

Draft Proposal (Product-Level Behavioral Analysis)

Product Design, Distribution, and Macroeconomic Sensitivity in Life Insurance and Annuities

Project Overview

This project builds directly on an initial industry-level analysis of life insurance and annuity activity using publicly available macroeconomic data. While the first phase establishes broad industry benchmarks using Federal Reserve Economic Data (FRED), the second phase extends the analysis by incorporating **proprietary, product-level sales data** to examine how different insurance and annuity products behave under varying macroeconomic conditions.

Rather than treating the insurance industry as a monolith, this project explicitly recognizes that **product design and distribution channel matter**. The central research question is:

How do different life insurance and annuity products respond differently to macroeconomic environments, and what does that reveal about consumer behavior, advisor behavior, and product design?

Data Sources

1. Public Macroeconomic & Industry Benchmark Data

Public data from FRED will be used to establish an **industry-wide baseline**, including:

- Interest rates (e.g., 10-year Treasury)
- Inflation (CPI, PPI)
- Equity market performance (S&P 500)
- Volatility indicators
- Aggregate life insurance and annuity financial accounts

These series provide long-run, time-aligned macro context and serve as an external benchmark against which proprietary data can be compared.

2. Proprietary Product-Level Sales Data

The second phase of the project uses **company-sensitive internal sales data**, aggregated and anonymized, including:

- Life insurance products:
 - Term
 - Whole Life (WL)
 - Indexed Universal Life (IUL)
- Annuity products:

- Structured / Flow annuities
 - Single Premium Deferred Annuities (SPDAs)
- Broker-dealer and distribution metrics:
 - Gross Dealer Concession (GDC)
 - Large-case sales (where relevant and aggregated)

The proprietary data provide time-series measures of sales volume, premium flows, and distribution activity by product type.

How the Data Are Conceptually Linked

The public and private datasets are linked through a **common behavioral and economic framework**:

- Public macro data describe the *economic environment*
- Proprietary sales data capture *revealed behavior* within that environment

By anchoring the analysis to public benchmarks first, the project avoids overfitting or firm-specific storytelling. The industry-level trends establish **what should be expected** under certain macro conditions; deviations at the product level then become analytically meaningful.

Analytical Approach

Phase 1: Industry Benchmarking

Using FRED data, the project estimates baseline relationships between:

- Interest rates
- Inflation
- Market performance
- Aggregate life insurance and annuity activity

This phase establishes expected directional sensitivities (e.g., higher rates -> stronger annuity demand).

Phase 2: Product-Level Sensitivity Analysis

Proprietary product data are then layered onto the same macro framework to examine:

- Differential sensitivity across product types
- Timing differences (lags vs immediate response)
- Distribution-driven amplification or dampening effects

For example:

- Term vs WL vs IUL responses in different rate regimes

- SPDA vs Flow annuity behavior during volatility spikes
- How GDC responds relative to underlying product demand

Regression and segmented time-series models are used to compare coefficients across products, rather than estimating a single pooled effect.

Behavioral and Economic Interpretation

The analysis is explicitly behavioral in nature:

- Consumers are not responding to macro variables directly, but to product features shaped by those variables
- Advisors act as intermediaries whose incentives and constraints influence product selection
- Product design embeds behavioral assumptions (e.g., guarantees, optionality, liquidity)

Differences in product behavior are interpreted as differences in how uncertainty, risk, and time preference are translated into financial decisions.

Ethical and Practical Considerations

All proprietary data are:

- Aggregated
- Anonymized
- Used solely for academic analysis

No individual policyholder or advisor behavior is evaluated. Results are presented at the product and system level, focusing on patterns rather than performance judgments. Public data are used as a grounding mechanism to ensure transparency and reproducibility of the analytical framework.

Contribution

This project contributes by:

- Bridging public macroeconomic data with real-world product behavior
- Demonstrating how different insurance products function as behavioral responses to economic conditions
- Providing a replicable framework that can be extended to other firms or time periods

Rather than asking whether insurance sales rise or fall, the project explains why different products behave the way they do.