

DISCUSSION OF “ELICITABILITY AND BACKTESTING: PERSPECTIVES FOR BANKING REGULATION”

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I discuss the incentive compatibility of comparative and calibration backtesting for banking regulation. In stylized models of risk reporting, calibration backtesting leads to uninformed risk reports that adapt insufficiently to volatility changes. In contrast, comparative backtesting incentivizes information for richer and more accurate models.

I congratulate [Nolde and Ziegel \(2017\)](#) for their inspiring contribution on comparative and calibration backtesting.

Backtests and incentives. Arguably, the main purpose of backtesting in the financial context is to guarantee high quality assessments of the current risk exposure. It is a troubling finding that classical calibration backtests have such little discriminating power against misspecified models. [Nolde and Ziegel \[\(2017\), page 24\]](#) argue that “such backtests may create a wrong incentive of minimizing the capital, subject to passing the backtest, rather than aiming for a more accurate forecasting method.” The sparse empirical literature on actual VaR-forecasts of commercial banks supports this line of reasoning. Risk reports are on average overly conservative, adapt insufficiently to volatility changes [[Berkowitz, Christoffersen and Pelletier \(2011\)](#), [Berkowitz and O’Brien \(2002\)](#), [Pérignon et al. \(2008\)](#)], and are often outperformed by simple GARCH-models [[Pérignon and Smith \(2010\)](#)]. In the following, I will argue in a highly stylized setting that this type of risk reporting may be the consequence of unconditional backtests and that comparative backtests might lead to more accurate risk reports.

Optimal risk reporting under unconditional calibration tests. Let us abstract from risk taking behavior and model the risk manager as a life-time capital requirement minimizing agent, where capital requirements are determined by the current VaR-forecasts and increase if the unconditional calibration backtest on the last 250 trading days is failed. This corresponds largely to the currently implemented system [[Bank for International Settlements \(2013\)](#)]. Let the time series of the asset at hand have some predictable volatility. Each trading day the risk manager issues a certain VaR forecast. Lower values induce lower capital requirements, but entail a higher probability of violation (underestimation of the realized loss), and thus of failing the backtest in the future. In this stylized inter-temporal

optimization problem, the capital minimizing reporting depends on the current volatility. The higher the current volatility is, the higher are the capital costs for decreasing the probability of a violation (and of the subsequently higher capital requirements). To reduce average capital requirement across time, the risk manager reports overly conservatively during low volatility and adapts insufficiently to increasing volatility.

Optimal risk reporting under costly information acquisition. Another interesting perspective arises when we consider the accuracy rewarding aspect of backtests. For this purpose, let us consider a financial institution with an infinite amount of information that is increasingly costly to incorporate into the risk model.

If the only objective is to pass the unconditional calibration backtest as currently proposed [Bank for International Settlements (2013)], there is no incentive to engage in costly information acquisition and the risk manager could issue an optimal unconditional forecast.

If the financial institution faces a comparative backtest in which the internal model competes against a standard risk measurement approach, there exist incentives to include information \mathcal{F} in the risk model until the marginal costs of acquiring additional information equal the expected costs when being obliged to use the standard model after not passing the comparative backtest. In this stylized setting, comparative backtesting incentivizes the risk manager to be more accurate (obtain a lower expected score).

Conclusion. At this point, the literature does not provide any guidelines to decide which type of backtesting is most appropriate to incentivize accurate forecasting for a financial institution that incorporates the additional costs of information acquisition and higher capital requirements in an inter-temporal setting. In light of the simple arguments above, it seems unlikely that the new approach proposed by the Basel Committee [Bank for International Settlements (2016), page 64] of basing capital requirements on Expected Shortfall reports and applying calibration backtesting on VaR reports provides strong incentives to develop accurate risk models.

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