Dynamic modelling and optimization of non-maturing accounts

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The risk management of non-maturing account positions in a bank's balance like savings deposits or certain types of loans is complicated by the embedded options that clients may exercise. In addition to the usual interest rate risk, there is also uncertainty in the timing and amount of future cash flows. Since the corresponding volume risk cannot directly be hedged, the account must be replicated by a portfolio of instruments with explicit maturities. This paper introduces a multistage stochastic programming model that determines an optimal replicating portfolio from scenarios for future outcomes of the relevant risk factors: Market rates, client rates and volume of the non-maturing account. The weights for the allocation of new tranches are frequently adjusted to latest observations of the latter. A case study based on data of a real deposit position demonstrates that the resulting dynamic portfolio provides a significantly higher margin at lower risk compared to a static benchmark.

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