to build real, tangible asset holdings, and a reform strategy should serve this function rather than treat it as a cost to be eliminated. We accordingly read the evidence as supporting the phased development of a gold-trading network that is safe, quality-standardized, and readily convertible into cash for savings purposes—the

licensed import channels, functioning exchange, and enforceable assay standards discussed in Section 2.4—rather than either indefinite preservation of the administrative monopoly or an unmanaged, abrupt price-convergence shock. We emphasize that this is distinct from, and not a case for, restoring gold’s pre-2012 monetary function: the convertibility we envisage is liquidity between gold and cash for individual savers, not gold’s re-entry into payments or credit intermediation, and nothing in our evidence supports reversing the 2012 reform’s success in curbing that channel. Third, and most importantly, the downside correction risk embedded in the premium should be placed at the center of the reform design. As the scope of licensed imports expands and the physical premium gradually narrows toward parity, holders of SJC gold bars—who both rely on gold as a savings vehicle and generally lack access to hedging instruments—may face substantial capital losses. A gradual, transparent, and well-communicated liberalization process that sequences price convergence with the buildout of this market infrastructure, allowing the premium to adjust in an orderly manner, would therefore be preferable to a sudden collapse. The increase in tail connectedness following the reform, which is not attributable to the unrelated domestic diamond-market episode that fell within the same window (Section 5.7), suggests that the market has begun to reconnect. As the measures are implemented more fully, the premium is likely to decline further, while co-movement with world gold prices is likely to increase.

7.2. Limitations and Future Research

Several limitations should be acknowledged, and they also point to promising avenues for further research. First, the marginal model for the domestic gold price series originally failed the probability integral transform test, a consequence of the roughly one-fifth of pre-reform trading days on which SJC prices remain unchanged combined with a small number of genuine extreme-return days that a single parametric family could not accommodate; we address this directly using the atom-at-zero mixture and semi-parametric construction of Section 3.2, which is not rejected by the corresponding diagnostics (Section 5.2). One simplification remains: the response-market quantile back-transform used to construct ΔCoVaR (Section 4.5) continues to use the parametric skewed-Student-t quantile function as a summary device even where the underlying marginal is semi-parametric; we regard this as a defensible pragmatic choice, but a fully consistent empirical-quantile back-transform is a natural extension. Second, although the post-reform observation window has been extended to 201 trading days and the upper-tail dependence finding survives a direct robustness check against a confounding domestic event (Section 5.7), the post-reform regime remains short relative to the seven-year pre-reform baseline, and the evidence of structural change should continue to be regarded as an emerging pattern warranting continued monitoring as the reform proceeds, rather than as a settled conclusion. Third, the decomposition of the exchange-rate component currently relies on the spread between the Vietcombank exchange rate and the central exchange rate because a complete time series for the parallel-market exchange rate is unavailable. Finally, the analysis uses daily data and focuses exclusively on SJC prices in Ho Chi Minh City; a single-brand focus is a reasonable starting point given SJC’s dominant share of the investment-gold segment, but it leaves open how other domestic brands, which lost SJC’s exclusive legal status under Decree 232, have responded to the reform. Future research could employ intraday data, compare different gold brands, and extend the analysis across regions in Vietnam as well as to the Chinese and Indian markets. Such extensions would help clarify how different regulatory regimes shape gold premia, commodity-market risk, and tail behavior.

As the new mechanism under Decree 232/2025 is implemented more fully, the key empirical test will be whether the physical premium actually narrows and whether tail integration strengthens in the manner suggested by these initial results. Monitoring both

the premium and the associated correction risk throughout the transition will be essential to ensuring a stable reform process. More broadly, the Vietnamese case demonstrates that administrative monopoly—rather than necessarily monetary or capital controls—can fragment commodity markets and generate jump-like adjustment risks that conventional market-risk measures tend to underestimate.

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