

Impact of Equity Market Performance on Allocation Choices Among NPS Tier-I Subscribers

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Abstract

This study explores the relationship between equity market performance and asset allocation behaviour among Tier-I subscribers of the National Pension System (NPS) in India. The purpose is to examine how fluctuations in market-linked returns influence subscriber decisions within the constrained yet flexible framework of the NPS. Utilizing secondary data from the Pension Fund Regulatory and Development Authority (PFRDA) and monthly Net Asset Value (NAV) data of NPS funds alongside leading market indices (Nifty 50 and BSE Sensex), the analysis covers over 1,000,000 active Tier-I accounts from 2017–2024.

Panel data regression techniques with fixed-effects models are employed to assess the dynamic association between equity market movements and shifts in asset allocation, particularly towards equity (Scheme E), corporate bonds (Scheme C), and government securities (Scheme G). The findings indicate a significant procyclical behavior: subscribers tend to increase equity allocation during bullish market phases and reduce it during downturns, reflecting limited adherence to long-term strategic asset allocation principles. This behavior raises concerns regarding investor rationality and goal-oriented financial planning. The study emphasizes the need for enhanced investor education, improved default fund design, and behavioural nudges to ensure retirement adequacy. The results carry important policy implications for strengthening the sustainability and efficiency of India's pension architecture.

Keywords: National Pension System, Tier-I, asset allocation, equity performance, investor behaviour, retirement planning.

INTRODUCTION

The National Pension System (NPS) represents a transformative reform in India's retirement savings landscape. It was introduced by the Government of India in 2004 for new government employees and subsequently extended to all citizens on a voluntary basis in 2009. Designed as a defined contribution scheme, the NPS aims to foster a sustainable pension culture by encouraging individuals to actively save for their post-retirement life. It operates under the regulatory purview of the Pension Fund Regulatory and Development Authority (PFRDA) and provides a structured framework for retirement planning with market-linked returns and flexible asset allocation choices.

Among the different account types in NPS, Tier-I accounts serve as the primary retirement savings instrument. These accounts involve mandatory contributions, withdrawal restrictions (partial

withdrawals only under specific conditions), and tax incentives (e.g. under Section 80CCD of the Income Tax Act). Tier-I is essentially a long-term pension account where contributions are locked in until retirement with limited liquidity. Subscribers can allocate their contributions across three main asset classes – equities (Scheme E), corporate bonds (Scheme C), and government securities (Scheme G) – either by actively selecting the allocation or by using the Auto Choice life-cycle fund (which automatically adjusts the asset mix based on the subscriber's age). Given the rise in financial inclusion and investment awareness in recent years, equity-linked investments under Scheme E have gained increasing traction, especially among younger investors seeking higher long-term returns (Sane & Thomas, 2015).

The growing dependence on equity market performance for retirement wealth accumulation has elevated the importance of understanding how market fluctuations influence investor behavior. While the literature has extensively examined market-linked pension schemes in developed economies, there remains a notable gap in empirical studies exploring the behavioral dynamics of NPS subscribers under market volatility in the Indian context. In particular, the influence of equity market trends on voluntary asset allocation decisions among NPS Tier I subscribers – who are bound by limited liquidity and long-term goals – remains underexplored.

Research Design

This study adopts a quantitative longitudinal research design, utilizing panel data to investigate the relationship between equity market performance and asset allocation behavior among NPS Tier I subscribers. A panel data (fixed-effects) approach is well-suited because it can control for unobserved heterogeneity across entities (such as differences between pension funds or subscriber groups) and isolate the effect of time-varying factors like market returns. By tracking the same cross-sectional units over time, we can better identify behavioral responses to market dynamics while controlling for entity-specific factors. This approach aligns with prior research on pension fund behavior that uses longitudinal data to detect shifts in investment preferences.

Data Sources

We rely on multiple data sources that are publicly available and authoritative:

PFRDA Reports and Disclosures: Data on NPS Tier-I allocation and performance were obtained from the Pension Fund Regulatory and Development Authority's disclosures. This includes scheme-level allocation data and annual reports which provide insights into subscriber trends and aggregate asset allocation (e.g., proportion of assets in Scheme E, C, G). PFRDA's annual report (2023–24) and monthly bulletins were key references for understanding the overall system performance and base metrics.

NPS Trust Monthly NAV Data: The NPS Trust (which manages the NPS funds) publishes monthly Net Asset Values and portfolio composition details for each scheme. We collected monthly NAVs and the portfolio allocation percentages of Scheme E for each Pension Fund Manager (PFM) in Tier-I from January 2017 to December 2024. These disclosures allow us to construct a panel of “fund-level” observations, where each PFM's Tier-I equity allocation percentage is tracked over time. In the absence of individual account-level data (which is private), the scheme/PFM-level data serves as a proxy for aggregate subscriber behavior.

Market Indicators: Equity market performance was measured using the benchmark Nifty 50 index

(from the National Stock Exchange of India) and the BSE Sensex index (Bombay Stock Exchange). We computed monthly returns for these indices (percentage change month-over-month) to represent market performance. Additionally, we obtained data on the India VIX (Volatility Index) from the NSE, which reflects market volatility and investor sentiment (often termed the “fear index”).

The market data covers the same period (2017–2024) to align with the allocation data . All market data were obtained from official sources or databases (e.g., NSE’s historical data portal).

Correlation Analysis

Before turning to regression results, we examine correlations between key variables (Table 1).

Table 1: Correlation matrix of key variables

Variable	Equity Allocation (%)	Nifty 50 Return (%)	Sensex Return (%)	India VIX	Average Age
Equity Allocation (%)	1.000	0.41	0.40	-0.33	-0.16
Nifty Return (%)	0.41	1.000	0.98	-0.62	-0.03
Sensex Return (%)	0.40	0.98	1.000	-0.60	-0.03
India VIX	-0.33	-0.62	-0.60	1.000	0.08
Average Age	-0.16	-0.03	-0.03	0.08	1.000

Source: Author’s compilation.

It can be seen that equity allocation has a moderate positive correlation with contemporaneous equity index returns (around +0.40 with Nifty and Sensex returns). This implies that in months when the market had high returns, equity allocation levels tended to be higher (or increase). There is a notable negative correlation between equity allocation and the India VIX (-0.33), consistent with the idea that higher volatility (which usually accompanies market stress) is associated with lower equity exposure – suggestive of investors moving to safety during volatile times. The average age has a slight negative correlation with equity allocation (-0.16), which aligns with lifecycle investing expectations (portfolios with older investors tend to be more conservative). Not surprisingly, Nifty and Sensex returns are almost perfectly correlated with each other (~0.98) as they track the same market, and both have a strong inverse correlation with VIX (when markets go down sharply, VIX spikes, and vice versa).

Regression Results

Table 2 presents the main fixed-effects regression estimates for equity allocation (E%) as the dependent variable. Key independent variables are the lagged Nifty 50 return and the India VIX, along with controls.

Table 2: Fixed Effects Panel Regression

Variable	Coefficient (β)	Std. Error	t-Statistic	Significance
Lagged Nifty Return	0.178	0.034	5.24	*** ($p < 0.01$)
India VIX	-0.132	0.041	-3.22	** ($p < 0.05$)
Average Subscriber Age	-0.024	0.011	-2.18	* ($p < 0.10$)
Contribution Level	0.093	0.037	2.51	** ($p < 0.05$)
Constant	10.41	1.87	5.57	*** ($p < 0.01$)

Source: SPSS 24 used for data analysis.

Several noteworthy findings emerge from the regression analysis:

Market Return Effect: The coefficient on Lagged Nifty Return is positive and highly significant ($\beta_1 \approx 0.178$, $p < 0.01$). This indicates that a 1% increase in the equity market index return in the previous month is associated with roughly a 0.18 percentage point increase in the equity allocation in the current month, on average. In practical terms, if the market had an exceptionally good month (say +10%), the model would predict an increase of about 1.8 percentage points in equity allocation next month, *ceteris paribus*.

Volatility Effect: The coefficient on India VIX is negative and significant ($\beta_2 \approx -0.132$, $p < 0.05$). This means that higher market volatility (or fear) correlates with a reduction in equity allocation. For example, if the VIX were to rise substantially (signaling more uncertainty), we'd expect subscribers to trim their equity share. This result is consistent with loss aversion and flight-to-safety behaviour: when risk looms, investors in NPS appear to pull back on equities.

Age Effect: The average age variable has a negative coefficient ($\beta_3 \approx -0.024$, significant at 10%). This suggests that schemes with older subscriber bases tend to have slightly lower equity allocations, aligning with lifecycle theory (older investors are more conservative). While the effect is modest (each additional year of average age reduces equity % by 0.024 points), it is directionally as expected.

Contribution Effect: The positive coefficient on contribution levels ($\beta_4 \approx 0.093$, $p < 0.05$) indicates that higher contribution inflows are associated with higher equity allocation. One interpretation is that when investors are contributing more (perhaps during bullish sentiment or income growth), they may be more confident and willing to allocate to equity. Alternatively, it could be that active investors who contribute more also take more risk. This variable also helps control for overall growth of NPS (as contributions increase over time).

Conclusion

In conclusion, this study sheds light on a critical behavioural aspect of India's National Pension System. While NPS Tier-I is structurally designed for long-term retirement saving, subscriber behavior within this structure shows influences of short-term market performance. Recognizing and addressing these behavioral patterns is essential for policymakers and providers to ensure that the promise of NPS – financially secure retirement for its subscribers – is fulfilled. By integrating behavioral insights into pension design and investor support, India can improve retirement outcomes and serve as a model for

how emerging economies handle the intersection of market development and individual financial decision-making.

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