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An Integrated Lévy-Prospect Theory Model for Asset Pricing in the MENA Region

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Abstract

1. **Purpose:**

Standard asset pricing models, such as the CAPM are too simplistic and fail to reflect the dynamics of volatile emerging markets. Behavioral biases, especially loss aversion, are high in the MENA markets and are behind the "fat tails" and jumps, phenomena that these conventional models disregard. The approach here is not just extending current models by adding terms but a construction of a new framework from the ground up. We suggest that a Lévy process provides a practical mechanism for generating the stochastic component, and that the discontinuous aspect (i.e., the jumps) can be driven directly by the collective non-linear behavior of loss-averse investors according to Prospect Theory. The object is to determine whether the risk of such behaviorally-induced downside jumps is a principal priced factor in the stock returns in the Middle East and North African (MENA) markets.

2**. Design/Methodology/Approach:**

The model is based on a behavioral Lévy process that is calibrated to account for the returns of a 100-stock MENA portfolio from December 2012 to December 2023. In contrast to factor models, our methodology effectively tunes the parameters of this compound stochastic process to the historical time series of market returns and the observed market moments. The approach concentrates on the calibration of jump parameters (eg jumps' intensity and magnitude) to measure the effect of loss aversion. We are interested in whether the estimated risk premium

needed to offset for the chance of large negative jumps is statistically significant, because this suggests that behavioral explanation is a fundamental driver of the asset return process per se.

3. **Findings:**

By endowing Prospect Theory with a Lévy process, the model predicts that calibration would uncover a positive and significant risk premium for the downside jump component. This result would suggest that MENA investors require higher average returns as compensation for the mental agony that would accompany the prospect of sudden losses, a form of risk that is not evident from conventional measures of risk based on variance. Establishing the existence of a priced premium for this behaviorally-induced jump risk would offer positive empirical evidence that investor loss aversion plays a fundamental role in the asset return process itself, resulting in a richer understanding of risk in the area concerned.

4. **Originality/Value:**

This study is one of the early empirical applications of an intregrated behavioral-stochastic asset pricing model in MENA region. Its implications are threefold: (1) it bridges the gap between behavioral finance theory and empirical asset pricing by embedding psychological bias as an endogenous part of the seasonally integrated return-generating process; (2) it provides new insights into risk by pricing the risk premium related to downside jumps, with immediate implications for better exchange and market valuations; (3) it offers actionable insight to market participants who will employ more effective portfolio construction and risk management strategies that replicate the distinct jump-like behaviors characteristic to the behaviorally biased market.

Keywords: Asset Pricing, Behavioral Finance, Loss Aversion, MENA Markets, Multi-Factor Models, Downside Risk.