

Accommodation or Obfuscation? Product Innovation in the Variable Annuities Market

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- Separate account life insurance contracts linked to a list of financial instruments with tax advantage
- 2 trillion USD in net assets (25% of US insurance industry's total assets)
- Equipped with optional features
 - ▶ **Guaranteed Living Benefits** (GLBs)
 - ▶ **Guaranteed Minimum Death Benefits** (GMDBs)
- 75% of all new VAs include GLBs
- Product landscape has changed dramatically over the past 25 years
 - ▶ Early: Various forms of GMDBs
 - ▶ Recent: Guaranteed Lifetime Withdrawal Benefits (GLWBs)

- Plenty of product variation in the VA market
 - ▶ “Radical”: GMDB, GMAB, GMIB, GMWB, GLWB
 - ▶ “Incremental”: Surrender Charge Schedule, Free Withdrawals, Step-Up Provisions, Impact of Withdrawals, etc.
 - ▶ Beneficial to consumers with specific needs

- VAs are complex products
 - ▶ Multi-dimensional payoff functions
 - ▶ On-going decision making throughout the contract period
 - ▶ Consumers may not be sophisticated to choose optimally

- **Classic View on Product Innovation**

- ▶ **Market Incompleteness**

- (Allen and Gale, 1994; Duffie and Rahi, 1995)

- **Potential “dark side” of Product Innovation: Obfuscation**

- ▶ **Strategic pricing of complexity**

- (Gabaix and Laibson, 2006; Carlin, 2009)

- ▶ **Empirical Studies from Retail Structured Products**

- (Henderson and Pearson, 2011; Célérier and Vallée, 2017)

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- What drives product innovation in the Variable Annuities market?
 - THEORY: A stylized model on product price and complexity
 - ▶ Allowing both “virtuous” and “obfuscating” product innovation
 - EMPIRICAL: Observations in line with theoretical model
 - ▶ Complexity of products in new categories increases for years and stagnates thereafter
 - ▶ Fees increase in product complexity
 - ▶ Substantial markup for categorical innovations
- ⇒ Co-existence of “virtuous” and “obfuscating” product innovation bridging views advertised in literature
- ▶ Mixed nature poses difficulties in view of consumers and policy

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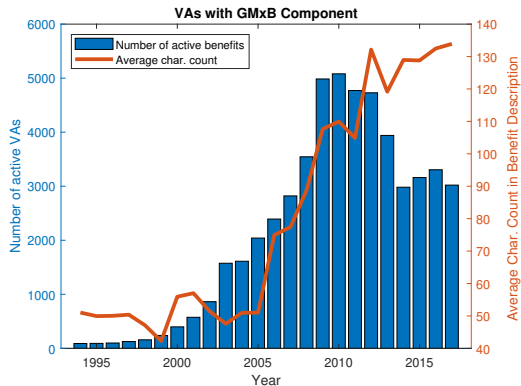
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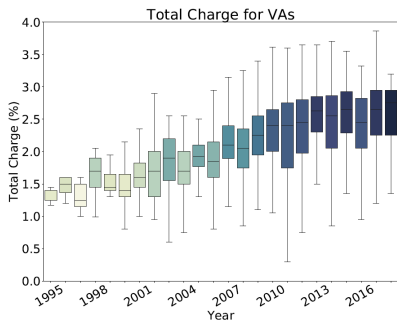
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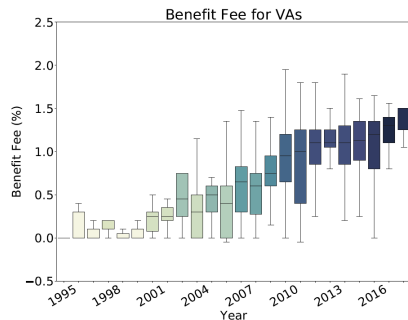
- VA prospectus: Typically several hundred-page long documents with detailed description
- Our source: Morningstar Annuity Intelligence
 - ▶ 2,302 plain VA contracts and 22,623 VA + benefit combinations
 - ▶ Starting from 1994
 - ▶ Numerical values on fees and benefits
 - ▶ Textual description on add-ons and conditions
- Key contract variables
 - ▶ Complexity: description length, number of scenarios
 - ▶ Price: total contract fee



- Frequent innovation and increasing complexity



(a) Total Fees of Variable Annuities



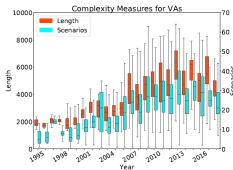
(b) Benefit Charges of Variable Annuities

- Increasing VA fees and benefit charges
- Recent findings in retail structured products (Célérier & Vallée, 2017)
- Is innovation in VA market also driven by obfuscation and shrouding?

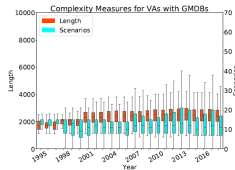
Why may consumers purchase VA with add-on benefits?

- Tax advantage
 - ▶ Just purchase basic VA without costly guarantees
- Pressure by salesperson
 - ▶ “Life insurance is sold, not bought”
 - ▶ Limited learning by consumers
- VA plus GMBs are insurance products
 - ▶ Provide protection against bundled risks that are difficult to obtain otherwise
 - ▶ VAs are held by high net worth individuals (Brown & Poterba, 2006)

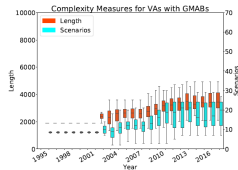
Analysis at the benefit level



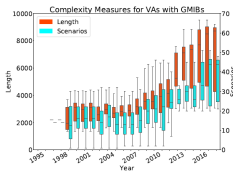
(a) All VAs



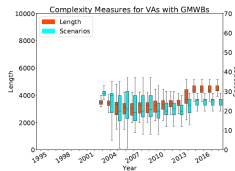
(b) GDMDBs



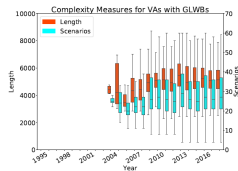
(c) GMABs



(d) GMIBs

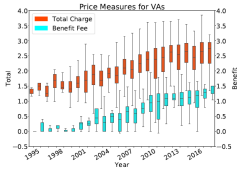


(e) GMWBs

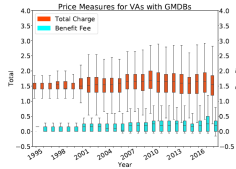


(f) GLWBs

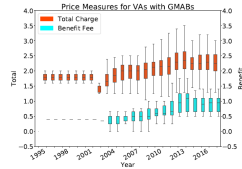
- “Increasing-stagnating” trends within benefit groups
- Increasing complexity in general: an aggregation of benefit trends?



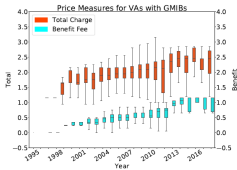
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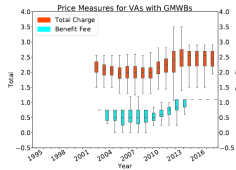
(b) GMDs



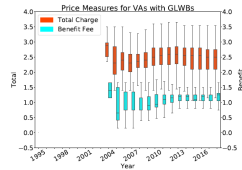
(c) GMABs



(d) GMIBs



(e) GMWBs



(f) GLWBs

- Increasing trends in aggregate and sub-markets
- Expensive early innovation
- Virtuous and obfuscating innovation

Proposition 1: “Virtuous” Innovation

Successful innovator chooses monopolistic price, lowest complexity, and attracts all type II sophisticated consumers in equilibrium.

Proposition 2: “Obfuscating” Innovation

- Unsuccessful innovators face trade-off between attracting type I sophisticated consumers with low price and profiting from unsophisticated consumers with high price.
- Higher competition leads to higher levels of complexity.

Empirical Predictions

- “Virtuous” Innovation: early innovation of new benefit types
 - ▶ High price
 - ▶ Low complexity
- “Obfuscating” Innovation: follow-up innovation within existing types
 - ▶ High complexity associates with high price
 - ▶ High complexity when facing competition

Complexity

$$\text{Complexity}_i = \beta_0^C + \text{Co. Fixed Effect}_i^C + \beta_{type}^C \text{Benefit Type}_i + \beta_X^C X_i + \varepsilon_i$$

- Complexity_i : description length or number of scenarios
- Benefit Type_i : generic categories (GMxBs)
- X_i : feature set

Complexity

- Early Inception
 - ▶ Less complex
- Linear time trend
 - ▶ Increasing
- Benefit dummies
- Benefit-specific time trends
 - ▶ Insignificant aggregate trend

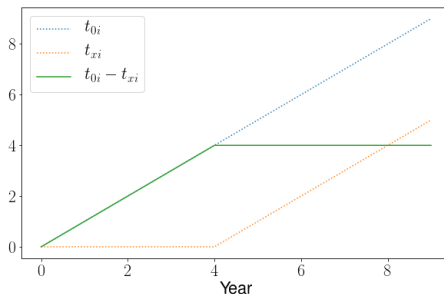
	(1)	(2)
Early 5%	-0.322*** (0.112)	-0.3649*** (0.107)
InterestRate	-0.002 (0.018)	-0.0347** (0.017)
Year	0.0377*** (0.008)	0.0113 (0.009)
GMA B	0.2092* (0.107)	-0.4198 (0.364)
GMIB	1.2681*** (0.087)	-1.3976*** (0.249)
GMWB	0.3612*** (0.112)	-0.4993 (0.456)
GLWB	1.8037*** (0.06)	2.6678*** (0.238)
GMA B \times Year		0.0424* (0.025)
GMIB \times Year		0.2026*** (0.018)
GMWB \times Year		0.0704* (0.037)
GLWB \times Year		-0.0481*** (0.014)
Company FE	Yes	Yes
Observations	1286	1286
Adj. R ²	0.618	0.663

Complexity

- To capture the “increasing - stagnating” trend

$$t_{0i} = \text{Inception}_i - \min_{\{type_j = type_i\}} \text{Inception}_j$$

$$t_{xi} = \max\{t_{0i} - x, 0\}$$



Complexity

- Year 0 & Year X

- ▶ Similar in sizes
- ▶ Opposite in signs
- ▶ “Increasing-stagnating” trend

	(3)	(4)	(5)
Early 5%	-0.2983** (0.125)	-0.2389* (0.133)	-0.188 (0.141)
InterestRate	-0.0044 (0.019)	-0.0082 (0.018)	-0.0061 (0.018)
Year 0	0.0681 (0.071)	0.0975* (0.051)	0.0996** (0.04)
Year 3	-0.0316 (0.073)		
Year 4		-0.0632 (0.054)	
Year 5			-0.066 (0.042)
GMAB	0.5131*** (0.125)	0.527*** (0.125)	0.5456*** (0.126)
GMIB	1.3406*** (0.089)	1.3357*** (0.089)	1.3324*** (0.089)
GMWB	0.667*** (0.132)	0.6959*** (0.135)	0.7285*** (0.138)
GLWB	2.1342*** (0.082)	2.1202*** (0.082)	2.1225*** (0.08)
Company FE	Yes	Yes	Yes
Observations	1286	1286	1286
Adj. R ²	0.618	0.618	0.619

Benefit Charges of Variable Annuities

- First Inception
 - ▶ Expensive early innovation
 - ▶ Not mark-up
- Complexity
 - ▶ Positive association
- Linear time trend
 - ▶ Increasing
- Benefit dummies and benefit-specific time trends

	(3)	(4)
First	0.1455 (0.126)	0.2254* (0.127)
InterestRate	-0.0156* (0.009)	-0.0167* (0.009)
Year	0.0305*** (0.004)	0.0194*** (0.005)
Length	0.121*** (0.02)	0.1167*** (0.022)
# of Scenarios	-0.0006 (0.002)	0.0002 (0.002)
GMAB	0.2539*** (0.055)	-0.4539** (0.199)
GMIB	0.2218*** (0.048)	0.0784 (0.139)
GMWB	0.1634*** (0.058)	-0.3835 (0.248)
GLWB	0.3921*** (0.04)	-0.0656 (0.132)
GMAB × Year		0.0501*** (0.013)
GMIB × Year		0.0103 (0.01)
GMWB × Year		0.0434** (0.02)
GLWB × Year		0.029*** (0.008)
Company FE	Yes	Yes
Observations	1286	1286
Adj. R ²	0.464	0.474

- Extended Carlin's model for product complexity
 - ▶ In equilibrium, “virtuous” and “obfuscating” firm behavior co-exist.
- Empirical findings in Variable Annuity market
 - ▶ Aggregate market trend is composed of temporary benefit trends
- Repercussions for consumers, firms, and policy makers
- Thoughts: what companies are likely to engage in virtuous innovation?

Thank you!