Regulating the Retail Options Boom: Evidence from India's 2024–25 Equity Index Derivatives Reforms*

Anklesh Rawat† ORCID: 0009-0001-2399-8032

Shreshtha Rawat‡ ORCID: 0009-0005-2546-2732

This version: July 2026 (Working paper)

Abstract

Between October 2024 and April 2025 the Securities and Exchange Board of India (SEBI) rolled out the most aggressive package of retail derivatives curbs attempted in a major market: a package spanning weekly-expiry rationalization, a threefold increase in minimum contract size, and tighter margining and position monitoring. We assemble a 48-month panel of exchange-level turnover (April 2022–March 2026, NSE and BSE combined) from SEBI Monthly Bulletin annexure tables and combine it with cohort-level participation data from SEBI's own studies to provide early causal evidence on the reforms. Using stock options (untargeted by the reforms) as a within-market control, a trend-adjusted difference-in-differences design implies that index-options notional turnover fell 37–43% below its counterfactual path in the six months following the first wave, while premium turnover fell far less (−13% year on year), consistent with a compositional shift away from deep out-of-the-money weekly contracts. Participation effects were large and fell hardest on the smallest traders, the mechanical incidence of a minimum contract size: unique traders fell 20% year on year, with declines of 25–36

*We thank the Securities and Exchange Board of India (SEBI) for making the underlying market statistics publicly available. All data used in this paper are public and aggregate; sources and replication details appear in Appendix A. All errors are our own. We welcome collaboration on extensions and related work; interested readers are invited to contact the corresponding author. *AI-use disclosure (SSRN policy):* in preparing this paper the authors used a large language model (Claude, Anthropic) to assist with data-extraction code, statistical programming, and drafting. All data, analyses, results, and conclusions were specified, reviewed, and verified by the authors, who take full responsibility for the content of this paper.

†Independent researcher. Email: ankleshrawat5@duck.com. Corresponding author.

‡Independent researcher.

log points concentrated in the smallest turnover cohorts (difference-in-differences estimate −47 log points, permutation-robust). We find no evidence of substitution into the cash market, which contracted alongside; substitution into products outside our panel cannot be ruled out. Aggregate turnover effects attenuate by FY2026 as activity migrated across exchanges, adapted to larger contracts, and, from January 2026, faced a rule-driven downward recalibration of lot sizes; participation effects persist through the latest available data.

Keywords: derivatives regulation; retail investors; index options; options trading; investor protection; SEBI; difference-in-differences; event study; market microstructure; India

JEL codes: G14, G18, G28, G12, G41

1 Introduction

India's equity index options market grew from a sideshow into the largest derivatives market in the world by contract volume in less than five years. Average daily premium turnover (the rupee amount paid for options, as distinct from the notional value of the underlying exposure) in index options rose at a compound annual rate of 72% between FY2020 and FY2025, and by March 2025 India's leading exchange traded more than four times as many contracts as the world's second-ranked venue (SEBI, 2025). The boom was overwhelmingly retail: individual traders' share of activity rose sharply, the median participant was young and low-income, and outcomes were dismal. SEBI's profitability studies document that roughly nine out of ten individual traders lost money in each of FY2022 through FY2025, with aggregate net losses of individual traders reaching Rs. 1,05,603 crore (about USD 12.5 billion) in FY2025 alone (SEBI, 2023, 2024, 2025).

Confronting what it framed as an investor-protection and systemic-stability problem, SEBI announced a package of six measures on 1 October 2024 ("Measures to Strengthen Equity Index Derivatives Framework"), phased in between 20 November 2024 and 1 April 2025: (i) each exchange restricted to a single weekly-expiry benchmark index product; (ii) minimum index derivative contract size raised from Rs. 5–10 lakh to Rs. 15–20 lakh; (iii) an additional 2% extreme loss margin on short index options on expiry day; (iv) upfront collection of option premium from buyers; (v) removal of calendar-spread margin treatment on expiry day; and (vi) intraday monitoring of position limits. This episode is, to our knowledge, the most forceful attempt by any major-market regulator to curb retail derivatives speculation directly through product design rather than through taxes or suitability rules.

This paper provides early causal evidence on what the curbs did. Three questions organize the analysis. First, by how much did the reforms reduce index-derivatives activity relative to a credible counterfactual, rather than relative to a boom-era peak? Second, who exited: was the participation decline concentrated among the small retail traders the regulation ostensibly protects? Third, where did the activity go: did volumes migrate to the cash market, to untargeted derivative products, or across exchanges?

Answering these questions requires confronting an identification problem that SEBI's own before-after comparisons cannot address: the post-reform window coincided with a sharp market-wide correction (October 2024–February 2025), a securities transaction tax increase on derivatives (effective 1 October 2024), and, later in the window, enforcement action against a major proprietary trading firm (July 2025). Simple interrupted-time-series estimates on index-options turnover are therefore badly confounded: we show that cash-market and stock-derivatives turnover (segments untouched by the curbs) fell 26–34 log

points over the same window.

Our identification strategy exploits the fact that the reform package targeted *index* derivatives while leaving *single-stock* derivatives untouched. Stock options trade on the same exchanges, under the same tax regime, through the same brokers, and are held by an overlapping clientele; common shocks to Indian equity-market activity load onto both segments. We estimate difference-in-differences (DiD) regressions comparing log average daily turnover (ADT; monthly turnover divided by trading days) of index options with stock options across 48 months spanning April 2022 to March 2026, aggregating NSE and BSE so that cross-exchange migration nets out. Because index options were on a steeper differential growth path before the reforms (the pre-period gap trends at +2.2 log points per month, $p = 0.002$), and our preferred specification allows a group-specific linear trend, in the spirit of the sensitivity analysis of Rambachan and Roth (2023), and we complement it with placebo dates, alternative controls, alternative windows, and permutation inference.

Four findings emerge. First, the curbs bit hard on the targeted margin. Relative to stock options and to the extrapolated pre-period differential trend, index-options notional ADT fell 52 log points at a six-month horizon (trend-adjusted level shift -0.573, $p < 0.001$); the average shortfall over November 2024–May 2025 is 56 log points, i.e. roughly -43% against the counterfactual. The raw year-on-year decline for December–May windows is -29%, essentially identical to the figure SEBI reports, but the DiD estimates show that about a third of that raw decline reflects the concurrent market-wide contraction rather than the reforms. Because the counterfactual depends on how the pre-period differential trend is treated, we emphasize throughout the bracket $[-37\%, -43\%]$ spanned by the unadjusted and trend-adjusted estimates (Section 8.1).

Second, the reforms changed the *composition* of activity more than its economic size. Premium turnover (the rupee amount actually paid for options, a closer though imperfect proxy for buyers' economic stake) fell only 13% year on year against 29% for notional, and the premium-to-notional ratio, which had been declining steadily through the boom (a signature of ever-cheaper, shorter-dated, deeper out-of-the-money contracts), reversed sharply after the reforms (+5.9 log points per month, $p < 0.001$). Larger mandatory contract sizes and fewer weekly expiries mechanically eliminated the smallest lottery-like trades; what remained was fewer, larger, higher-premium positions.

Third, exit was concentrated exactly where the regulation aimed. Unique individual traders fell 20% year on year and 30% between Q1 and Q4 of FY2025. Using SEBI's six turnover cohorts, traders with six-month turnover below Rs. 10,000 declined 36 log points while the Rs. 1–10 crore cohort declined only 4; a cohort-level DiD that nets out pre-period differential growth yields -46.8 log points ($p = 0.001$; permutation $p = 0.10$, the second-most

extreme of all twenty possible exposure assignments) for small-ticket relative to large-ticket cohorts.

Fourth, we find no evidence of substitution into the cash market. Cash ADT fell 9.6% year on year over the same comparison window and its interrupted-time-series break is statistically indistinguishable from that of other untargeted segments. The margin of adjustment was exit and adaptation, not migration to delivery-based trading. At the same time, the aggregate turnover effect proved transitory: by Q4 FY2026 market-wide index-options premium ADT exceeded its pre-reform level, driven partly by continued migration toward BSE's surviving weekly product, an exchange-substitution pattern we quantify by contrasting NSE-only DiD estimates (-31%, $p < 0.001$, over the full window) with market-wide ones (≈ 0), and partly by a rule-driven relaxation: effective the January 2026 contract series, the exchanges recalibrated index lot sizes downward (the Nifty lot fell from 75 to 65) to remain within SEBI's mandated Rs. 15–20 lakh contract-value band, mechanically lowering the minimum ticket late in our sample (Section 2).

Related literature. The paper contributes to three strands. First, the literature on retail derivatives trading and its costs: retail option traders systematically lose money (Bauer et al., 2009; Barber et al., 2009), prefer lottery-like payoffs (Kumar, 2009; Boyer and Vorkink, 2014), and intensified both tendencies in the post-2020 boom (Bryzgalova et al., 2023; de Silva et al., 2024). For India specifically, Agarwal et al. (2025) document with trader-level data the extreme short-horizon, near-expiry speculation underlying the boom, and show that an earlier single-instrument intervention (the 2015 lot-size increases) induced "avenue-shifting" into cheaper, shorter-dated, deeper out-of-the-money contracts rather than exit. SEBI's descriptive studies place India at the extreme of the international facts on participation growth, expiry-day concentration, and loss rates; we add quasi-experimental estimates of a regulator's attempt to unwind them. Second, the literature on regulating speculative trading: transaction taxes (Umlauf, 1993; Jones and Seguin, 1997), leverage restrictions (Heimer and Simsek, 2019), and product restrictions in bubble episodes (Xiong and Yu, 2011). The closest precedent for the contract-size lever is Korea's June 2012 fivefold increase in the KOSPI 200 options multiplier, which durably reduced options volume and shifted investor composition away from retail and high-frequency traders (Lee et al., 2026). The Indian episode is distinctive in that the intervention operated through contract design (lot size, expiry frequency, margins) rather than price, and our composition results show precisely the margins along which such design-based regulation works. Third, we speak to the modern DiD literature: our setting is a two-group, single-adoption-date design in which the threats are differential trends and few-cluster inference, and we implement the corresponding remedies:

trend adjustment and sensitivity in the spirit of Rambachan and Roth (2023), collapsed-series HAC inference following Bertrand et al. (2004); Donald and Lang (2007), placebo dates in the spirit of Conley and Taber (2011), and exact permutation inference for the cohort design.

The remainder of the paper proceeds as follows. Section 2 details the institutional setting and the reform timeline. Section 3 describes data construction and validation. Section 4 lays out the empirical designs. Section 5 reports aggregate-turnover results, Section 6 participation and heterogeneity, Section 7 substitution and falsification tests, and Section 8 robustness. Section 9 discusses interpretation and policy implications; Section 10 concludes.

2 Institutional Background

2.1 The retail index-options boom

Equity derivatives in India trade on the National Stock Exchange (NSE), which historically accounted for nearly all activity, and BSE, which re-entered index derivatives in mid-2023 with weekly Sensex options. Between FY2020 and FY2025, average daily premium turnover in index options grew at a 72% compound annual rate and notional turnover at 101%, against 25% for the cash market (SEBI, 2025). The growth was concentrated in short-dated contracts: by FY2024, expiry-day trading in weekly index options dominated activity, with exchanges operating five weekly expiries across different indices so that some weekly contract expired nearly every trading day.

Participation tracked the product boom. Unique individual traders in equity derivatives rose from 42.7 lakh in FY2022 to 96.0 lakh in FY2025 (SEBI, 2025). Outcomes were persistently poor: the share of individual traders with net losses was 90–92% in every year from FY2022 to FY2025, aggregate net losses of individuals rose from Rs. 40,824 crore (FY2022) to Rs. 1,05,603 crore (FY2025), and over 75% of FY2024 traders declared annual income below Rs. 5 lakh (SEBI, 2024, 2025).

2.2 The reform package

SEBI's circular of 1 October 2024 announced six measures, phased in as shown in Table 1. The first wave (20 November 2024) eliminated all but one weekly expiry per exchange (NSE retained weekly Nifty 50 contracts and discontinued weekly Bank Nifty, Nifty Financial Services, Nifty Midcap Select, and Nifty Next 50; BSE retained weekly Sensex) and imposed an additional 2% extreme loss margin on short index options on expiry day. The second wave (January 2025) tripled the minimum contract value from Rs. 5–10 lakh to Rs. 15–20

lakh (the Nifty lot rose from 25 to 75) and consolidated monthly index expiries to a single day per exchange. From 10 February 2025 option premia were collected upfront from buyers and expiry-day calendar-spread margin offsets were removed; from 1 April 2025 position limits were monitored intraday.

Two features of the contract-size measure matter for interpreting the later part of our sample. First, the circular fixes a contract-*value* band (Rs. 15–20 lakh), not a lot size: exchanges must periodically recalibrate lots to keep contract values inside the band as index levels move. Second, as indices appreciated through 2025 the initial lots drifted toward the band's ceiling, and effective the January 2026 contract series NSE reduced the Nifty 50 lot from 75 to 65, with parallel downward revisions for other index contracts (NSE circular of 28 November 2025). The minimum ticket therefore fell by roughly 13% in the final quarter of our panel, a rule-driven partial relaxation of treatment intensity that bears directly on the interpretation of the FY2026 turnover recovery (Section 9).

Table 1: SEBI measures to strengthen the equity index derivatives framework

Measure	Effective from
Rationalization of weekly index derivatives (one benchmark per exchange)	20 Nov 2024
Additional 2% extreme loss margin on expiry day (short options)	20 Nov 2024
Increased minimum contract size (Rs. 5–10 lakh → Rs. 15–20 lakh)	2 Jan 2025 (NSE)[a]
Rationalization of monthly index derivatives (single expiry day)	Jan 2025
Upfront collection of option premium from buyers	10 Feb 2025
Removal of calendar-spread treatment on expiry day	10 Feb 2025
Intraday monitoring of position limits	1 Apr 2025

Source: SEBI circular dated 1 October 2024 and SEBI (2025), Table 1.
[a] BSE from 10 January 2025.

2.3 Confounding events

Five contemporaneous events could contaminate naive before–after comparisons. (i) The July 2024 Union Budget raised the securities transaction tax on futures (0.0125%→0.02%) and on the sale of options (0.0625%→0.1% of premium), effective 1 October 2024. Because the STT change applies to stock and index derivatives alike, it differences out of our index-versus-stock comparisons. (ii) Indian equities corrected sharply between October 2024 and

February 2025 amid heavy foreign portfolio outflows; this depressed turnover in all segments and is absorbed by the control series and, in event-study form, by month effects. (iii) SEBI's circular of 29 May 2025 standardized expiry days (BSE Tuesday, NSE Thursday) and strengthened risk metrics; our short-window estimates end in March/May 2025 and are unaffected, while full-window estimates embed it. (iv) On 3 July 2025 SEBI barred a large proprietary trading firm (Jane Street group entities) from Indian markets in connection with alleged expiry-day index manipulation, temporarily chilling index-options activity; we show robustness to excluding July–August 2025. (v) The January 2026 lot-size recalibration described above is an endogenous component of the policy regime rather than an external shock, but it means the "post" period is not of uniform treatment intensity: our short-window estimates (samples ending March/May 2025) predate it entirely, while full-window estimates average over it.

3 Data

3.1 Sources and construction

Our primary dataset is a monthly panel of segment-level turnover covering April 2022 through March 2026 (48 months), constructed from the annexure tables of SEBI's Monthly Bulletin ("Trends in Equity Derivatives Segment" and "Trends in Cash Segment" for NSE and BSE), which republish exchange-reported monthly totals of contracts and turnover by instrument: index futures, stock futures, index options (calls and puts, premium and notional), and stock options.[1] We aggregate calls and puts, sum NSE and BSE to obtain market-wide series (so that migration between exchanges does not masquerade as a policy effect), and divide by NSE trading days to obtain average daily turnover (ADT) in Rs. crore. Premium-turnover reporting for options begins with the FY2024 bulletin format, so premium series start in April 2023 (36 months) while notional series cover the full 48 months.

Participation and profitability data come from SEBI's published studies: the July 2025 comparative study (unique traders by six-month turnover bucket for three December–May windows; quarterly FY2025 participation and net losses) and the September 2024 and January 2023 profit-and-loss studies (annual FY2022–FY2024 benchmarks) (SEBI, 2023, 2024, 2025). These are aggregate tabulations of trader-level data that are not publicly available at the micro level.

[1] Bulletin issues used: April 2023, April 2024, March 2025, April 2025, and April 2026, each of which reports monthly rows for the fiscal year then in progress. Exact URLs and extraction code appear in Appendix A.

3.2 Validation

Because we hand-assemble the panel from multiple bulletin vintages, we validate it against SEBI's independently published aggregates. For the December 2024–May 2025 window our market-wide index-options ADT is Rs. 58,834 crore (premium) and Rs. 3.17 crore crore (notional), against SEBI's reported Rs. 61,533 crore and Rs. 3.19 crore crore, differences of 4.4% and 0.4% attributable to day-count conventions. For December 2023–May 2024 the premium figures agree to 0.2% (Rs. 67,608 vs Rs. 67,467 crore). Cash-market ADT agrees within 1% in both windows. Our December-window year-on-year changes (−29.2% notional, −13.0% premium for index options; −9.6% for cash) reproduce SEBI's headline figures (−29%, −9%[2], and −11%).

3.3 Summary statistics

Table 2 reports summary statistics. Index options dominate: mean notional ADT of Rs. 3.4 crore crore versus Rs. 0.41 lakh crore for stock options and Rs. 0.95 lakh crore for the cash market. The scale gap between treated and control series is large, which is why all estimation is in logarithms and why levels comparisons are never used.

Table 2: Summary statistics: average daily turnover, April 2022–March 2026

	N	Mean	SD	P25	Median	P75	Post/Pre
Index options, premium	36	64,056	13,993	55,542	62,160	67,285	1.07
Index options, notional ('000)	48	34,068	13,777	23,733	34,671	45,683	1.34
Stock options, premium	36	6,902	1,710	5,984	6,967	8,220	1.09
Stock options, notional	48	408,067	128,032	273,406	460,454	497,164	1.37
Index futures	48	33,561	6,387	28,182	33,890	38,129	0.88
Stock futures	48	115,348	32,851	81,354	123,437	139,423	1.21
Cash market	48	95,035	30,144	66,129	102,451	115,376	1.28

Notes: market-wide (NSE+BSE) average daily turnover in Rs. crore; index-options notional in Rs. '000 crore. Premium series begin April 2023 owing to the bulletin reporting format. "Post/Pre" is the ratio of mean ADT after November 2024 to before; it is uninformative about the policy effect because both windows mix trend growth and the market cycle (see Section 4). Source: authors' calculations from SEBI Monthly Bulletin annexure tables.

Figure 1 plots the treated series. The visual signature of the reforms is unmistakable

[2]SEBI's −9% premium figure refers to index options market-wide including BSE with SEBI's day-count; our −13% uses a common trading-day denominator across segments. The notional and cash figures, which drive our conclusions, match SEBI's almost exactly.

in notional turnover (a collapse beginning November 2024 and deepening through February 2025) and more muted in premium terms.

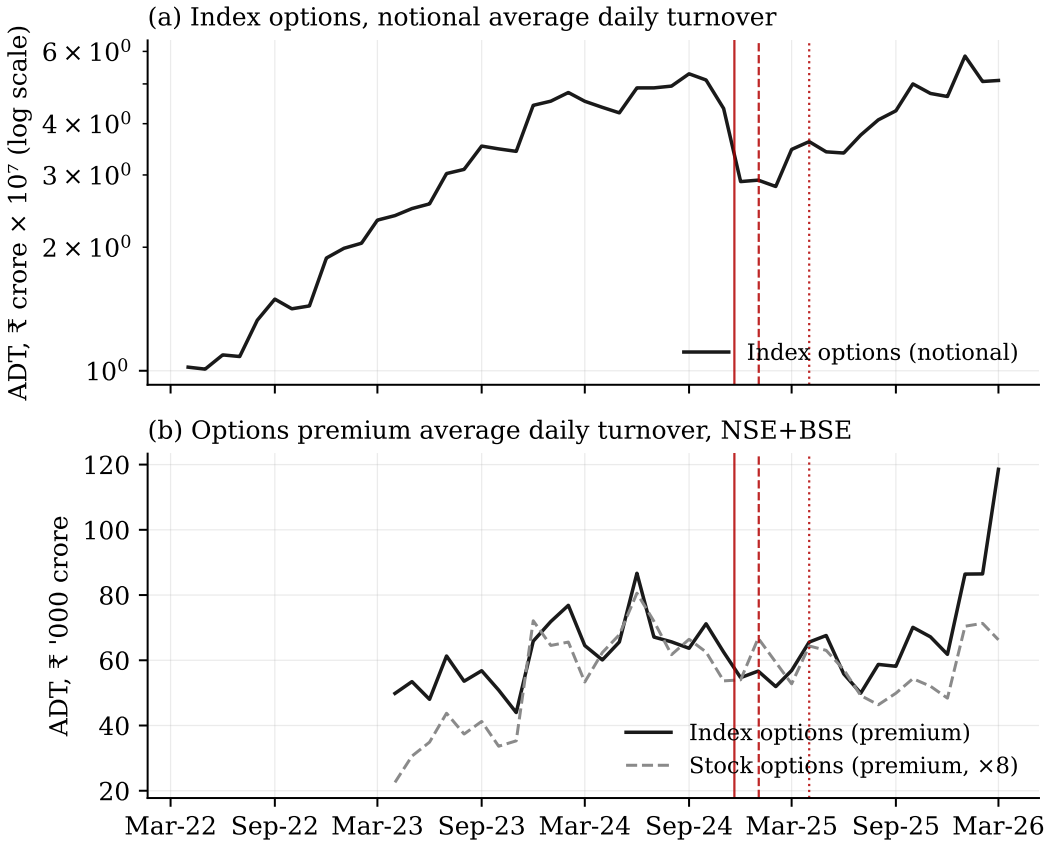

Figure 1: Index-options turnover, market-wide (NSE+BSE), April 2022–March 2026. Vertical lines mark the three reform waves (20 November 2024; January 2025; 1 April 2025). Panel (b) overlays stock-options premium ADT (scaled ×8 for visibility), the control series.

4 Empirical Strategy

4.1 Difference-in-differences with a within-market control

The reform package applies to *index* derivatives only. Single-stock options are our primary control: they trade on the same platforms, face the same taxes (including the October 2024 STT increase), clear through the same intermediaries, and are exposed to the same market cycle, but none of the six measures in Table 1 applies to them.[3] One microstructural

[3]Stock derivatives position limits and ban-period rules were modified only later (May 2025 circular), in the direction of *loosening*; this would bias our estimates toward zero. Index *futures*, by contrast, are not a valid control: the contract-value band and intraday position monitoring apply to index derivatives generally, futures included.

asymmetry deserves note: since October 2019, single-stock derivatives settle by physical delivery, with delivery margins that escalate over the final days before expiry, whereas index options are cash-settled. Episodes of market stress can therefore move stock-options turnover through a settlement-friction channel that does not operate on index options. The direction of any induced bias is ambiguous (forced early square-offs of in-the-money positions raise measured turnover, while deterred expiry-week positioning lowers it), and our conclusions do not rest on stock options alone: the short-run relative contraction is visible against stock futures and the cash market as well (Tables 6 and 7). The estimating equation on the two-group monthly panel is

$$\ln Y_{gt} \;=\; \alpha_g + \lambda_t + \beta \left(\text{Index}_g \times \text{Post}_t\right) + \varepsilon_{gt}, \tag{1}$$

where Y_{gt} is ADT of group $g \in \{\text{index options}, \text{stock options}\}$ in month t, α_g are group effects, λ_t month effects, and $\text{Post}_t = \mathbf{1}\{t \geq \text{Nov 2024}\}$. With two groups and one adoption date, equation (1) is a canonical 2×2 design: the negative-weight pathologies of staggered two-way fixed effects (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021; Sun and Abraham, 2021) do not arise.

Inference with two groups cannot rely on clustering. Following Donald and Lang (2007) and Bertrand et al. (2004), we collapse the panel to the monthly log difference $\Delta_t \equiv \ln Y_{\text{idx},t} - \ln Y_{\text{stk},t}$ and estimate

$$\Delta_t \;=\; \mu + \beta\, \text{Post}_t + u_t, \tag{2}$$

with Newey–West HAC standard errors (six lags) (Newey and West, 1987). The point estimate of β is numerically identical to equation (1). Equation (2) also makes the nature of the design explicit: with one treated and one control series, this is in effect an interrupted time series on a differenced outcome, and all inference is time-series inference: identification comes from the timing of the treatment, not from cross-sectional variation across many treated units. We choose six lags to allow serial correlation of up to half a year, a longer window than automatic bandwidth rules would select at $T = 48$, as a conservative default.

4.2 Differential trends and the trend-adjusted estimator

Parallel trends is the key threat: index options were on a steeper growth path than stock options before the reforms. In the pre-period the gap Δ_t trends upward at 2.20 log points per month ($\hat{\gamma} = 0.022$; HAC $p = 0.002$) for notional and downward at 3.34 log points per month (-0.033; $p < 0.001$) for premium. A constant β in equation (2) is therefore biased toward zero for notional (the counterfactual gap would have kept widening) and away from

zero for premium. Our preferred specification allows a group-specific linear trend and a post-treatment trend break:

$$\Delta_t \;=\; \mu + \gamma\, t + \beta\, \mathrm{Post}_t + \delta\, (t - t_0)\, \mathrm{Post}_t + u_t, \tag{3}$$

where t_0 is the first treated month. Here β is the on-impact level shift relative to the extrapolated differential trend and $\beta + h\,\delta$ the implied gap at horizon h. The estimand is thus the effect of the reform package as implemented on index-options ADT relative to stock options, net of a differential pre-trend approximated as linear. Linear extrapolation of a boom trend is a strong assumption at long horizons (exactly the concern formalized by Rambachan and Roth (2023)), so we emphasize short horizons ($h \leq 6$), report the average post-window deviation from trend, and treat long-horizon extrapolations as bounds rather than estimates. We also report event-study versions (the path of Δ_t relative to October 2024, detrended on pre-period coefficients only) and placebo estimates that assign a false adoption date of November 2023 within the pre-period, in the spirit of Conley and Taber (2011). Table 3 collects the pre-trend and placebo diagnostics for the identifying gap in one place.

Table 3: Pre-trend diagnostics for the identifying gap

	Notional	Premium
Pre-period differential trend $\hat{\gamma}$ (log pts/month)	0.022	−0.033
standard error	(0.007)	(0.006)
p-value	[0.002]	[< 0.001]
Placebo shift, false Nov 2023 adoption ($\hat{\beta}_{\mathrm{plac}}$)	0.243	−0.387
standard error	(0.140)	(0.065)
months (pre-period only)	31	19

Notes: $\hat{\gamma}$ is the slope of $\Delta_t = \ln(\text{index-opt. ADT}) - \ln(\text{stock-opt. ADT})$ on a linear trend over the pre-period (April 2022–October 2024 for notional; April 2023–October 2024 for premium); Newey–West (6-lag) standard errors. The placebo assigns a false adoption date of November 2023 and estimates equation (2) on pre-period data only (Table 7, Panel A). The notional placebo is small and insignificant at 5% ($p = 0.083$); the significant *premium* placebo is the mechanical signature of the strong pre-existing premium-compression trend ($\hat{\gamma} = -0.033$), which the trend-adjusted estimator absorbs by construction, its placebo analogue being $\hat{\gamma}$ itself.

4.3 Interrupted time series

For each series separately we estimate a seasonal interrupted-time-series (ITS) model,

$$\ln Y_t = \alpha + \beta_1 t + \beta_2 \text{Post}_t + \beta_3 (t - t_0)\text{Post}_t + \textstyle\sum_m \theta_m \mathbf{1}\{\text{month} = m\} + \epsilon_t, \tag{4}$$

with Newey–West errors. We use the ITS estimates not as causal effects but as a decomposition device: comparing the break in the treated series with breaks in untargeted series (stock options, stock futures, cash) reveals how much of the raw collapse is market-wide.

4.4 Cohort difference-in-differences

SEBI's July 2025 study (Table 8) reports unique traders in six total-turnover buckets for three six-month windows: December–May of 2022–23, 2023–24, and 2024–25. The tripling of minimum contract size binds hardest on small-ticket traders, so we define cohorts with six-month turnover below Rs. 10 lakh as exposed and estimate, on log growth rates $g_{cw} = \Delta \ln N_{cw}$ across the two window-to-window transitions,

$$g_{cw} = \phi \, \text{Exposed}_c + \psi \, \text{Post}_w + \theta \left(\text{Exposed}_c \times \text{Post}_w\right) + e_{cw}. \tag{5}$$

With six cohorts and two periods, asymptotic inference is unreliable; we therefore compute exact permutation p-values over all $\binom{6}{3} = 20$ possible exposure assignments (Conley and Taber, 2011).

5 Aggregate Turnover Results

5.1 Main estimates

Table 4 presents the turnover results. Columns (1)–(2) report the unadjusted DiD of equation (2) over the full window (through March 2026); columns (3)–(4) end the sample in March 2025, isolating the immediate post-reform period and predating the May 2025 circular and the July 2025 enforcement action; columns (5)–(6) report the trend-adjusted specification of equation (3).

Table 4: Effect of the 2024–25 curbs on index-options turnover: difference-in-differences vs. stock options

	Unadjusted, full		Unadjusted, ≤ Mar-25		Trend-adjusted, full	
	(1)	(2)	(3)	(4)	(5)	(6)
	Notional	Premium	Notional	Premium	Notional	Premium
Index × Post (β)	0.033	−0.072	−0.167	−0.210	−0.573	−0.007
	(0.138)	(0.114)	(0.110)	(0.103)	(0.148)	(0.058)
	[0.809]	[0.528]	[0.128]	[0.042]	[0.000]	[0.905]
Post × trend (δ)					0.009	0.059
					(0.008)	(0.010)
Pre-period diff. trend (γ)					0.022	−0.033
					(0.007)	(0.006)
Implied gap at 6 months					−0.520	
Mean gap, Nov-24–May-25					−0.557	0.240
(percent)					−42.7%	
Months	48	36	36	24	48	36

Notes: Dependent variable is Δ_t = ln(index-options ADT) − ln(stock-options ADT), market-wide (NSE+BSE). Newey–West standard errors (6 lags) in parentheses; p-values in brackets. "Post" = $\mathbf{1}\{t \geq$ Nov 2024$\}$. Columns (5)–(6) estimate equation (3); the implied gap at horizon h is $\beta + h\delta$. The premium column (6) is dominated by the reversal of the premium-to-notional compression trend; see Section 5.3. Percent effects are $100(e^{\beta} - 1)$.

Table 5 distills the headline magnitudes at the horizons that matter for policy.

Table 5: Headline effects at key horizons (trend-adjusted DiD vs. stock options)

	Log-point gap	Percent
Panel A: Notional ADT (trend-adjusted)		
On impact ($h = 0$)	-0.573	-43.6%
3 months ($h = 3$)	-0.546	-42.1%
6 months ($h = 6$)	-0.519	-40.5%
Mean, Nov 2024–May 2025	-0.557	-42.7%
Memo: no trend adjustment ($\gamma = 0$)	-0.469	-37.4%
Panel B: Premium ADT (trend-adjusted)		
On-impact level shift (β)	-0.007	-0.7%
Post-reform trend break (δ, per month)	$+0.059$	
Year on year, Dec–May (reference)		-13.0%

Notes: derived from Table 4, columns (5)–(6), and Section 8.1. Panel A reports the trend-adjusted implied gap $\beta + h\hat{\delta}$ ($\hat{\beta} = -0.573$, $\hat{\delta} = 0.009$); the honest short-run bracket $[-43\%, -37\%]$ is spanned by the trend-adjusted and the no-trend ($\gamma = 0$) window means. Panel B: the premium effect is the reversal of the pre-reform premium-to-notional compression, captured by the trend break δ (+5.9 log points per month, $p < 0.001$) rather than a level change; see Section 5.3. Percent $= 100(e^x - 1)$.

Three patterns stand out. First, the unadjusted full-window DiD is approximately zero: over 17 post months, index-options turnover ends up where the two-group comparison alone would predict. This is *not* evidence of no effect; it reflects offsetting forces (an immediate contraction followed by recovery and adaptation) combined with a counterfactual (column 1) that ignores index options' steeper pre-trend. Second, restricting to the immediate post window, index options underperformed stock options by 15–19% (columns 3–4; premium significant at 5%). Third, the preferred trend-adjusted estimates (column 5) show a large and precisely estimated on-impact collapse in relative notional turnover: 57 log points ($\hat{\beta} = -0.573$; -44%; $p < 0.001$), a six-month gap of 52 log points, and an average November-to-May shortfall of 56 log points (-0.557), i.e. notional activity ran at about 57% of its counterfactual level. The positive but insignificant δ indicates slow relative recovery of roughly 0.9 log points per month. In column (6) the object of interest is the trend break δ, not the level shift: the premium result *is* the reversal of the compression trend (Section 5.3).

The conclusions do not hinge on stock options as the sole comparator. The ITS decomposition below shows the same asymmetric break against stock futures and the cash market, and Table 7 shows that the full-window DiD with stock futures as the control (0.161, s.e.

0.168) matches the stock-options result almost exactly: the identification rests on triangulation across three untargeted segments, not on a single control series.

Figure 2 displays the identifying variation transparently: the log gap between index- and stock-options notional ADT, its pre-period linear trend, and the post-reform shortfall. The gap drops discretely in November–December 2024, bottoms after the January 2025 contract-size increase, and then narrows gradually without returning to trend by March 2026. Figure 3 shows the event-study version: pre-period detrended coefficients fluctuate around zero with no anticipation in the announcement window (October 2024), followed by a sharp break at implementation.

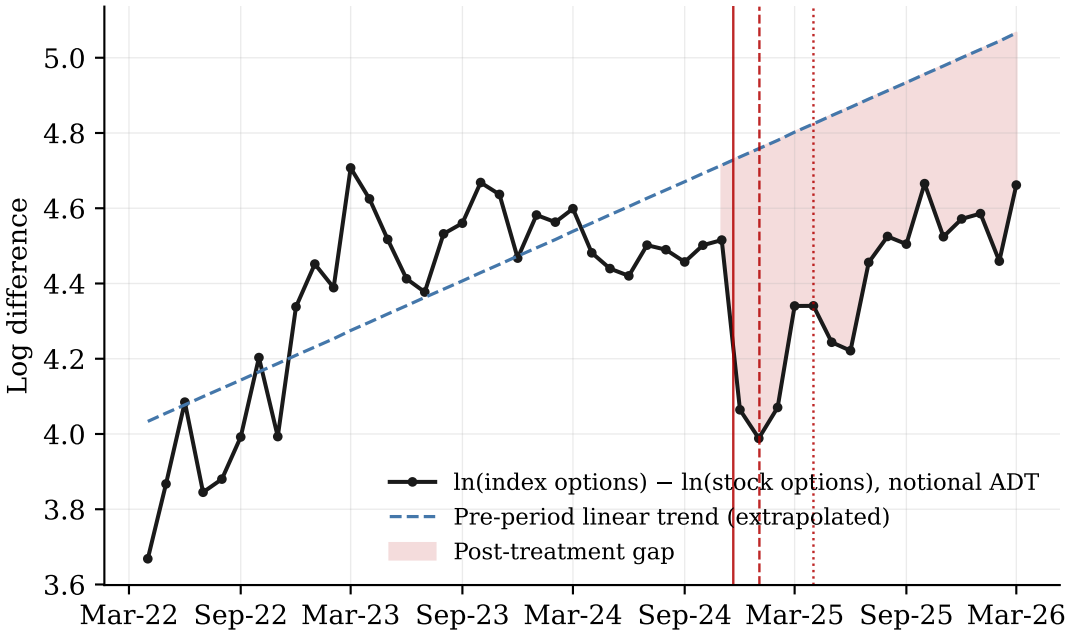

Figure 2: The identifying gap. Solid line: ln(index-options notional ADT) − ln(stock-options notional ADT), market-wide. Dashed line: linear trend fitted on the pre-period (April 2022–October 2024) and extrapolated. Shaded area: post-treatment shortfall. Vertical lines: reform waves.

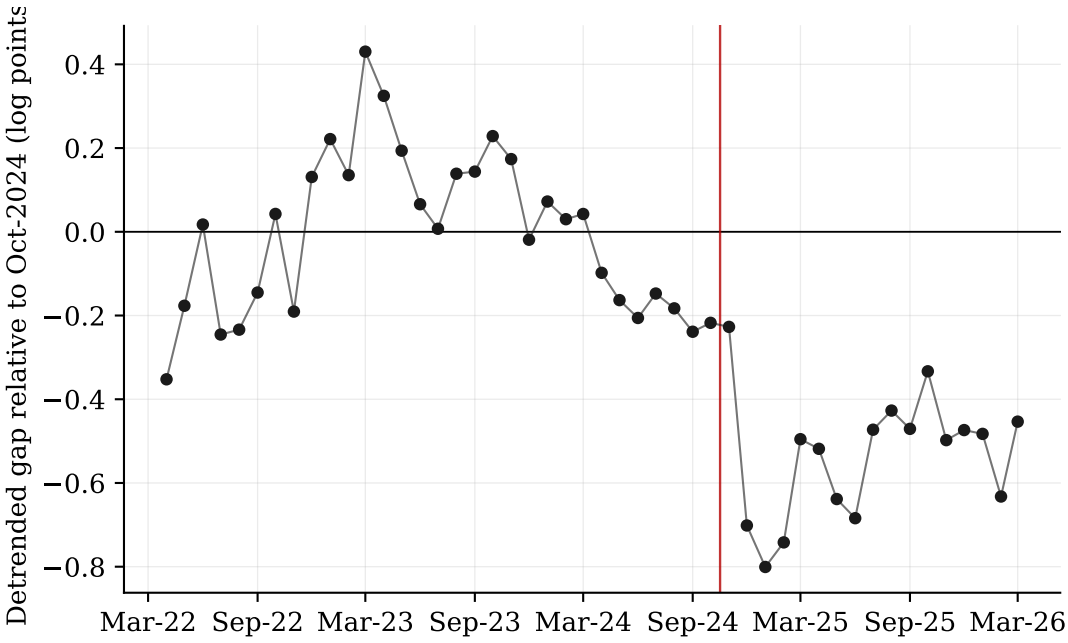

Figure 3: Event-study representation: monthly gap relative to October 2024, detrended using pre-period observations only. The vertical line marks the first reform wave (20 November 2024).

5.2 Decomposition: how much of the raw decline was the reform?

The raw year-on-year decline in market-wide index-options notional ADT for December–May windows is −29.2%, SEBI's headline number. The ITS estimates in Table 6 put the naive level break for index-options notional at −0.838 log points (−57%), but the same specification applied to untargeted segments yields breaks of −0.260 (stock options), −0.269 (stock futures), and −0.337 (cash): a market-wide contraction of roughly 23–29% coincided with the reforms. Netting this out (which is what the DiD does) attributes roughly 43% (trend-adjusted, short-run) of the treated-series collapse to the reforms and the remainder to the common cycle. The lesson for policy evaluation is direct: before–after comparisons around November 2024 overstate the causal effect of the curbs by roughly a third.

Table 6: Interrupted time series, by segment (log ADT, monthly)

	(1) Index opt. (notional)	(2) Index opt. (premium)	(3) Stock opt. (notional)	(4) Stock fut.	(5) Cash
Level break (β_2)	−0.838	−0.429	−0.260	−0.269	−0.337
	(0.091)	(0.064)	(0.056)	(0.090)	(0.077)
	[0.000]	[0.000]	[0.000]	[0.003]	[0.000]
Slope change (β_3)	−0.023	0.008	−0.031	−0.029	−0.025
	(0.005)	(0.006)	(0.005)	(0.007)	(0.006)
Pre-trend (β_1)	0.060	0.022	0.038	0.033	0.037
R^2	0.952	0.618	0.900	0.815	0.821
Months	48	36	48	48	48

Notes: equation (4) with calendar-month dummies; Newey–West standard errors (6 lags) in parentheses, p-values in brackets. The comparison of column (1) with columns (3)–(5) shows that untargeted segments also broke downward at the reform date, reflecting the concurrent market correction; ITS breaks are therefore upper bounds on the causal effect.

5.3 Composition: notional versus premium

The reforms compressed notional turnover far more than premium turnover: −29.2% versus −13.0% year on year. Mechanically, eliminating four of five weekly expiries removes the cheapest, shortest-dated contracts (those with the lowest premium-to-notional ratios), and tripling the lot size truncates the smallest trades. The trend-adjusted premium regression (Table 4, column 6) makes the compositional shift precise: the pre-period premium gap was *falling* at 3.3 log points per month (options were becoming progressively cheaper relative to their notional as the weekly-expiry share grew), and after the reforms this trend reversed to +5.9 log points per month ($p < 0.001$). The average price of traded option exposure rose. In economic terms, the reforms did not proportionally reduce the rupee amount spent on option purchases; they eliminated the highest-leverage, lottery-like end of the product spectrum, precisely the segment SEBI's studies associate with the most concentrated retail losses.

Figure 4 shows this compositional reversal directly: the log premium-to-notional ratio falls steadily through the boom and turns upward at the reforms.

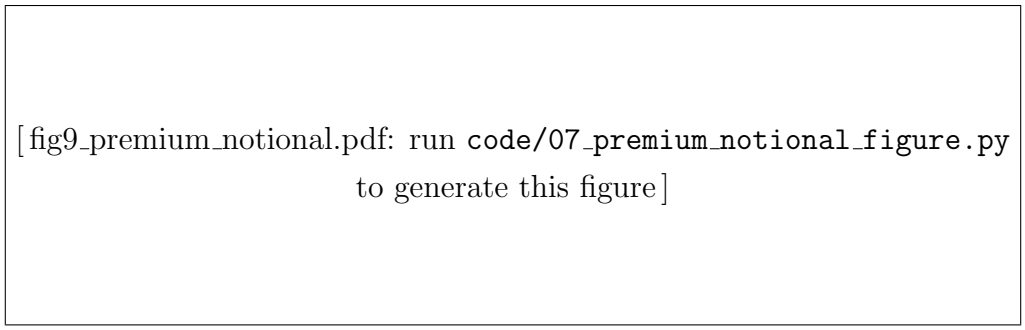

Figure 4: Composition of index-options activity: the log premium-to-notional ratio ln(premium ADT/notional ADT), market-wide (NSE+BSE), April 2023–March 2026. Dashed line: linear trend fitted on the pre-reform period (April 2023–October 2024) and extrapolated. Vertical lines: the three reform waves (20 November 2024; January 2025; 1 April 2025). The multi-year decline (progressively cheaper, shorter-dated, deeper out-of-the-money contracts) reverses sharply after the first wave.

Two caveats bound this interpretation. First, premium turnover is an imperfect welfare metric: it measures buyers' outlay, not net economic exposure, and is silent on the risk borne by option writers. Second, part of the ratio's rise could in principle reflect the elevated implied volatility of the October 2024–February 2025 correction, which mechanically raises premia per unit of notional; that the reversal persists well after the correction ended (the post-reform ratio trend runs through March 2026) points to composition rather than transient option repricing, but without contract-level moneyness data we cannot decompose the two channels formally. The compositional pattern also contrasts instructively with the 2015 lot-size episode, in which constrained retail flow *escaped* into cheaper, deeper out-of-the-money contracts (Agarwal et al., 2025): by removing four of five weekly expiries at the same time as it raised the minimum ticket, the 2024–25 package closed the avenue-shifting margin that undid the earlier, single-instrument intervention.

6 Participation and Heterogeneity

6.1 Who exited

Unique individual traders in equity derivatives fell from 84.1 lakh (December 2023–May 2024) to 67.6 lakh (December 2024–May 2025), −20%, after rising 54% the previous year. Figure 5 shows the cohort pattern that provides the paper's central mechanism evidence for the contract-size channel: growth reversals are monotonically decreasing in trader size. The smallest bucket (< Rs. 10,000 of six-month turnover) swung from +81 log points of growth pre-reform to −36 post; the Rs. 1–10 crore bucket swung from +28 to −4.

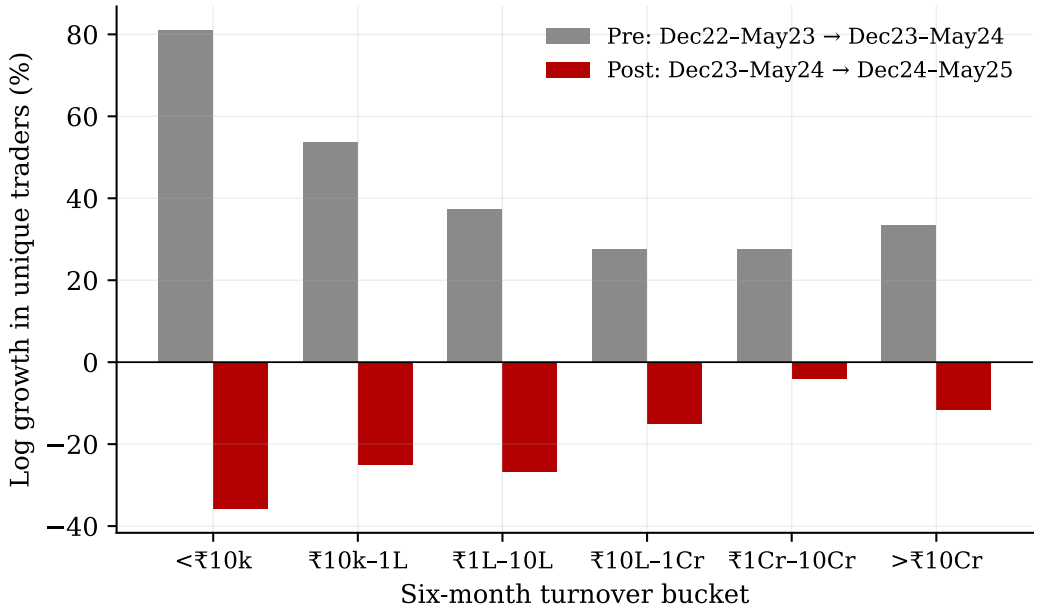

Figure 5: Log growth in unique traders by six-month turnover bucket, pre-reform transition (December 2022–May 2023 → December 2023–May 2024) versus post-reform transition (December 2023–May 2024 → December 2024–May 2025). Source: authors' calculations from SEBI (2025), Table 8.

Estimating equation (5) with the three sub-Rs. 10-lakh buckets as exposed yields $\hat{\theta} = -0.468$ (HC1 s.e. 0.137, $p = 0.001$): small-ticket cohorts lost an additional 47 log points of participation growth relative to large-ticket cohorts, over and above the common post-reform reversal. Exact permutation inference over all 20 exposure assignments gives $p = 0.10$: the realized assignment produces the second-largest $|\hat{\theta}|$ of the 20, where 0.05 is the smallest attainable value with six cohorts. Given the monotone dose–response visible in Figure 5 (the effect declines steadily across all six buckets rather than depending on one outlier), we read the cohort evidence as consistent with the contract-size channel: tripling the minimum ticket priced the smallest traders out first. Two further design-based checks reinforce this reading. Treating exposure continuously rather than as a binary (regressing cohort growth on the log midpoint of the turnover bucket, a post indicator, and their interaction) yields a dose–response slope of 0.065 log points of participation growth per log rupee of cohort size after the reform (HC1 s.e. 0.016), and the Spearman rank correlation between cohort size and the pre-to-post growth swing is 0.83 ($p = 0.042$, $n = 6$): larger cohorts were systematically more insulated.

The exit was derivatives-specific, not a retreat from equity markets. Total demat accounts across NSDL and CDSL rose from 15.1 crore at end-March 2024 to 19.2 crore at end-March 2025 (growth of 27% during the very year in which unique derivatives traders fell 20%)

and reached 22.5 crore by early 2026.[4] New investors kept entering the securities market throughout the reform window; what contracted was participation in the targeted product class.

Two features of the cohort data deserve emphasis. First, average traded value *within* buckets barely moved (SEBI Table 9 reports within-bucket changes of 0–8%), so the participation declines are an extensive-margin phenomenon (traders exiting) rather than incumbents shrinking within buckets. Second, the pre-period cohort growth rates reveal the boom's recruitment pattern: the smallest cohort was growing fastest before the reforms (+81 log points), meaning the policy interrupted an inflow of precisely the marginal, small, inexperienced traders whose loss rates SEBI's studies show to be the worst.

6.2 Quarterly dynamics of participation and losses

Figure 6 tracks FY2025 by quarter. Unique traders declined from 61.4 lakh in Q1 to 42.7 lakh in Q4 (−30%), with the largest single-quarter drop in Q4, the first full quarter with all major measures in force. Aggregate net losses peaked at Rs. 33,661 crore in Q3 and fell 26% in Q4 (Rs. 24,745 crore); average per-person losses fell 8%. The per-trader improvement is modest: the loss-maker share remained at 86.4% in Q4, against 84.5% in Q1. On the earliest available evidence, the curbs shrank the base of exposed traders substantially but improved the odds of the remaining traders only marginally.

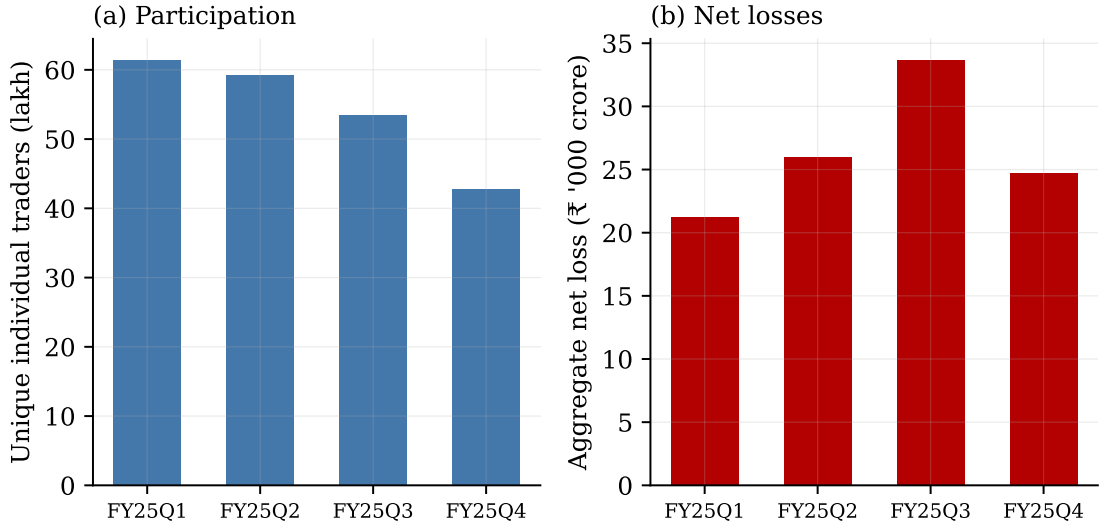

Figure 6: Quarterly participation and aggregate net losses of individual traders in equity derivatives, FY2025. Source: SEBI (2025), Table 12 (sample of top-13 brokers, ≈96 lakh unique traders).

[4]NSDL: 358 lakh (Mar-2024) → 395 lakh (Mar-2025) → 444 lakh; CDSL: 1,156 → 1,530 → 1,801 lakh. Source: SEBI Monthly Bulletin depository-statistics tables (April 2025 and April 2026 issues).

7 Substitution and Falsification

7.1 No migration to the cash market

A stated concern around the reforms was that displaced speculation would migrate to the cash segment (particularly intraday equity trading). The data show the opposite: cash-market ADT fell 9.6% year on year over the December–May comparison window, and its ITS level break (−0.337) is statistically indistinguishable from the breaks in stock options and stock futures (Table 6). Figure 7 plots all series indexed to their May–October 2024 average: no untargeted segment rises as index options fall. The adjustment margin was exit (consistent with the 20% decline in unique traders) rather than substitution across the products we observe. This conclusion is bounded by the panel's coverage: it speaks to aggregate exchange turnover in equity segments. Substitution into channels outside the panel (commodity or currency derivatives, offshore venues, or a shift from intraday to delivery-based activity within the cash aggregate) cannot be ruled out; what the data establish is that the cash market in aggregate absorbed no measurable inflow.

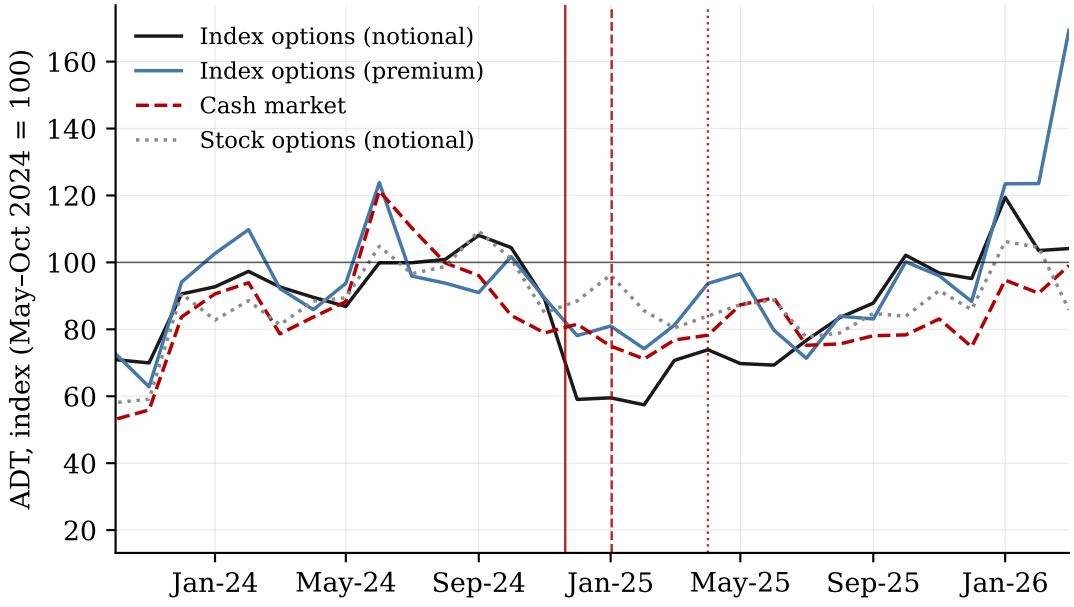

Figure 7: Average daily turnover by segment, indexed to the May–October 2024 mean (= 100). If curbed index-options activity had migrated to other segments, their indices would rise after November 2024; none does.

7.2 Exchange substitution

Cross-exchange migration, by contrast, was substantial. Re-estimating the full-window notional DiD on NSE-only data yields $\beta = -0.374$ ($p < 0.001$; -31%), against ≈ 0 market-wide. The wedge reflects BSE's rising share: with NSE's weekly products consolidated to Nifty alone, activity continued shifting toward BSE's surviving weekly Sensex contract through FY2026. Studies that measure the reforms' effects on NSE data alone will therefore overstate the aggregate decline by conflating policy impact with venue substitution, a general lesson for evaluating exchange regulation in fragmented markets. Figure 8 traces the migration directly: BSE's share of market-wide index-options ADT rose from 23.5% (notional) and 12.7% (premium) in October 2024 to 44.1% and 27.9% by March 2026, with no reversal after any reform wave.

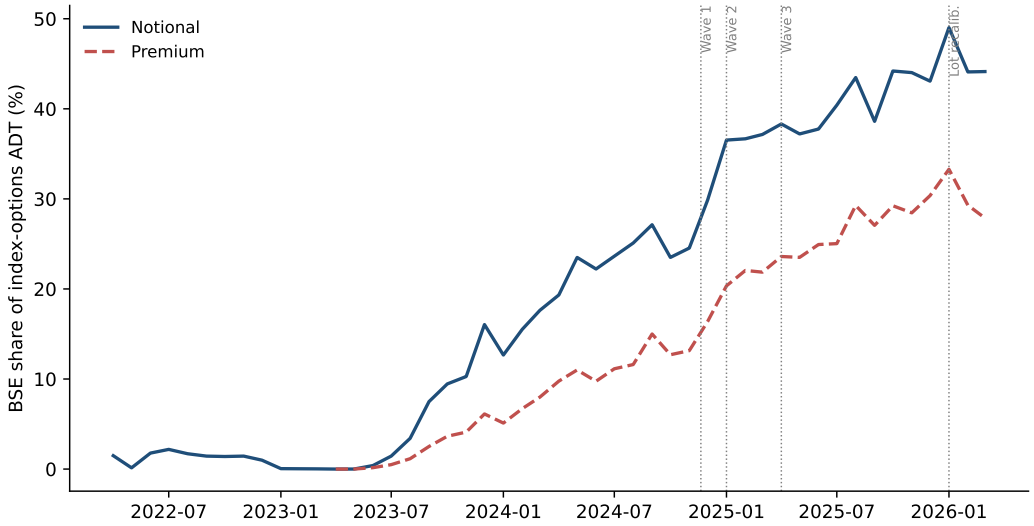

Figure 8: BSE's share of market-wide index-options average daily turnover, April 2022–March 2026. Dotted vertical lines mark the three reform waves and the January 2026 lot-size recalibration. Source: authors' calculations from SEBI Monthly Bulletin annexure tables (NSE and BSE panels).

8 Robustness

Table 7 collects robustness checks on the collapsed-series DiD.

Table 7: Robustness of the difference-in-differences estimates

Specification	β	s.e.	N (months)
Panel A: placebo adoption date (Nov 2023), pre-period only			
Notional	0.243	(0.140)	31
Premium	−0.387	(0.065)	19
Panel B: sample perturbations (full window, unadjusted)			
Drop transition months (Nov–Dec 2024), notional	0.048	(0.141)	46
Drop transition months (Nov–Dec 2024), premium	−0.066	(0.113)	34
Drop Jul–Aug 2025 (enforcement action), notional	0.021	(0.141)	46
Drop Jul–Aug 2025 (enforcement action), premium	−0.072	(0.117)	34
Panel C: alternative control and venue			
Control = stock futures, notional	0.161	(0.168)	48
NSE only, notional	−0.374	(0.106)	48

Notes: all rows estimate equation (2) (equation (3) logic applies as in the main table) with Newey–West (6-lag) standard errors. Panel A assigns a false adoption date of November 2023 and estimates on pre-period data only. The significant premium placebo reflects the strong pre-existing premium-compression trend and motivates the trend-adjusted specification, whose placebo analogue is the pre-trend coefficient itself. Panel C's NSE-only estimate bundles the policy effect with NSE→BSE migration.

Three points. First, the notional placebo is small, positive, and insignificant at 5% (0.243, $p = 0.083$); the premium placebo is large and significant, but this is exactly the manifestation of the premium series' strong secular trend that our trend-adjusted estimator is built to absorb; after trend adjustment the "placebo" object is the pre-trend itself, which is estimated, not assumed. Second, results are insensitive to dropping the implementation-transition months and the enforcement-action months. Third, using stock futures as an alternative control yields the same qualitative conclusion (near-zero full-window unadjusted DiD); no alternative control overturns the short-run contraction, which is visible against every untargeted segment.

Beyond Table 7, the cohort result survives its own design-based test (permutation inference, Section 6), and the aggregate-turnover conclusions do not rest on any single data vintage: the panel reproduces SEBI's independently published window aggregates to within 0.2–4% (Section 3).

Two further checks address inference and the post period's non-uniform treatment intensity. First, the trend-adjusted notional estimate is insensitive to the HAC bandwidth: across Newey–West lags of 2 to 12 the point estimate is unchanged (−0.573) and its stan-

dard error ranges only from 0.131 to 0.148, with $p < 10^{-3}$ throughout. Second, splitting the post indicator at the January 2026 lot-size recalibration (the design remains a two-group, single-adoption comparison; the post period is merely partitioned) locates the recovery in time: in the unadjusted collapsed series, the index–stock gap averages -0.004 (s.e. 0.138) over November 2024–December 2025 but $+0.206$ (s.e. 0.105) over January–March 2026, the three months after the exchanges lowered the Nifty lot from 75 to 65. With only three post-recalibration months we read this as descriptive, but it is consistent with Section 2's interpretation that part of the late-sample turnover recovery is rule-driven rather than purely behavioral.

Finally, the on-impact break does not depend on the linearity of the differential pre-trend. Allowing a quadratic pre-trend yields a level shift of -0.396 (s.e. 0.077); a piecewise-linear pre-period (kink at the pre-sample midpoint) yields -0.331 (s.e. 0.071); both remain significant at $p < 10^{-4}$. What curvature does affect is *extrapolated magnitudes*: a concave quadratic extrapolated over the post window implies the boom would have reversed on its own, an unstable counterfactual at multi-month horizons. This is precisely why magnitude statements in this paper are anchored to the linear-trend and no-trend bracket of Section 8.1 rather than to any higher-order extrapolation, and why the discrete break, robust across all three trend specifications, is the primary causal object.

8.1 Sensitivity to the counterfactual trend

The trend-adjusted estimate extrapolates the estimated pre-period differential trend ($\hat{\gamma} = 0.022$ log points per month). Following the logic of Rambachan and Roth (2023), Figure 9 recomputes the average November 2024–May 2025 effect under *every* assumed counterfactual trend γ in a wide grid, anchored at the October 2024 fitted level. The estimate is -0.557 at $\hat{\gamma}$ and remains -0.469 (-37%) with no trend adjustment at all ($\gamma = 0$). The breakdown value at which the effect reaches zero is $\gamma^* = -0.117$: the index–stock options gap would have had to be *shrinking* at 11.7 log points per month absent the reforms, a trend opposite in sign to the estimated one, 19.7 standard errors below it, and more than five times its magnitude. No plausible violation of the trend assumption overturns the short-run contraction; the honest bracket for the short-run effect is $[-43\%, -37\%]$, spanned by the with- and without-trend estimates.

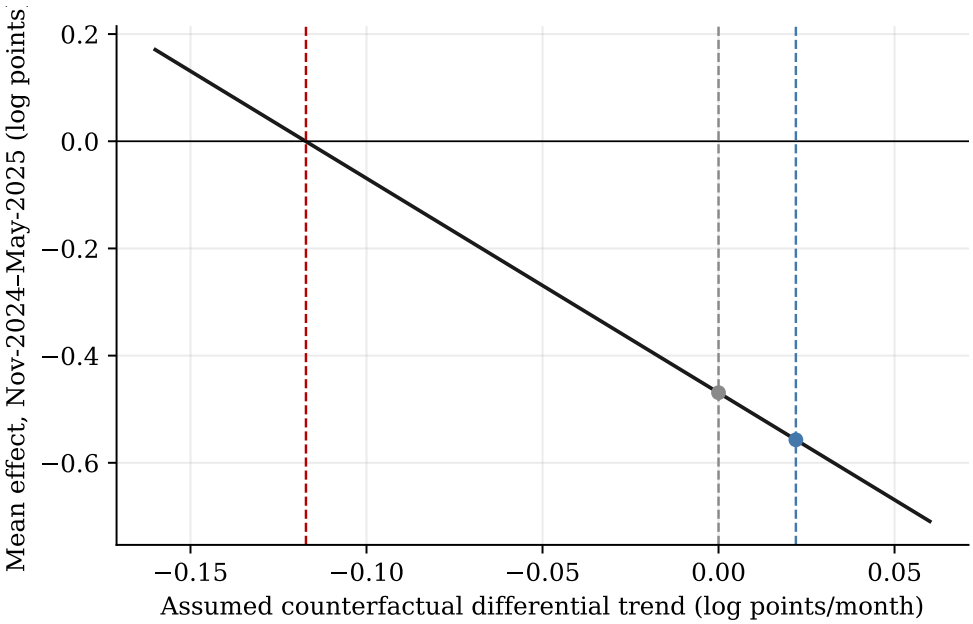

Figure 9: Sensitivity of the short-run effect to the assumed counterfactual differential trend, in the spirit of Rambachan and Roth (2023). The mean November 2024–May 2025 effect is plotted against the counterfactual trend γ imposed on the index–stock options log gap (anchored at the October 2024 fitted level). Reference lines mark no adjustment ($\gamma = 0$), the estimated pre-trend $\hat{\gamma} = 0.022$ (s.e. 0.007), and the breakdown value $\gamma^* = -0.117$.

9 Discussion

9.1 Interpreting the pattern of effects

Taken together, the estimates describe a regulation that worked through exactly the channels its design implies, with a mix of intended and unintended consequences:

Scale. The short-run contraction in targeted activity was large (roughly −43% against counterfactual in notional terms) and front-loaded around the weekly-expiry rationalization and the contract-size increase, the two measures that mechanically destroy trade opportunities rather than merely repricing them.

Composition. The premium-to-notional ratio reversed a multi-year compression trend, implying the surviving flow is concentrated in larger, more expensive, less lottery-like contracts. If the policy objective is framed as reducing the availability of cheap, high-leverage, near-expiry speculation to small retail traders, the composition evidence indicates success on that specific margin.

Incidence. Participation declines were concentrated among the smallest traders, mechanically so, since a Rs. 15–20 lakh minimum ticket binds only on them. Whether this is welfare-

improving depends on one's model of the marginal small trader. Under the behavioral-losses view supported by SEBI's profitability studies (91% of individuals losing, average loss exceeding Rs. 1 lakh per person), removing small traders from a negative-expected-value game is protective. Under a consumer-sovereignty view, the same fact pattern is a paternalistic exclusion of small players from a market that remains open to the wealthy. The Q4-FY2025 data (losses per remaining trader down only 8%, loss-maker share broadly unchanged) suggest the reform's protective effect operates almost entirely through the extensive margin (fewer people exposed) rather than by improving anyone's trading outcomes. This pattern speaks to a live domestic policy debate: Aggarwal and Mitra (2026) argue that poorly targeted derivatives interventions impose market-wide costs without improving the outcomes of the traders they aim to protect. Our evidence is consistent with the outcome half of that critique (per-trader loss rates barely moved) while showing that the package did achieve a large, targeted, and so-far durable reduction in the number of small traders exposed.

Adaptation. The aggregate turnover effect decayed within a year: market-wide premium ADT exceeded pre-reform levels by Q4 FY2026. Mechanisms visible in our data include venue substitution toward BSE's surviving weekly product and re-concentration of activity in the permitted contracts; mechanisms documented elsewhere include longer-dated positioning. In addition, the January 2026 lot-size recalibration (Nifty 75 to 65) mechanically lowered the minimum ticket by about 13%, so part of the late-sample recovery reflects a rule-driven relaxation of treatment intensity rather than behavioral adaptation alone. The participation decline, by contrast, shows no reversal through the latest available cohort data. A regulation aiming at *who* trades appears more durable than one aiming at *how much* is traded.

9.2 Implications for market participants

For brokers and exchanges, the results imply that the revenue shock from derivatives curbs is better forecast from participation (client-count) elasticities than from headline turnover, which recovers: discount brokers whose economics depend on small-ticket order flow bear the persistent incidence, while exchange premium-based fee pools recovered within five quarters. For institutional traders and market makers, the compositional shift toward higher premium-per-notional contracts and a single weekly expiry per exchange concentrates gamma and expiry-day risk in fewer, larger maturities, consistent with the regulator's follow-on May 2025 move to delta-based ("future-equivalent") open-interest metrics and expiry-day standardization. For policymakers elsewhere confronting retail options booms, the obvious parallel is the United States, where zero-days-to-expiry (0DTE) contracts (daily-expiring S&P 500 options that now account for roughly half of SPX options volume) are dominated by small

retail trades with negative average returns (Beckmeyer et al., 2023). India ran the restrictive counterfactual to the permissive US regime: the experiment suggests contract-design levers (expiry frequency, minimum ticket size) can achieve targeted de-risking quickly and regressively, but that turnover-based success metrics will flatter the intervention only briefly.

9.3 Limitations

Our causal claims rest on aggregate, segment-level data; trader-level microdata remain proprietary to SEBI and the exchanges. Three specific limitations follow. First, with one treated and one control series, inference relies on time-series variation (HAC), placebo dates, and design transparency rather than cross-sectional clustering; we cannot rule out an index-options-specific shock coincident with November 2024 other than the reforms, though we know of no candidate: the market correction, STT change, and enforcement shocks are all either common to the control or explicitly tested. Second, the trend-adjusted counterfactual extrapolates a boom-era differential trend; Section 8.1 shows the short-run conclusion survives every counterfactual trend short of an implausible sign reversal 19.7 standard errors below the estimate, and the unadjusted and trend-adjusted estimates bracket the effect at $[-37\%, -43\%]$. Third, the cohort design has six units and two periods; its permutation p-value (0.10) is bounded below by 0.05, and we lean on the monotone dose–response pattern rather than the significance threshold. Fourth, the control is not microstructurally identical to the treated series: stock options settle physically, with escalating expiry-week delivery margins, while index options settle in cash (Section 4 discusses the direction of any induced bias and the untargeted-segment checks that bound it). Fifth, our substitution analysis observes exchange-traded equity segments only; migration to commodity, currency, or offshore products is outside the panel. Finally, FY2023 premium data do not exist in the bulletin format, so premium estimates use 19 pre-treatment months against 31 for notional, and the premium results are correspondingly less well identified.

10 Conclusion

SEBI's 2024–25 index-derivatives reforms are the sharpest regulatory experiment yet run on a retail options boom. Exploiting the package's exclusive targeting of index products, we estimate that the curbs reduced index-options notional turnover by 37–43% relative to counterfactual in the six months after implementation, reversed a multi-year slide in the premium-to-notional ratio, and pushed roughly one in five individual traders, disproportionately the smallest, out of the equity derivatives segment, with no detectable migration into

the cash market at the aggregate level. Aggregate turnover adapted and recovered within five quarters: partly through migration to BSE's surviving weekly product and partly through the exchanges' rule-driven January 2026 lot-size recalibration; the contraction in participation did not reverse. The reforms, in short, succeeded quickly at their compositional and participation objectives while their headline turnover effect proved transitory, an instructive combination for regulators weighing product-design interventions against transaction taxes, and a caution against evaluating either by turnover alone.

Three extensions merit future work as data accumulate: trader-level profitability after the reforms (does the surviving population's loss rate fall?), the May 2025 delta-based open-interest framework as a second experiment, and the cross-market comparison with the United States' zero-days-to-expiry growth under a permissive regime.

References

Agarwal, V., P. Ghosh, N. R. Prabhala, and H. Zhao (2025). Animal spirits on steroids: Evidence from retail options trading in India. Working paper. SSRN 5430635.

Aggarwal, N. and B. Mitra (2026). Retail losses in India's derivatives market: A re-examination of the evidence. *Ideas for India*, 29 April 2026. Accessed 16 July 2026.

Barber, B. M., Y.-T. Lee, Y.-J. Liu, and T. Odean (2009). Just how much do individual investors lose by trading? *Review of Financial Studies* 22(2), 609–632.

Bauer, R., M. Cosemans, and P. Eichholtz (2009). Option trading and individual investor performance. *Journal of Banking & Finance* 33(4), 731–746.

Beckmeyer, H., N. Branger, and L. Gayda (2023). Retail traders love 0DTE options... but should they? Working paper. University of Münster. SSRN 4404704.

Bertrand, M., E. Duflo, and S. Mullainathan (2004). How much should we trust differences-in-differences estimates? *Quarterly Journal of Economics* 119(1), 249–275.

Boyer, B. H. and K. Vorkink (2014). Stock options as lotteries. *Journal of Finance* 69(4), 1485–1527.

Bryzgalova, S., A. Pavlova, and T. Sikorskaya (2023). Retail trading in options and the rise of the big three wholesalers. *Journal of Finance* 78(6), 3465–3514.

Callaway, B. and P. H. C. Sant'Anna (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics* 225(2), 200–230.

Conley, T. G. and C. R. Taber (2011). Inference with "difference in differences" with a small number of policy changes. *Review of Economics and Statistics* 93(1), 113–125.

de Silva, T., K. Smith, and E. C. So (2024). Losing is optional: Retail option trading and expected announcement volatility. Working paper. MIT Sloan.

Donald, S. G. and K. Lang (2007). Inference with difference-in-differences and other panel data. *Review of Economics and Statistics* 89(2), 221–233.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. *Journal of Econometrics* 225(2), 254–277.

Heimer, R. and A. Simsek (2019). Should retail investors' leverage be limited? *Journal of Financial Economics* 132(3), 1–21.

Jones, C. M. and P. J. Seguin (1997). Transaction costs and price volatility: Evidence from commission deregulation. *American Economic Review* 87(4), 728–737.

Kumar, A. (2009). Who gambles in the stock market? *Journal of Finance* 64(4), 1889–1933.

Lee, J., D. Ryu, and R. I. Webb (2026). How do option contract sizes affect investor composition and market quality? *Review of Derivatives Research* 29(1).

Newey, W. K. and K. D. West (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica* 55(3), 703–708.

Rambachan, A. and J. Roth (2023). A more credible approach to parallel trends. *Review of Economic Studies* 90(5), 2555–2591.

Securities and Exchange Board of India (2023). Analysis of profit and loss of individual traders dealing in equity futures and options segment. Study, Department of Economic and Policy Analysis, 25 January 2023.

Securities and Exchange Board of India (2024). Analysis of profits and losses in the equity derivatives segment (FY22–FY24). Study, Department of Economic and Policy Analysis, 23 September 2024.

Securities and Exchange Board of India (2025). Comparative study of growth in equity derivatives segment vis-à-vis cash market after recent measures. Research report, 7 July 2025.

Sun, L. and S. Abraham (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics* 225(2), 175–199.

Umlauf, S. R. (1993). Transaction taxes and the behavior of the Swedish stock market. *Journal of Financial Economics* 33(2), 227–240.

Xiong, W. and J. Yu (2011). The Chinese warrants bubble. *American Economic Review* 101(6), 2723–2753.

A Data Construction and Replication

A.1 Sources

All data are public. The monthly turnover panel is extracted from the annexure tables of the SEBI Monthly Bulletin (`https://www.sebi.gov.in`, Reports & Statistics → Publications → SEBI Bulletin): "Trends in Equity Derivatives Segment at NSE/BSE," "Trends in Cash Segment of NSE/BSE." Because each bulletin issue reports monthly rows only for the fiscal year in progress, we combine the April 2023 issue (FY2022–23 months), April 2024 issue (FY2023–24), March 2025 issue (April 2024–February 2025), April 2025 issue (March 2025, extracted from the PDF annexure), and April 2026 issue (FY2025–26). The FY2022–23 bulletin format reports options turnover in notional terms only; premium reporting begins with the FY2023–24 format, so premium series start April 2023. Table 8 lists the issues used and the panel months each contributes.

Table 8: SEBI Monthly Bulletin issues used and the panel months each contributes

Bulletin issue	Panel months contributed	Options series
April 2023	Apr 2022 – Mar 2023 (FY2022–23)	Notional only[a]
April 2024	Apr 2023 – Mar 2024 (FY2023–24)	Notional + premium
March 2025	Apr 2024 – Feb 2025	Notional + premium
April 2025	Mar 2025[b]	Notional + premium
April 2026	Apr 2025 – Mar 2026 (FY2025–26)	Notional + premium

Notes: annexure tables "Trends in Equity Derivatives Segment at NSE/BSE" and "Trends in Cash Segment of NSE/BSE" (`https://www.sebi.gov.in`). Each issue reports monthly rows only for the fiscal year then in progress; the notional panel spans 48 months (April 2022–March 2026) and the premium panel 36 months (April 2023–March 2026).

[a] The FY2022–23 bulletin format reports options turnover in notional terms only; premium reporting begins with the FY2023–24 format.

[b] March 2025 cells extracted from the PDF annexure; stock-options cells absent from that layout are recovered as fiscal-year totals minus the sum of April 2024–February 2025.

Participation and profitability tables are from SEBI's research reports of 25 January 2023, 23 September 2024, and 7 July 2025 (`https://www.sebi.gov.in`, Reports & Statistics → Research). Cohort counts (Table 8 of the July 2025 study) classify traders by combined NSE+BSE traded value in the equity derivatives segment over each six-month window; the FY2025 quarterly profit-and-loss series (Table 12) covers clients of the top-13 brokers (≈96

lakh of ≈107 lakh unique traders market-wide).

A.2 Construction choices

(i) Calls and puts are summed; (ii) NSE and BSE are summed for market-wide series, with NSE trading days used as the day-count denominator for all segments to keep ADT comparisons consistent; (iii) futures turnover is notional by convention; (iv) all values are in Rs. crore at current prices; (v) fiscal years run April–March; (vi) the March 2025 stock-options cells unavailable in the April 2025 PDF layout are recovered as fiscal-year totals minus the sum of April 2024–February 2025 months, both published in the same table family.

A.3 Validation against SEBI aggregates

Table 9: Panel validation against SEBI (2025) window aggregates (ADT, Rs. crore)

Window aggregate	This paper	SEBI (2025)	Deviation
Index options premium, Dec-23–May-24	67,608	67,467	+0.2%
Index options premium, Dec-24–May-25	58,834	61,533	−4.4%
Index options notional, Dec-24–May-25	3,17,21,632	3,18,50,658	−0.4%
Index options notional, Dec-22–May-23	2,18,06,546	2,24,69,205	−2.9%
Cash market, Dec-24–May-25	1,06,453	1,05,544	+0.9%
Cash market, Dec-23–May-24	1,17,735	1,18,190	−0.4%

Deviations reflect SEBI's averaging convention (average of monthly ADTs versus total turnover over total days) and day-count differences across exchanges; none affects any inference in the paper.

A.4 Replication

Python code for extraction (`01_extract_data.py`), estimation (`02_analysis.py`, `03_trend_adjusted.py`, `05_sensitivity.py`), figures (`04_figures.py`), and the revision-round extensions (post-period split, cohort dose–response, HAC lag sensitivity, and exchange shares, `06_tierc.py`), together with the derived CSV panel and all source-document URLs and download dates (16 July 2026), accompanies this paper. No proprietary or paid data source is used at any step.

Data and code availability. The complete replication package (the derived monthly panel and cohort CSV files, all estimation and figure code, and the source SEBI bulletin documents) is openly available. The version-controlled project is maintained at `https://github.com/DogInfantry/sebi-fo-curbs-2025`; a citable snapshot of that repository is archived on Zenodo (DOI: 10.5281/zenodo.21420045), and the curated dataset is deposited at the Harvard Dataverse (DOI: 10.7910/DVN/FZYZNN). All inputs are public SEBI publications.

B Additional Results

Cohort growth detail. Log growth in unique traders by bucket (percent): pre-reform transition: $<$ Rs. 10k: +81.0; Rs. 10k–1L: +53.7; Rs. 1L–10L: +37.4; Rs. 10L–1Cr: +27.6; Rs. 1–10Cr: +27.5; $>$ Rs. 10Cr: +33.4. Post-reform transition: −35.8; −25.0; −26.8; −14.9; −4.1; −11.7 respectively.

Year-on-year window magnitudes (Dec–May, ADT). Index options: premium −13.0%, notional −29.2%. Stock options: premium −6.6%, notional +0.5%. Index futures: −9.3%. Stock futures: −8.5%. Cash market: −9.6%.

AI-Use Disclosure

In accordance with SSRN policy, the authors disclose that a large language model (Claude, Anthropic) was used in the preparation of this paper for statistical code, and preliminary drafting assistance. The research design, data-source selection, verification of all extracted numbers against primary SEBI documents, interpretation of results, and final text were determined and reviewed by the authors, who take full responsibility for the paper's content.