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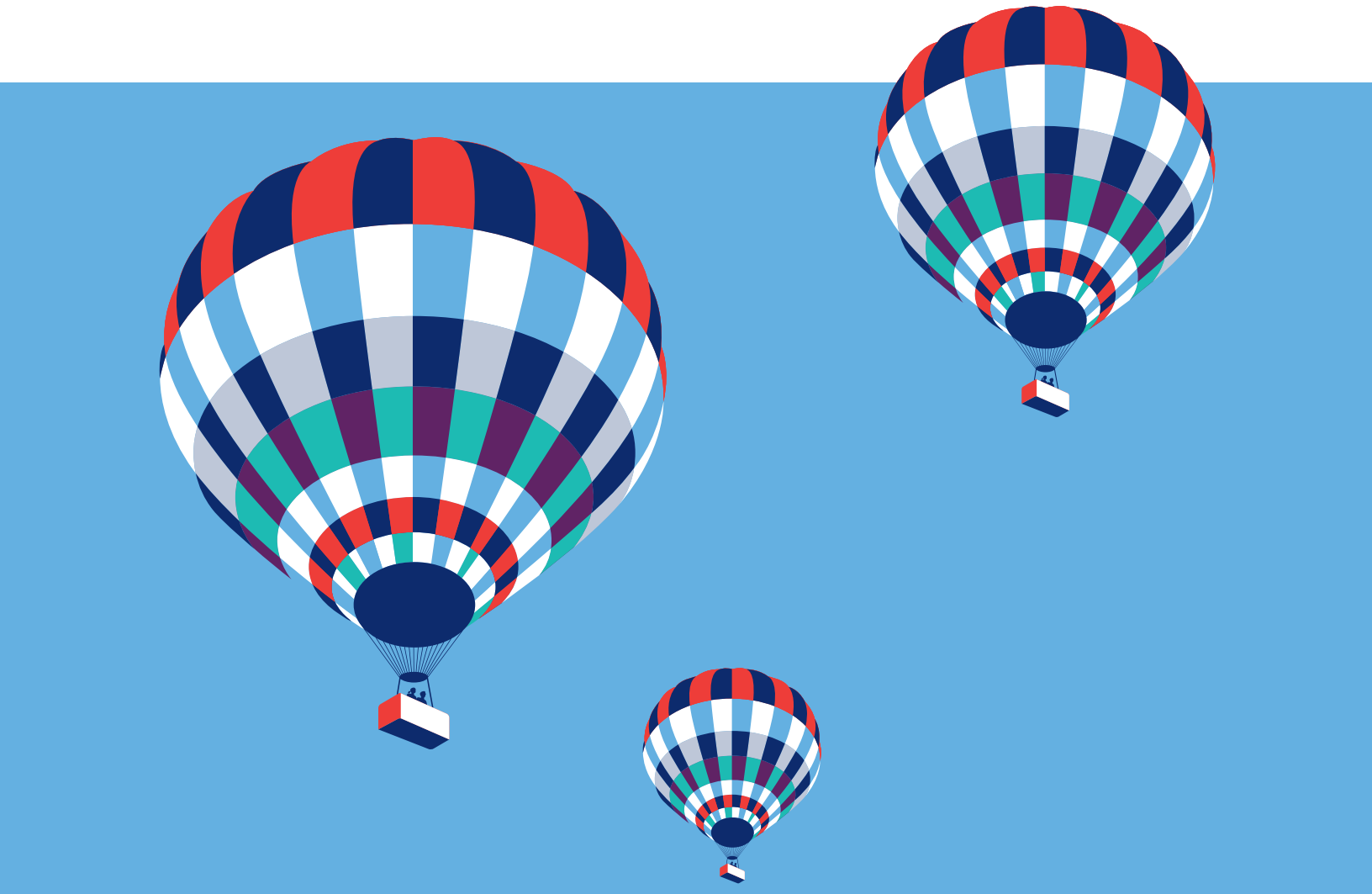
Intraday Volatility Control in FIA Indexes



Introduction

In previous research, we have highlighted the benefits of volatility control in Fixed Indexed Annuities (FIAs). It avoids the volatility premium inherent in option markets and adjusts the effective participation rate based on realized market conditions rather than relying solely on long-term forecasts. This improves pricing efficiency, enabling insurance carriers to offer more competitive and stable crediting rates, and potentially enhancing policyholder outcomes.

Historically, daily volatility control has been the standard implementation. However, there has been a recent trend toward using intraday data within the risk control mechanisms of FIA indexes. While using intraday data introduces additional complexity in index calculation and hedging, it also provides several advantages: more precise risk targeting, faster responses to changing market conditions, and, in some cases, the potential to capture excess returns.

This paper examines the limitations of daily risk control and how intraday techniques address them. We then analyze how these improvements translate into benefits for policyholders. Next, we examine case studies that demonstrate these benefits. Finally, we consider when intraday methods are most appropriate and when traditional approaches may still be preferable.

Salt Financial Index Data

To avoid the use of proprietary index data and maximize comparability between the versions, we worked with Salt Financial – a leading provider of indexes, analytics, and research – to develop simulated daily and intraday volatility controlled indexes built on the SPDR S&P 500 ETF Trust, one of the largest ETFs tracking the S&P 500©. These proxy indexes were designed using standard parameters for each volatility control type, with identical volatility targets, transaction costs, maximum leverage, and other relevant factors. The only meaningful difference is in the measurement and implementation of the volatility control.

Benefits of Intraday Risk Control

Daily volatility controlled strategies typically use one or more lookback windows to calculate trailing volatility, often with more weight given to recent observations. This serves as the predicted forward volatility, with which the strategy is scaled to its target. However, relying on end-of-day prices alone creates two significant limitations: missed intraday volatility and lagged adjustments.

1. Missed Intraday Volatility

Consider the following hypothetical scenarios:

- An index opens and climbs steadily during the day, closing up by 1%.
- Another index opens, suffers a sharp intraday selloff after an economic release, then rallies back to finish up 1% by the close.

Daily volatility measurement would treat both scenarios as identical, despite the second clearly being more volatile. In this case, daily risk control underestimates actual volatility.

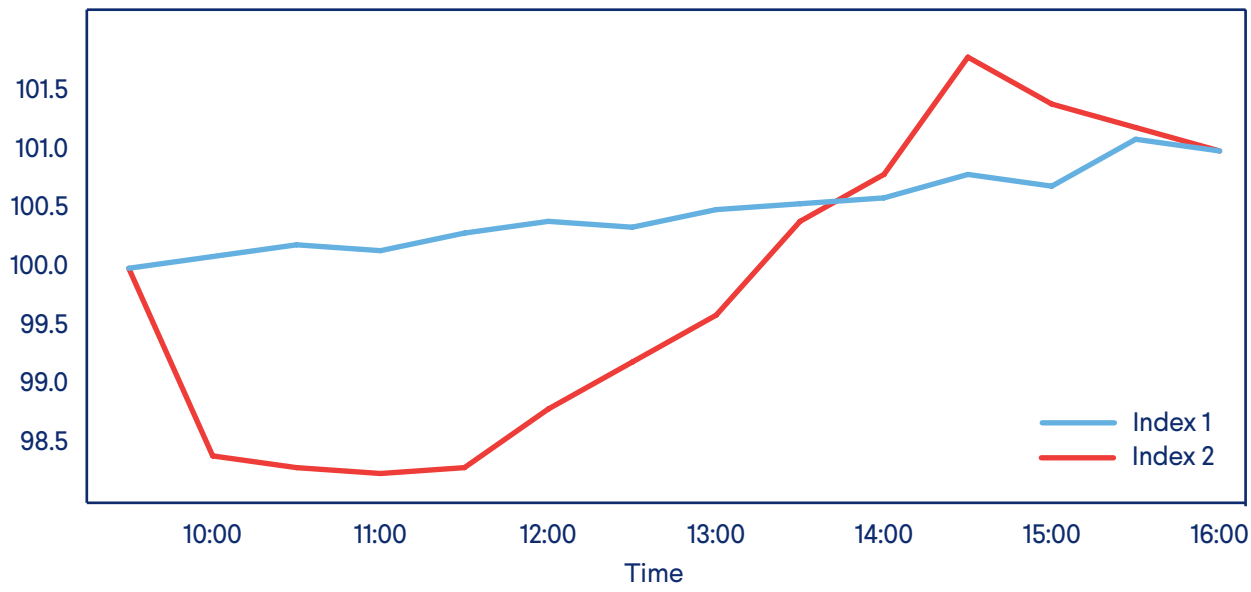


Figure 1 – Intraday Index Price

Hypothetical example for illustrative purposes only.

2. Lagged Adjustments

Similarly, imagine a scenario where the initial drop in the second index persists. A daily strategy cannot adjust to increased volatility until the following day's close, effectively a 2-day lag. In contrast, intraday data enables the index to react in near real time, reducing exposure more quickly and maintaining a closer alignment with target volatility.

By capturing intraday dynamics, these strategies ensure that realized volatility aligns more closely with the targeted level, reducing the risk of outsized deviations.

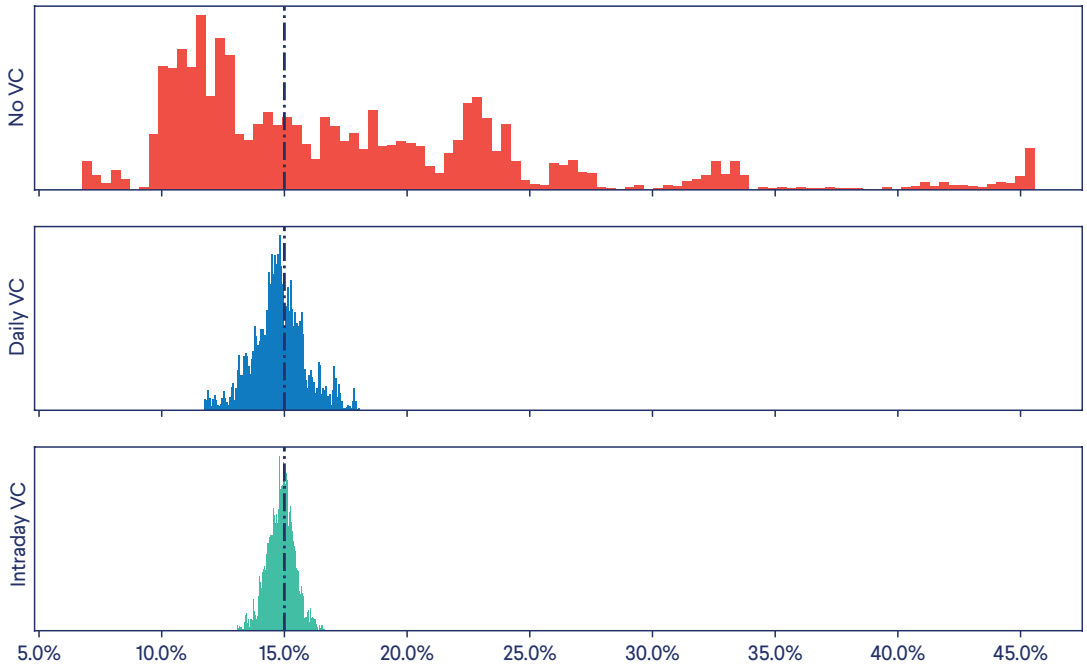


Figure 2 – 1-Year Volatility Range by VC Type

Hypothetical example for illustrative purposes only.

Policyholder Outcomes

It is clear how intraday measurement and/or implementation improves the volatility measurement and targeting, but how does that translate to an improved experience for the FIA policyholder? An index with a tighter range of volatility – and therefore fewer volatility spikes – is less risky for an option writer. Lower risk here means lower cost, which increases the distance the option budget can go, resulting in higher participation rates.

In addition to improved rates, intraday approaches can also enhance returns. Volatility spikes often occur during market downturns. By scaling down exposure more quickly, intraday indexes can reduce drawdowns relative to daily versions. Conversely, when markets rebound, they can also re-risk more quickly, allowing policyholders to capture a greater share of the recovery. This combination makes intraday particularly effective in "V-shaped" market environments when compared to daily volatility control.

Indexes with intraday implementation can also enhance returns by capitalizing on shorter-term market anomalies. Markets have been shown to exhibit intraday momentum (upward or downward moves often continue within the day), followed by overnight mean reversion (the next day often opens in the opposite direction)[1]. By adjusting exposures throughout the day, intraday indexes can capitalize on both of these tendencies, potentially adding incremental performance.

[1] (Heston, Korajczyk, & Sadka, 2010)
(Lou, Polk, & Skouras, 2019)

Case Studies

The theory is clear, but it may be easier to see these effects by examining some examples of the difference in outcomes between indexes using daily or intraday data.

Improved Volatility Measurement

As shown above, the distribution of realized volatility for the intraday index is more concentrated around the target than its daily counterpart. Some of this efficiency comes from small daily improvements over time, while some comes from more quickly reacting to extreme market events. When the underlying asset experiences a sharp move, either up or down, the intraday mechanism can calculate and adjust much more quickly than the daily mechanism. Looking specifically at the period between November 2017 and October 2018, there was a large drawdown between October 9 and October 11 of 2018. Excluding those days, we see that the intraday index is closer to the 15% target, 0.21% away versus 1.12% for the daily version. Including those days, we observe that both indexes exhibit excess volatility compared to the target, but the effect is significantly larger in the daily version. We see similar patterns in more recent periods of elevated volatility, including the onset of COVID in 2020 and "Liberation Day" in 2025. The intraday tracks the volatility target slightly better when excluding the most volatile periods, but substantially better when it is included. Between the two effects, this explains the compressed distribution of volatility in the intraday index.

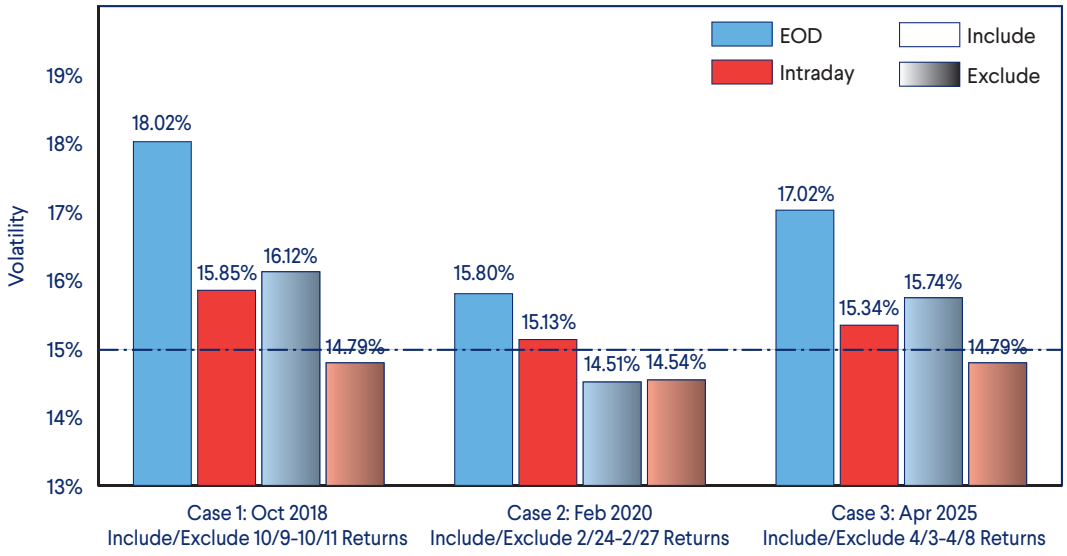


Figure 3 – EOD vs Intraday Rolling 1-Year Volatility Hikes: Extreme Return Cases

Hypothetical example for illustrative purposes only. Past performance is not indicative of future results.

Improved Participation Rate

Even in the absence of performance improvements, lower option costs directly improve policyholder outcomes. An option dealer who writes an option at a specific volatility will suffer losses if the realized volatility ends up being higher. They mitigate this risk by charging a premium, which is higher for assets with more or larger volatility spikes. For example, the intraday 15% volatility index may price with an implied volatility of 16.5%, while the daily risk control would price at 17.6% due to its greater incidence of heightened volatility periods. With a theoretical 4% option budget, this translates to an average participation rate improvement of 5% (65% versus 60% given prevailing market conditions at the time of this paper's writing). Applied to 15 years of returns on the daily risk control index (i.e., ignoring any additional performance benefits of the intraday index), this increases average annual credited returns by approximately 0.60% per year.

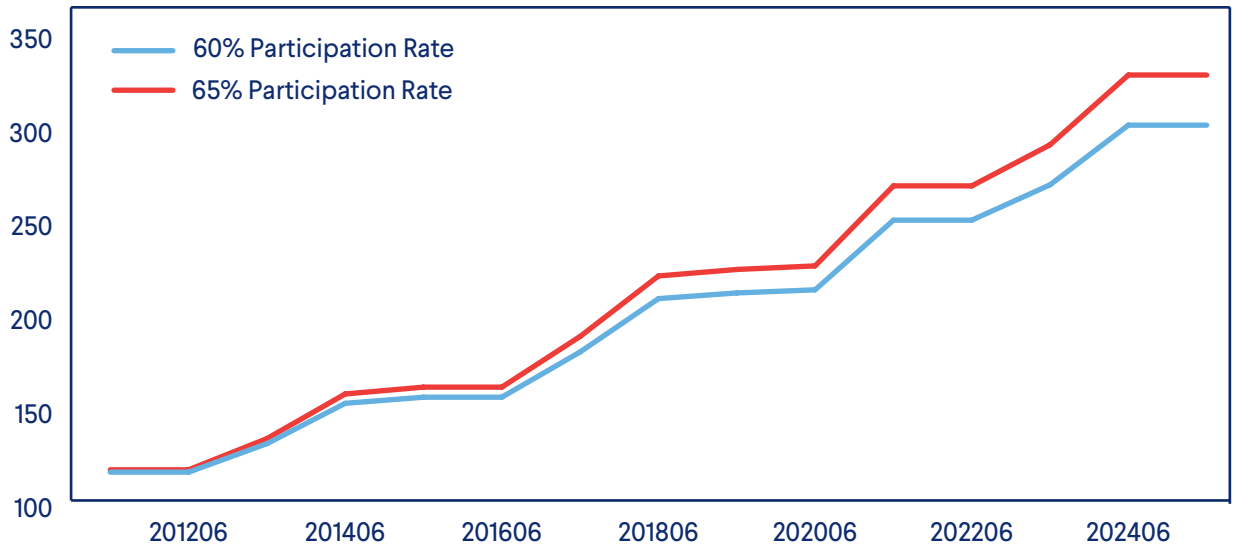


Figure 4 – Theoretical 15-Year Account Growth

V-shaped markets

In addition to the improved volatility tracking, sharp market declines and recoveries, such as March 2020 and April 2025, illustrate where intraday responsiveness can matter most from a performance perspective. During these periods, intraday strategies reduced exposure more quickly than daily strategies, cushioning losses during the drawdown, then re-leveraging earlier, capturing a larger portion of the subsequent rebound.

Looking to "Liberation Day" in April 2025, we see that the intraday was able to reduce its exposure on the first day, avoiding taking the full hit of the large drop. This dramatically reduced how much drawdown the intraday experienced relative to the DRC.

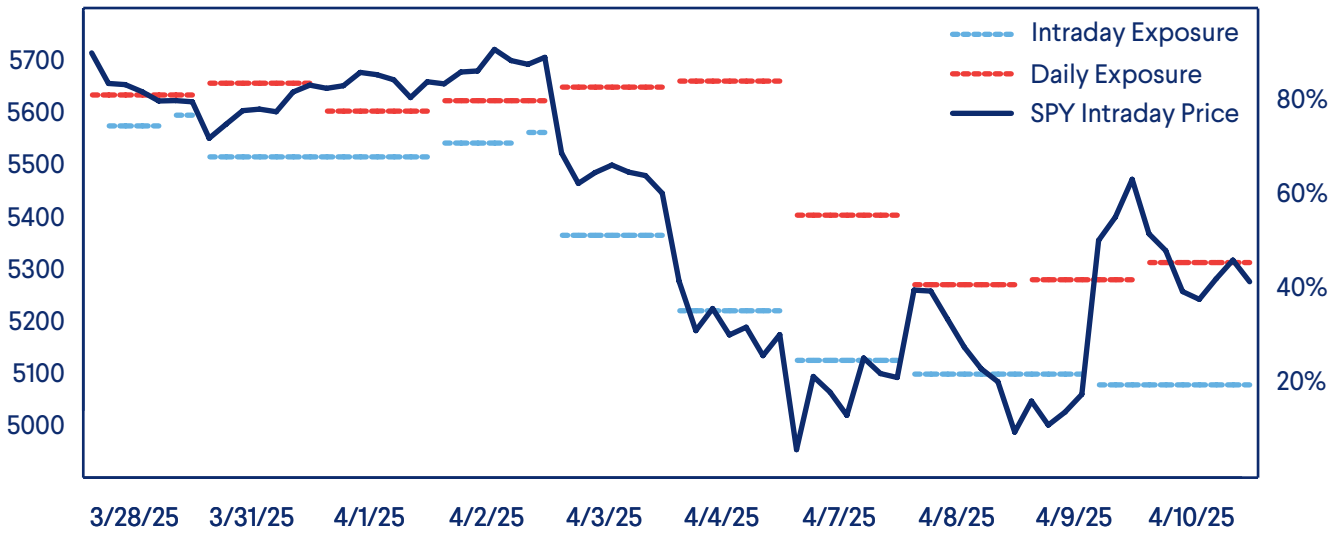


Figure 5 – Intraday Exposure: Daily Vol Control vs Intraday Vol Control

Hypothetical examples for illustrative purposes only. Past performance is not indicative of future results.

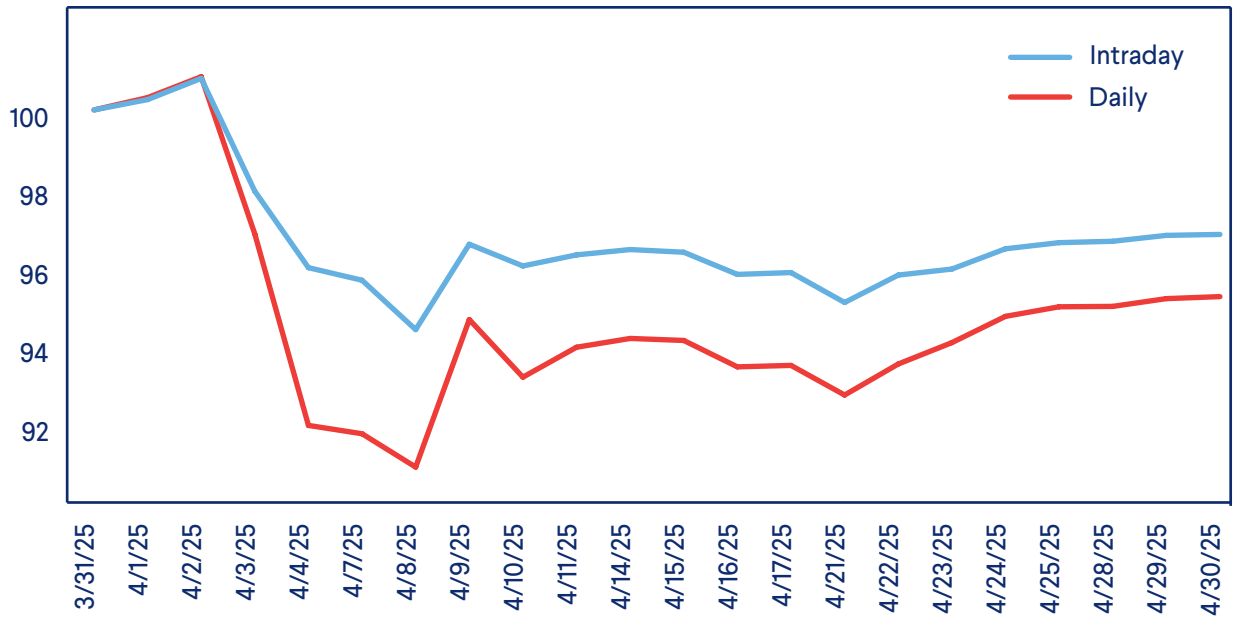


Figure 6 – Intraday vs Daily Performance – April 2025

Why Not Use Intraday Everywhere

Despite its advantages, intraday volatility control is not universally applicable. These strategies require a long history of robust high-frequency data across all underlying constituents. As a result, they are most suitable for indexes using liquid, broad-market equity indexes, and perhaps Treasuries, as their underlying assets. When expanding into other asset classes such as commodities and credit, intraday data may be sparse or unavailable, making daily methodologies more practical.

Similarly, indexes incorporating equity alpha strategies may not be strong candidates for this approach. Unless the strategy is tied to exchange-traded instruments with long histories of intraday data, the ability to implement intraday volatility control does not exist.

We believe there is value in both asset-class diversification and alpha within FIA indexes, despite their inability to use intraday techniques[2]. However, for broad equity-based indexes and simpler multi-asset portfolios, intraday can and should continue to become the standard.

[2] (Getler, 2024)

Conclusion

Intraday volatility control represents a meaningful evolution in FIA index design. By addressing some of the shortcomings of daily models, it delivers faster responsiveness and tighter volatility targeting. This, in turn, can lead to higher participation rates, better drawdown management, improved recovery capture, and capture of additional alpha – outcomes that directly benefit policyholders.

At the same time, intraday volatility control is not a universal solution. Its effectiveness depends on the availability of robust intraday data and the nature of the underlying strategy. For broad equity index based strategies though, the evidence suggests that intraday risk control is both feasible and advantageous. As carriers refine FIA offerings, these indexes are poised to play an increasingly central role in delivering policyholder value.

References

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