

# Pro-CyclicalitY Beyond Business Cycles: The Case of Traditional Risk Measurements\*

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## **Abstract**

Since the introduction of risk-based solvency regulation, pro-cyclicalitY has been a subject of concerns from all market participants. We propose a simple and efficient methodology to empirically evaluate the amount of pro-cyclicalitY in the way financial institutions measure risk. To do so, we introduce a new indicator based on the Sample Quantile Process (a dynamic extension of Value-at-Risk), conditioned on realized volatility.

Using this framework, we prove that pro-cyclicalitY is inherent in risk measure estimates based on historical data. More precisely, taking the example of VaR, we show that the empirical estimate of this risk measure is mean-reverting over a 1 year horizon when the portfolio is held fixed. It means that a capital requirement rule based on historical measurements of VaR tends in calm times to understate future required capital and tends in volatile times to overstate it. We quantify this pro-cyclicalitY by applying our methodology to major equity market indices. We make the interesting point that the pro-cyclicalitY property holds true even in a world with constant volatility, though the empirical magnitude of the mean-reversion is greater than what would be observed in that special case.

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