



IMPACT OF US FEDERAL FUNDS RATE CHANGES ON STOCK RETURNS OF INDIAN IT MULTINATIONAL FIRMS: THE MODERATING ROLE OF LEVERAGE

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Abstract

This study examines the impact of changes in the US Federal Funds Rate (FFR) on the monthly stock returns of six major Indian IT firms — TCS, Infosys, Wipro, HCL Technologies, Tech Mahindra, and Mphasis — over April 2019 to March 2025 (426 firm-month observations). Using a Fixed Effects panel regression with HC1-robust standard errors, the study finds a statistically significant positive relationship between FFR changes and IT stock returns ($\beta = +7.440$, $p = 0.011$), driven by the USD/INR exchange rate earnings translation channel. Financial leverage does not moderate this relationship, consistent with the structurally negligible debt levels across the sector (mean D/E = 0.08). Sub-period analysis confirms effects are concentrated in the 2022–2025 aggressive tightening cycle ($\beta = +11.888$, $p = 0.0003$). VIX is the most consistent negative predictor of returns across all specifications. The findings contribute to the monetary policy spillover literature and carry direct implications for portfolio management and corporate treasury strategy.

Keywords: Federal Funds Rate; Indian IT sector; stock returns; leverage moderation; monetary policy transmission; exchange rate channel; panel data; financial accelerator

1. Introduction

The United States Federal Reserve occupies a singular position in global financial architecture. Its decisions on the federal funds rate reverberate across equity markets, currency valuations, and capital flows well beyond American borders. In the post-2008 era of financial globalisation, these spillovers have intensified dramatically — the 2013 taper tantrum caused the Indian rupee to lose over 12% of its value in weeks, and the 2022–2024 tightening cycle, which raised the FFR from near zero to 5.25–



5.50% in eighteen months, further demonstrated how powerfully US monetary policy shapes global financial conditions.

India's IT sector presents a structurally unique case. TCS, Infosys, Wipro, HCL Technologies, Tech Mahindra, and Mphasis earn 50–80% of revenues in US dollars while bearing the majority of costs in Indian rupees. This currency mismatch creates a natural exchange rate exposure that may reverse the conventional negative relationship between rate increases and equity valuations: when the Federal Reserve tightens and the dollar strengthens, each dollar of IT revenue converts into more rupees, directly boosting operating margins. During the 2022–2024 cycle, the rupee depreciated from approximately ₹75 to ₹87 per dollar — a 15% earnings tailwind.

The study addresses three research problems: (1) whether FFR changes significantly affect monthly stock returns of Indian IT firms; (2) whether financial leverage moderates this relationship; and (3) whether effects differ across monetary policy regimes — pre-tightening (2019–2022) versus aggressive tightening (2022–2025). The panel covers 71 months and 426 firm-month observations encompassing three distinct monetary policy regimes.

2. Literature Review

2.1 Monetary Policy Transmission to Equity Markets

Kuttner (2001) established the methodology for isolating monetary policy surprises via federal funds futures. Bernanke and Kuttner (2005) produced the seminal estimate: a surprise 25bp rate cut associates with approximately a 1% increase in broad US equity indices, primarily through changes in expected excess returns. Thorbecke (1997) confirmed expansionary policy generates positive stock returns; Gürkaynak et al. (2022) showed growth and value stocks respond asymmetrically. Ehrmann and Fratzscher (2004) demonstrated that financially constrained firms exhibit significantly larger sensitivity to Fed policy.

2.2 International Spillovers and the Global Financial Cycle

Rey (2015) argued a global financial cycle — driven by US monetary policy — synchronises capital flows and risky asset prices worldwide. Miranda-Agrippino and Rey (2020, 2022) provided empirical support. Hoek, Kamin, and Yoldas (2022, 2023) introduced a crucial qualification: when Fed tightening is driven by positive US growth shocks rather than inflation concerns, increased global demand can



partially offset the tightening effect for emerging markets. Chen and Tillmann (2025) found the 2022–2023 cycle generated unusually large pass-through to emerging market financial conditions.

2.3 India-Specific and IT Sector Evidence

Aizenman et al. (2016) demonstrated India was among the most affected emerging markets during the 2013 taper tantrum. Lakdawala (2021) showed Indian stocks have grown progressively more responsive to US monetary shocks since the early 2000s. Khuntia and Hiremath (2019) documented IT stocks display a distinct response profile diverging from interest-rate-sensitive sectors. Tomar and Kesarwani (2021) found the error correction term statistically insignificant for IT — indicating non-conformity with long-run adjustment dynamics. Industry evidence consistently shows every 1% rupee depreciation increases IT sector net profit by 1.5–3.5%, since revenues are dollar-denominated and costs rupee-based.

2.4 Leverage as a Moderator

The financial accelerator (Gertler & Gilchrist, 1994) establishes leverage as a critical amplifier of monetary policy transmission. Ottonello and Winberry (2020) demonstrated leverage and distance-to-default are the primary cross-sectional determinants of heterogeneous investment responses. Ippolito et al. (2024) provided the most direct stock market channel evidence: leverage is more important than firm size or age in explaining cross-firm variation in stock price responses. Whether this mechanism operates where firms carry structurally negligible debt — as in Indian IT — is an open and empirically important question.

Research Gap: No study has examined FFR changes on individual Indian IT firms using firm-level panel data. The financial accelerator literature has been tested almost exclusively where firms carry material debt — its extension to structurally near-zero leverage contexts is absent. No prior study explicitly compares the 2022–2025 tightening cycle with preceding accommodative regimes for this sector.

3. Theoretical Framework

Present Value Theory: Equity value $P = \sum E(CF_t)/(1+r)^t$. An FFR increase raises r , reducing equity value — the conventional channel. However, for Indian IT exporters, tightening simultaneously boosts expected INR earnings through dollar appreciation. The net equity price effect depends on which channel dominates.



Exchange Rate Channel: FFR increases widen the US-India interest rate differential, attracting capital toward dollar assets. Portfolio rebalancing strengthens the dollar and depreciates the rupee, directly boosting IT earnings. The $\Delta\text{USD/INR}$ variable explicitly controls for this mechanism.

Financial Accelerator: The core mechanism rests on an external finance premium that widens during tightening, disproportionately affecting high-leverage firms as net worth declines and debt service costs rise. With a sample-wide mean D/E of 0.084 and no firm exceeding 0.27, this mechanism faces a fundamental structural constraint in the Indian IT context.

4. Research Methodology

4.1 Objectives and Hypotheses

(1) Examine the impact of FFR changes on stock returns of Indian IT firms. (2) Assess whether leverage moderates this relationship. (3) Compare return sensitivity across pre-aggressive and aggressive tightening periods.

H₁: FFR changes have no significant impact on IT stock returns (null); significant negative impact (alternative) — tests standard PV prediction.

H₂: Leverage does not moderate the FFR–return relationship (null); higher leverage amplifies the negative impact (alternative). The null is expected to hold given near-zero leverage.

H₃: No significant difference in FFR impact across sub-periods (null); stronger impact during the 2022–2025 tightening cycle (alternative).

4.2 Sample, Data, and Variables

Six NSE-listed IT firms (TCS, Infosys, Wipro, HCL Technologies, Tech Mahindra, Mphasis) selected for continuous listing, complete data availability, and collective dominance of the NSE IT index. Study period: April 2019 to March 2025 — 71 months, yielding a balanced panel of 426 firm-month observations covering three monetary policy regimes: pre-pandemic rate-cutting (Apr 2019–Feb 2020), near-zero hold during COVID recovery (Mar 2020–Mar 2022), and aggressive tightening (Apr 2022–Mar 2025).

Table 1: Variable Definitions and Sources

Variable	Measurement	Source
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Monthly Stock Return (R_{it})	$\ln(P_t / P_{t-1})$ of adjusted closing prices	Investing.com
ΔFFR (Primary IV)	First difference of monthly avg. effective Federal Funds Rate (pp)	FRED / Fed Reserve
Leverage (D/E)	Total financial debt $\div$ total equity (quarterly, forward-filled)	CMIE Prowess IQ
$\Delta FFR \times D/E$	Product of monthly FFR change and firm-level D/E ratio	Computed
$\Delta USD/INR$	Monthly change in USD/INR exchange rate	RBI Database
ΔVIX	Monthly change in CBOE VIX volatility index	CBOE
$\ln(MktCap)$	Natural log of monthly market capitalisation (USD bn)	CMIE Prowess IQ

Source: Author's compilation

4.3 Model Specifications

Three progressively enriched Fixed Effects panel regressions are estimated:

Model 1 (Baseline): $R_{it} = \alpha_i + \beta_1(\Delta FFR_t) + \varepsilon_{it}$

Model 2 (Moderation): $R_{it} = \alpha_i + \beta_1(\Delta FFR_t) + \beta_2(D/E_{it}) + \beta_3(\Delta FFR_t \times D/E_{it}) + \varepsilon_{it}$ — β_3 is the primary object of inference for H_2 .

Model 3 (Full — Primary): $R_{it} = \alpha_i + \beta_1(\Delta FFR_t) + \beta_2(D/E_{it}) + \beta_3(\Delta FFR_t \times D/E_{it}) + \beta_4(\Delta USD/INR_t) + \beta_5(\Delta VIX_t) + \beta_6(\ln MktCap_{it}) + \varepsilon_{it}$

The Hausman test ($\chi^2 = 95.249$, $p < 0.0001$) decisively confirms Fixed Effects. The Breusch-Pagan test (stat = 17.501, $p = 0.008$) confirms heteroskedasticity, necessitating HC1-robust standard errors. Sub-period analysis splits at April 2022; a DiD framework classifies firms into high- and low-leverage groups at the sample median D/E of 0.065.



5. Data Analysis and Results

5.1 Descriptive Statistics

Mean monthly return is 1.37% (~16.4% annualised), consistent with strong historical IT sector performance. Standard deviation of 8.3% per month reflects substantial dispersion, with the minimum (−24.0%) coinciding with the COVID-19 crash and the maximum (+31.8%) reflecting post-crash rallies. The leverage distribution — mean D/E of 0.084, maximum 0.27 — reflects the asset-light, cash-surplus nature of Indian IT firms.

Table 2: Descriptive Statistics (N = 426)

Variable	Mean	Std Dev	Min	Max	N
Stock Return	0.01371	0.08308	−0.24030	0.31770	426
ΔFFR	0.00027	0.00232	−0.00930	0.00700	426
Leverage (D/E)	0.08354	0.06952	0.00000	0.27000	426
USD/INR	78.01	5.07	68.76	86.96	426
VIX	20.38	7.18	12.73	57.74	426
$\ln(\text{MktCap})$	3.13	1.28	0.35	5.26	426
$\Delta\text{FFR} \times \text{D/E}$	0.00003	0.00025	−0.00140	0.00168	426

Source: Author's calculations based on Investing.com, FRED, RBI, CBOE, CMIE Prowess

5.2 Correlation and Diagnostic Analysis

The strongest bivariate correlation with returns is VIX ($r = -0.139$). The ΔFFR –return correlation is weakly positive ($r = 0.042$), counterintuitive under standard theory but reflecting the conflation of the discount rate effect (negative) with the exchange rate earnings effect (positive). The ΔFFR –interaction term correlation ($r = 0.760$) is mechanically expected. VIF analysis confirms all values below 2.6 — within acceptable multicollinearity bounds.



5.3 Primary Regression Results — Model 3

The ΔFFR coefficient is statistically significant and positive in the Fixed Effects specification ($\beta = +7.440$, $p = 0.011$). This directly contradicts H_1 's directional prediction but is theoretically coherent: rapid FFR increases during 2022–2024 drove ~16% USD appreciation against the INR, boosting INR-denominated earnings for firms earning 50–80% of revenues in USD. The magnitude implies a one-percentage-point FFR increase associates with a 7.44pp increase in monthly returns; a 0.50pp increase corresponds to approximately 3.72% additional monthly return.

The $\Delta\text{USD/INR}$ coefficient is significantly positive ($\beta = +0.00316$, $p = 0.005$), confirming the earnings translation channel. The ΔVIX coefficient is significantly negative ($\beta = -0.00165$, $p = 0.011$), consistent with Rey's (2015) global financial cycle hypothesis. The size coefficient is significantly negative ($\beta = -0.09376$, $p < 0.001$), capturing within-firm mean reversion. Under RE, only VIX is significant and the ΔFFR coefficient is small and insignificant ($\beta = +1.845$, $p = 0.548$) — underscoring the critical importance of FE's within-firm identification.

Table 3: Panel Regression Results — Model 3, Full Specification (N = 426)

Variable	FE Coeff.	FE p-val	RE Coeff.	RE p-val	Sig.
ΔFFR (Primary IV)	+7.43951	0.0110	+1.84477	0.5476	**
Leverage (D/E)	+0.33009	0.1675	-0.02947	0.6512	n.s.
$\Delta\text{FFR} \times \text{Leverage}$	-13.521	0.5567	-6.966	0.7820	n.s.
$\Delta\text{USD/INR}$	+0.00316	0.0045	-0.00089	0.2670	***
ΔVIX	-0.00165	0.0113	-0.00167	0.0244	**
$\ln(\text{MktCap})$	-0.09376	0.0000	-0.00621	0.0823	***

Note: *** $p < 0.01$, ** $p < 0.05$. HC1 robust standard errors. Hausman $\chi^2 = 95.249$ ($p < 0.0001$) confirms Fixed Effects.

Source: Author's calculations



5.4 Moderation and DiD Analysis

The interaction term ($\Delta\text{FFR} \times \text{D/E} = -13.521$, $p = 0.557$) is directionally consistent with the financial accelerator prediction but statistically indistinguishable from zero; the 95% CI $[-58.70, +31.66]$ is extremely wide. Two structural factors explain the null: (1) near-zero leverage severely limits cross-sectional differentiation, and (2) the financial accelerator is structurally dormant where no material debt service burden exists. The DiD coefficient ($\text{Post} \times \text{High Leverage} = -0.0008$, $p = 0.961$) corroborates this conclusion. This null is a substantive theoretical finding — it establishes the boundary conditions under which the financial accelerator framework is inapplicable.

5.5 Sub-Period Analysis

Period 1 (Apr 2019–Mar 2022, near-zero rates): ΔFFR coefficient is -3.138 and insignificant ($p = 0.641$). Period 2 (Apr 2022–Mar 2025, aggressive tightening): coefficient rises to $+11.888$, highly significant ($p = 0.0003$) — more than triple the full-period estimate. The exchange rate earnings translation channel operates most powerfully when FFR increases are large, rapid, and sustained. ΔVIX is the only variable significant in both sub-periods, confirming global risk sentiment as a persistent structural risk factor.

Table 4: Sub-Period Analysis — Model 3 Fixed Effects (N = 426)

Variable	P1 Coeff. (Apr19– Mar22)	P1 p-val	P2 Coeff. (Apr22– Mar25)	P2 p-val	
ΔFFR	-3.13770	0.641 n.s.	$+11.88818$	0.0003 ***	—
Leverage (D/E)	$+0.04803$	0.848 n.s.	-0.21717	0.603 n.s.	—



$\Delta\text{FFR} \times \text{Leverage}$	+45.734	0.352 n.s.	-3.937	0.881 n.s.	—
$\Delta\text{USD/INR}$	+0.02941	0.000 ***	+0.00665	0.047 **	—
ΔVIX	-0.00566	0.000 ***	-0.00636	0.000 ***	—
$\ln(\text{MktCap})$	-0.10221	0.000 ***	-0.02614	0.425 n.s.	—
N / R ²	210 / 0.244	—	216 / 0.193	—	—

Note: *** $p < 0.01$, ** $p < 0.05$, n.s. = not significant. P1 = April 2019–March 2022; P2 = April 2022–March 2025.

5.6 Hypothesis Testing Summary

Table 5: Summary of Hypothesis Testing

H	Statement	Empirical Result	Decision
H ₁	FFR changes have significant negative impact on IT stock returns	Positive & significant ($\beta = +7.440$, $p = 0.011$)	REJECTED — direction reversed
H ₂	Leverage moderates the FFR–return relationship	Insignificant ($\beta = -13.521$, $p = 0.557$); DiD = -0.0008, $p = 0.961$	NOT SUPPORTED — FA dormant
H ₃	Stronger impact during aggressive tightening period	$\beta = -3.138$ (P1, n.s.) vs $\beta = +11.888^{***}$ (P2)	SUPPORTED (positive direction)

Source: Author's compilation based on empirical results



6. Discussion

6.1 Positive FFR Effect via Exchange Rate Earnings Translation

The most striking finding is the direction reversal of the FFR–return relationship. Standard discounted cash flow theory predicts rate increases suppress equity values — the empirical evidence decisively contradicts this for Indian IT. The dominant mechanism is the exchange rate earnings translation channel: when the Fed tightens, the rupee depreciates, and each dollar of IT revenue translates into more INR, directly lifting earnings and equity prices. Crucially, even after controlling for the contemporaneous exchange rate movement ($\beta = +0.00316$, $p = 0.005$), the Δ FFR coefficient remains positive and significant — indicating the FFR operates through additional channels, including forward-looking analyst earnings revisions and currency momentum.

6.2 Financial Accelerator is Structurally Dormant

The financial accelerator predicts higher-leverage firms experience amplified negative stock price responses to rate increases. The evidence does not support this: the interaction coefficient is statistically zero, the DiD coefficient is effectively zero (-0.0008 , $p = 0.961$), and leverage variation across the sample is insufficient to activate the mechanism. With no material debt service burden, no collateral to impair, and no credit constraint to tighten, the financial accelerator is structurally deactivated. This null result establishes an important boundary condition for the theory: the mechanism requires a minimum threshold of leverage to be empirically detectable.

6.3 Regime-Concentrated Effects and the Role of VIX

The regime-dependence of FFR effects is theoretically coherent: with near-zero rate changes in Period 1, the earnings translation channel carries minimal signal; in Period 2's fastest tightening cycle in four decades, the channel dominates. The VIX coefficient is the study's most robust finding — negative and significant in every specification, both sub-periods, and under both FE and RE. This confirms that global risk sentiment operates as a persistent and independent structural risk factor for Indian IT equities, consistent with Rey's (2015) global financial cycle hypothesis and the risk-off capital outflow mechanism.



7. Implications

Theoretical: The sign of the FFR–return relationship is not universally negative — the present value model must account for the cash flow numerator being endogenous to the exchange rate when applied to export-oriented firms. Aggregate-index studies of monetary transmission that conflate domestically-oriented and export-oriented sectors will systematically misestimate direction and magnitude. For the financial accelerator literature, the null moderation result defines a critical boundary condition: the mechanism is empirically inactive when sector-wide leverage is negligible.

Portfolio Management: Indian IT stocks exhibit a counter-cyclical positive response to Fed rate increases. Applying a blanket 'reduce emerging market equities during Fed tightening' rule will systematically underweight Indian IT at precisely the moments of highest return potential. Dynamic tactical allocation strategies that adjust IT sector weights based on both the level and pace of FFR changes are better aligned with the empirical evidence.

Corporate Treasury: The findings support a calibrated, partial hedging approach — protecting against extreme adverse scenarios while retaining participation in moderate depreciation. Full hedging eliminates the earnings translation benefit and does not maximise shareholder value. Given the dominant role of VIX, volatility risk management deserves at least as much attention as interest rate risk management in portfolios with Indian IT exposure.

8. Limitations and Future Research

The study covers only six large-cap IT firms and should not be generalised to smaller IT or IT product companies without further investigation. The compressed leverage distribution severely limits statistical power to detect H_2 moderation even if a true effect existed. Monthly average FFR changes rather than futures-derived surprise components may introduce attenuation bias in causal identification. The model does not control for RBI monetary policy actions, global technology spending cycles, or firm-level hedging ratios.

Future research should broaden the sample to mid-cap and small-cap IT firms with potentially higher leverage to properly test the financial accelerator hypothesis. Cross-sector comparison — applying the same framework to banking and real estate — would provide the counterfactual this study cannot supply. High-frequency event study methodology using FOMC surprise components would sharpen



causal identification. Incorporating firm-level foreign currency hedging ratios as an explicit moderating variable would provide the most operationally relevant guidance for corporate treasury strategy.

9. Conclusion

This study examined whether US Federal Funds Rate changes significantly affect monthly stock returns of Indian IT firms, whether leverage moderates this relationship, and whether effects differ across monetary policy regimes. Using Fixed Effects panel regression over 426 firm-month observations from April 2019 to March 2025, three clear conclusions emerge:

First, the conventional negative hypothesis does not hold for Indian IT firms. The dominant transmission mechanism is the USD/INR exchange rate earnings translation channel: Fed tightening strengthens the dollar, depreciates the rupee, and directly boosts INR-equivalent IT revenues, lifting equity valuations. The positive and significant FFR effect ($\beta = +7.440$ full period; $\beta = +11.888$ in tightening sub-period) is a core contribution to monetary policy spillover literature.

Second, financial leverage does not moderate the FFR–return relationship. The structural near-absence of debt across all six firms renders the financial accelerator mechanism dormant. This null result establishes the boundary conditions under which the financial accelerator framework is inapplicable.

Third, VIX — not the Federal Funds Rate — is the primary macro-financial risk factor for Indian IT equities. Its negative and significant effect is stable across all specifications, identifying global risk sentiment as the dominant systematic driver. These findings reframe how US monetary policy and Indian IT equities interact in academic models, portfolio construction, and corporate treasury strategy.



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