Case Study:

Longevity Risk Hedging for Pension Schemes

VESTTOO

Case Study: **Longevity Risk Hedging for Pension Schemes**

In times of economic turbulence and market instability, it pays for pension schemes to strive towards a lower-risk future. Corporate, private and public pension funds looking to hedge their longevity risk can take advantage of the unique benefits Vesttoo's data-driven risk management solution has to offer by transferring their pension liabilities to the capital markets

Our Customer's Goals

A mid-size national bank in the EU, sponsor of defined benefit (DB) plans for ~4000 retirees, was interested in hedging its longevity risk exposure and reached out to Vesttoo to develop a custom-made solution specifically adapted to its needs. Their main goal was to hedge longevity risk exposure by reducing deferred pension liabilities and stabilizing their volatile balance sheets.

- Fully collateralized liability hedge with no counterparty risk
- Hedge covering a "last man standing" pension scheme
- Asset and upside retention
- A cost-effective solution, refinancing option at maturity
- Accurate risk & stress modeling, based on the latest academic developments
- Low basis and tail risks
- Flexible solution for the specific portfolio size and scheme type
- One-stop-shop, fully customized solution

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After learning our customer's requirements, Vesttoo's team suggested a custom-made fully collateralized Stop Loss hedge program to be transferred to capital market investors. The Stop Loss was built on Vesttoo's portfolio-specific liability index, calculated by proprietary AI & machine learning-based risk models and reviewed, audited and endorsed by Milliman and KPMG.

One-Stop-Shop De-Risking Solution

The deal was built over a specific list of deferred pension plans from the fund's portfolio. Vesttoo grouped claim tranches based on specific policy cohorts, made up of similar policyholder ages and portfolio characteristics, in order to reduce basis risk as much as possible. Working on a pool of deferred policies, Vesttoo's team created an accurate risk profile, using proprietary stochastic risk algorithms which significantly reduced basis and tail risks, and used it to structure the Stop Loss program.

Vesttoo's accurate portfolio-specific liability index enabled radically reduced deal maturity - from ~40 to 5 years. This was achieved by Vesttoo's algorithms, which predicted the pool's portfolio future mortality performance at inception. At maturity, Vesttoo will adjust and discount the next ~35 year prediction based on the specific actual mortality of that pool within the last 5 years.

Vesttoo worked closely with the Bank's various departments in order to get an accurate picture of the pension scheme's funded status and asset risk concerns.

Furthermore, Vesttoo's team collaborated with its deep investor network to optimize the solution's risk and stop parameters in order for it to be attractive for all sides of the deal.

Structured notes based on a specific tranche of policies is a new approach which was swiftly adopted by the regulator as well as accounting and actuarial companies. Well respected firms such as KPMG and Milliman were involved in constructing our liability hedge solution, functioning as deal trustees, ensuring data, and risk model accuracy.

Vesttoo worked closely with all parties involved- taking care of everything in the process.

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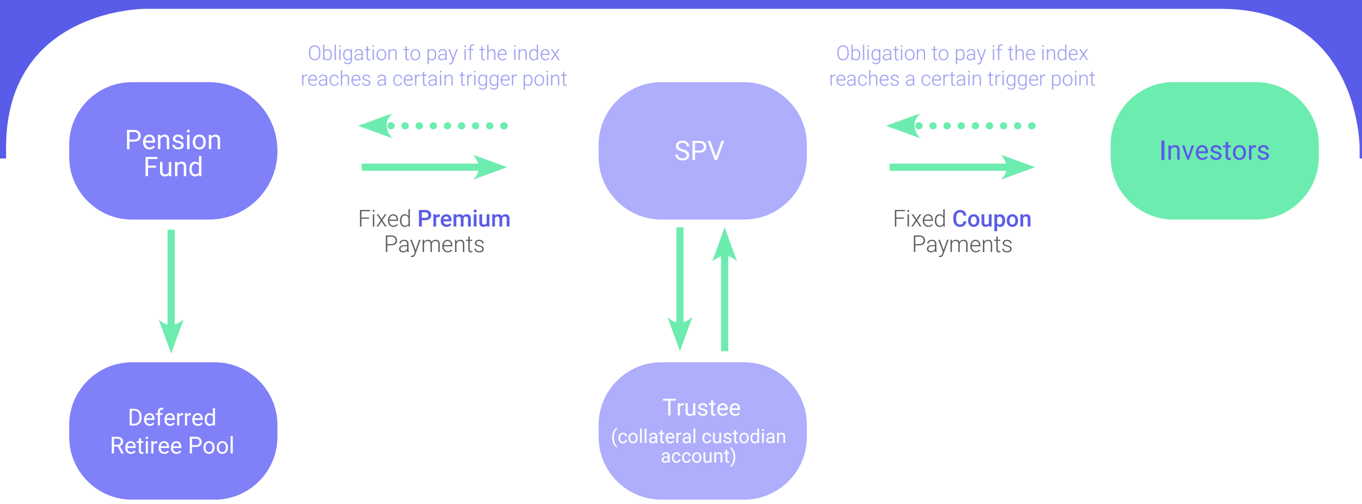
Fully-Customized Aggregate Stop Loss Deal

The resulting deal was a fully customized liability-hedge program for the bank's pension scheme, in the form of a fully-collateralized Stop Loss deal, while issuing a structured note by the SPV.

The deal was priced at an annual premium, converting unknown future liabilities into fixed future obligation, with no upfront fees or frictional costs.

Reinsurance Through the Capital Markets: Bonds



The deal was successfully placed for noteholders to access within a short time, providing the longevity risk hedging the bank needed for their corporate DB pension scheme at an affordable price via the capital markets.

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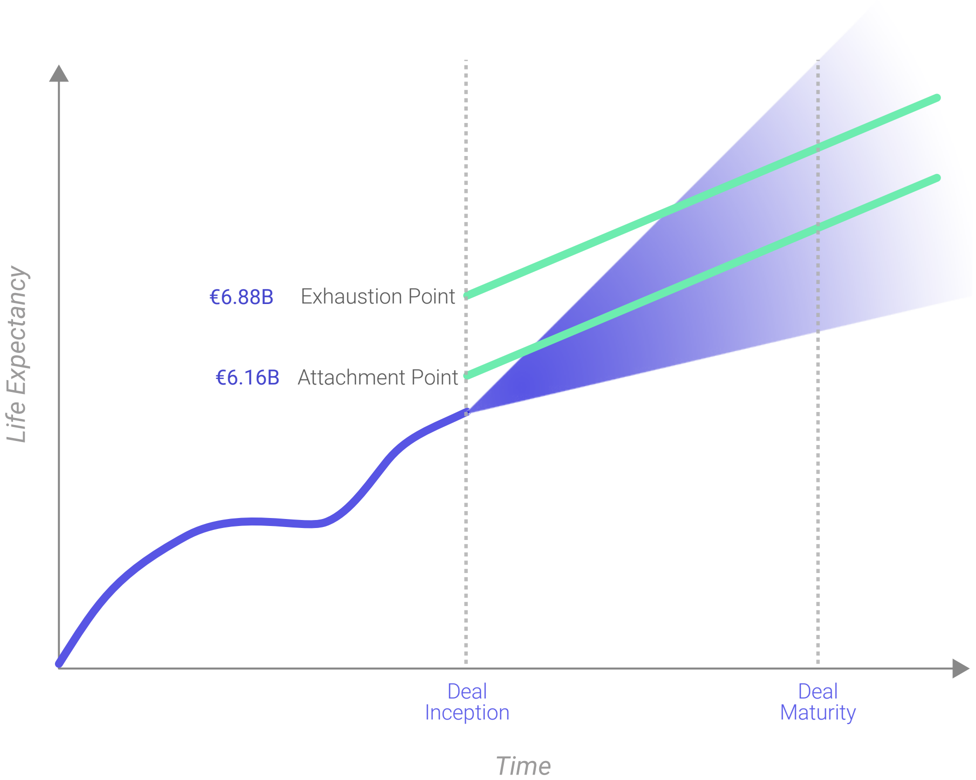
The deal was structured in a way that it could be easily applicable to different portfolio sizes and scheme types in the future with minor alterations, or refinanced by the bank at maturity, providing the speed and flexibility required.

Risk profiling using Vesttoo's proprietary technologies directly addressed the inherent uncertainty in forecasting pensioner life expectancy, ensuring highly accurate calculations and very low basis and tail risks. The portfolio-specific liability index allowed for a reduced deal duration, further optimizing the hedge per euro spent.

Deal Specifics:

Transferring the liabilities of excess payments beyond the deductible, with the coverage capped at €720 million.

- Pension fund liabilities were accounted for at €6 billion
- Pension fund takes excess losses up to €160 million
- Investors are accountable for the next €720 million



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Product:	Closed block of Deferred Annuity Payments
Risk Model:	Vesttoo independently modeled risks using bottom-up methodology on its AI platform
Currency:	Euro
Term:	5 years (flexible with refinancing options at maturity)
Premium:	Fixed effective annual premium of 2.2% out of coverage (~0.2% of liabilities)
Cash Flow:	Unfunded deal, no cash flow was transmitted at inception - everything was priced in the annual premium
Collaterals:	The deal is fully collateralized at inception, hence no additional collateral is required throughout the course of the deal. If the pool is amortizing as planned the collateral can be amortized accordingly
Settlement:	At maturity, the bank receives compensation if actual payments exceed the predetermined deductible (based on scheduled payment), up to a cap

Immediate **Liability Hedging** and Efficient **Risk Management** at a Fraction of the Cost

In summary, thanks to Vesttoo´s fully customized stop loss program, €720 million-worth of the bank's liabilities were transferred to the capital markets, covering €6 Billion in longevity-linked liabilities. The deal was priced at 2.2% of the notional risk transfer.

Vesttoo's solution provided the bank with fully-customized coverage for its deferred pension liabilities while stabilizing their volatile balance sheets at a fraction of the cost, with no upfront payments or counterparty risk. The bank received the hedging it needed and a flexible solution easily applicable to other portfolio types and sizes, improving the overall risk management.

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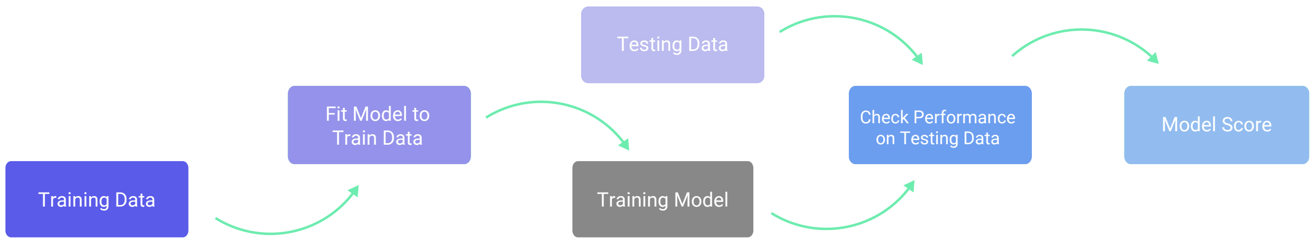
AI & Machine Learning **Methodology**

Vesttoo's methodology uses predictions based on cross-validation backtesting techniques, ensuring highly accurate modeling. This AI and machine learning approach is based on the latest published academic developments in mortality modeling and uniquely handles the unusual behavior of diverse liability sets. By applying its technology on each policy (bottom-up) the machine learning models create a robust forecast for the Best Estimate, standard deviation and stress scenarios.

In addition, Vesttoo's model provides liability sensitivity for every key economic factor by using stress testing of model risk and extreme events. This sensitivity vector is critical for optimization and for marketing the deal.

Our proprietary technology carries out thousands of tests, in which the system trains on a specific time period, creates a model and then applies it to another time period. The most accurate model is chosen out of the thousands carried out, radically increasing modeling accuracy:



About Vesttoo

Vesttoo has developed advanced technologies for data-driven risk management, transferring actuarial risk to the capital markets.
Vesttoo specializes in risk modeling for alternative risk transfer for the P&C insurance and longevity markets, providing insurers with a low-cost strategic risk management solution for immediate capital relief

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