Experience Studies

Southeastern Actuaries Conference

Kevin Pledge FIA, FSA

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Where are we now?

- Data availability?
- Studies calculated one at a time?
- Static reports?
- Are sales persistency studies consistent with actuarial lapse studies?
- Do studies result in management action, or are they limited to actuarial interest?

Where do you want to be?

What is required to:

- Have all your data in one place - ready to be studied any which way?
- Be automatically be notified of adverse experience the moment it occurs?
- Have the ability to produce new studies in 5 seconds?
- Tie results to financial impacts and demographic changes?

How did we get here?

Mainframe Applications

Mainframe Extracts

Spreadsheets / Access

Computational systems

Data Warehouse

Integrated
or
Extract provider

Issues

- Segmentation
- Alterations
- Withdrawal
  - Reinstatement, NTU
  - Non-forfeiture Options, e.g. RPU
  - Conversions
- Mortality
  - Cause of death
  - Credibility
- Premium Persistency
  - Frequency / Severity

Study Methods

- Direct Approach
  - Computation based on exact exit dates and exposure
  - Based on current view of data
- Census Approach
  - Traditional approach for handling aggregate data
- Multi-state Approach
  - Based on true history of data

Direct (or Seriatim) Approach

- Calculate exposure directly from birth date, study dates and exit dates
- Group by age, duration and risk factors

Pros

- Intuitive

Cons

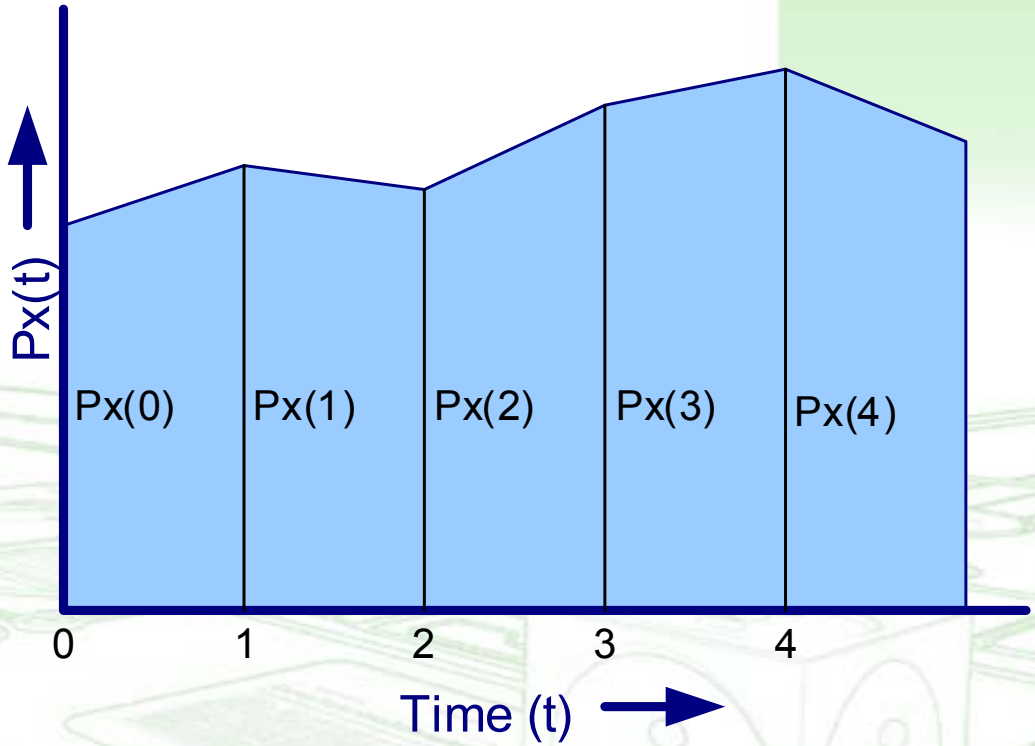
- Inflexible over time
- Computationally intensive
- Uses current attributes

Census Approach

Introduction

Study Methods

Other Considerations



$$E_x = \int_0^T Px(t)dt \approx \frac{1}{2}Px(0) + \sum_{t=1}^{T-1} Px(t) + \frac{1}{2}Px(T)$$

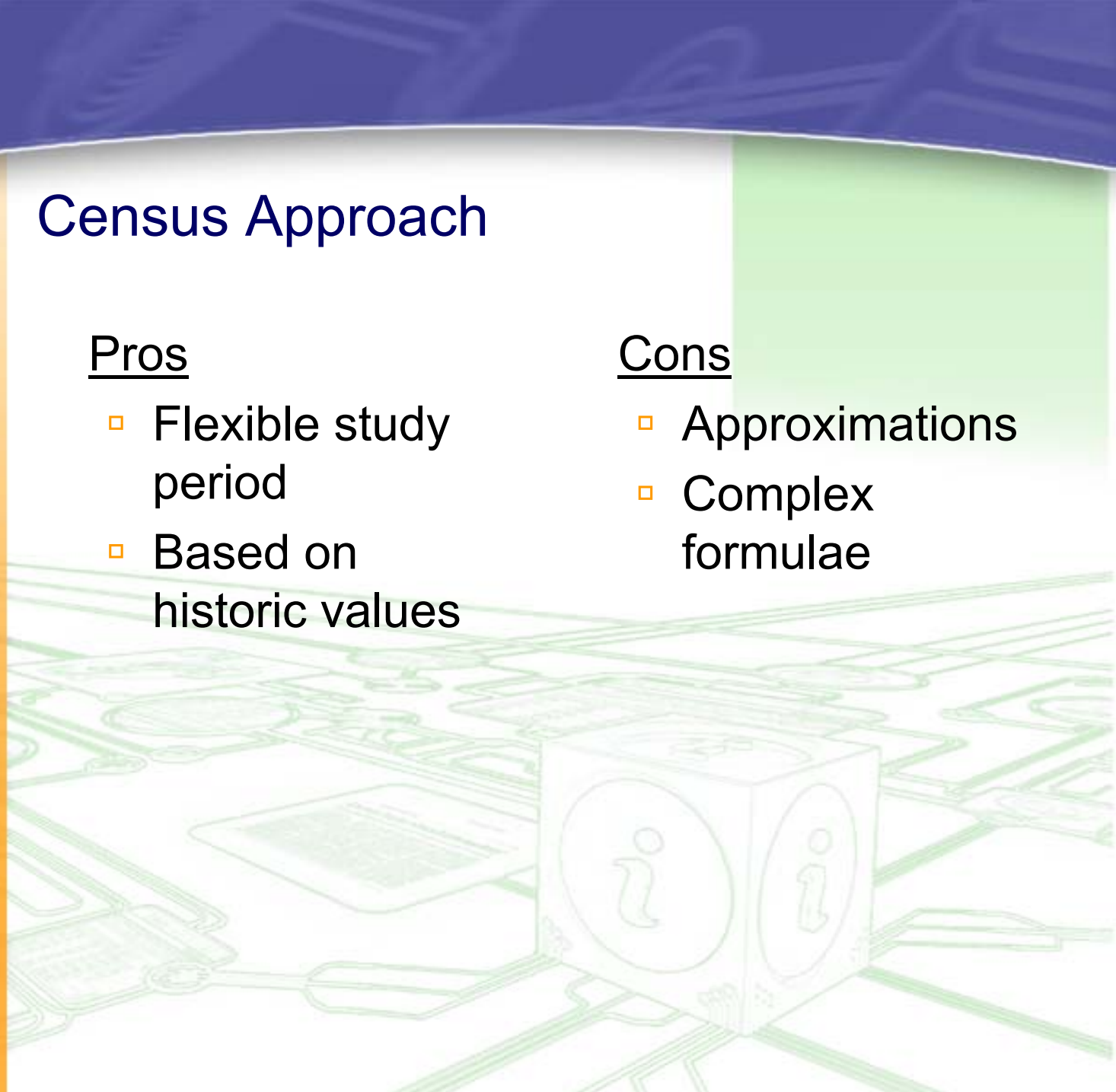
Census Approach

Pros

- Flexible study period
- Based on historic values

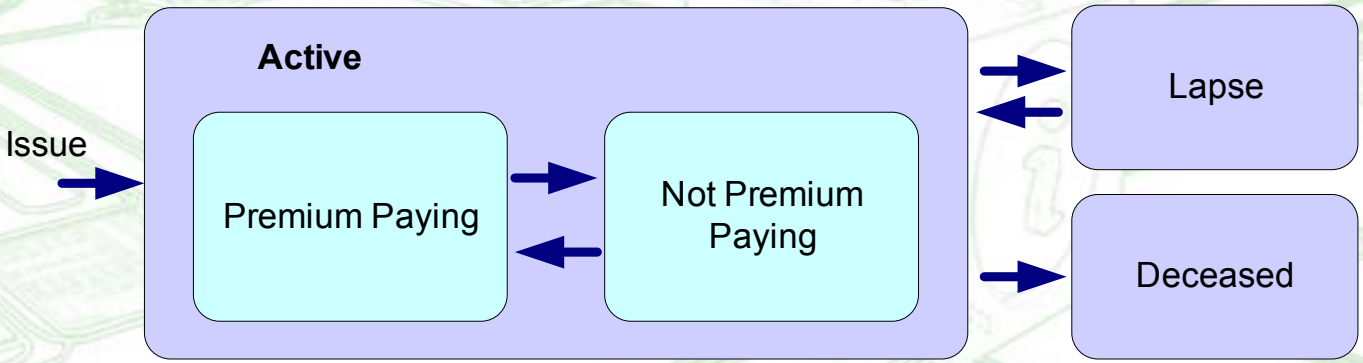
Cons

- Approximations
- Complex formulae



Multi-State Approach

- Policy level study based on business model
- Data intensive (data warehouse)
- Ultimate flexibility – true data, slice and dice
- Simplest calculation
- Population validation



Multi-State Approach

Pros

- Flexible study period
- Easy to add new risk factors
- Simple computations
- More accessible

Cons

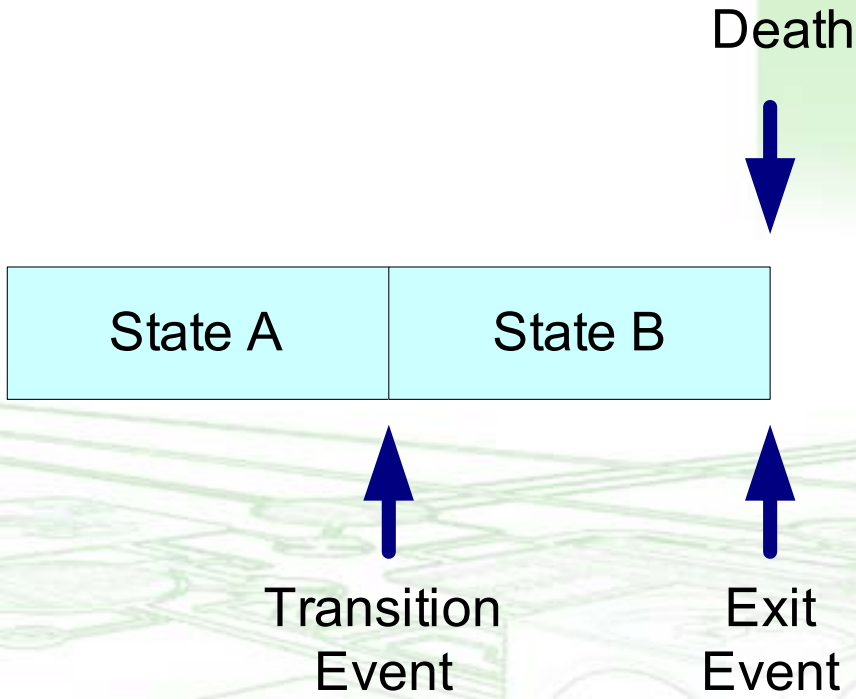
- Require explicit business model

Comparison of Approaches

Introduction

Study Methods

Other Considerations



Comparison of Approaches

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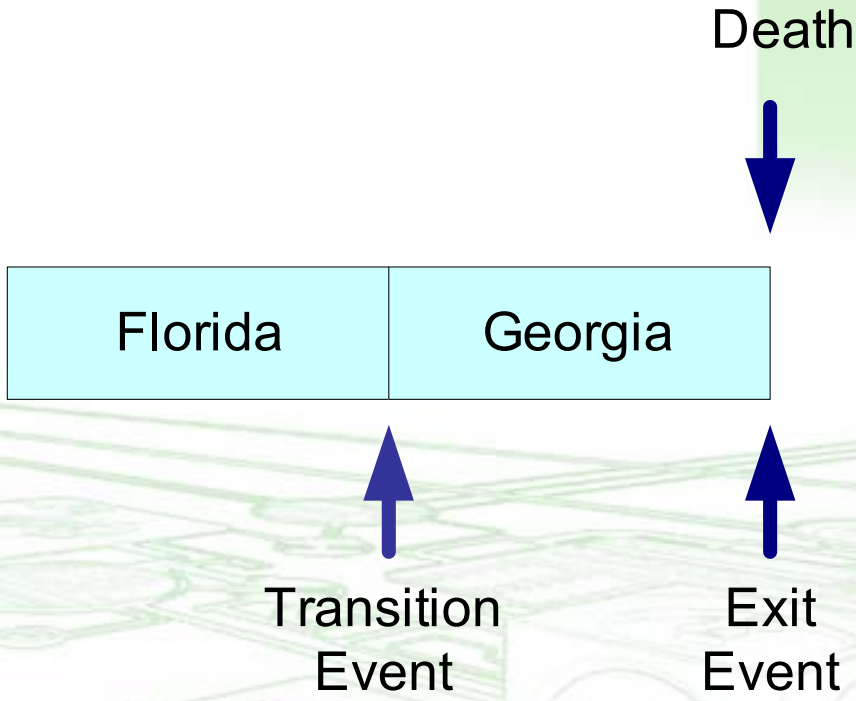


Direct Approach: All exposure as Georgia

Census Approach: Approx exposure at that time

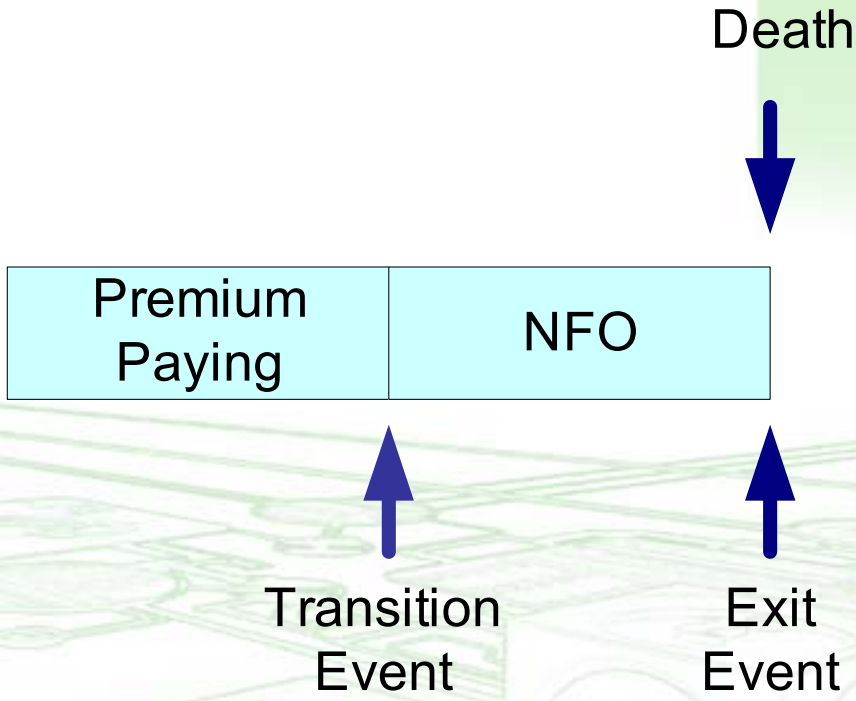
Multi-state: Exact exposure either way + ability to study

Comparison of Approaches

Introduction

Study Methods

Other Considerations



Direct Approach: Calculate exposure depending on study

Census Approach: Calculate exposure depending on study

Multi-state: Single exposure filtered based on event

Comparison of Approaches

	Direct	Census	Multi-state
Precise exposure calculation	✓		✓
Flexible time period		✓	✓
Supporting demographics			✓
True historic attributes		✓	✓

Introduction

Study Methods

Other Considerations

Other considerations

- Supporting demographics
- Credibility Testing / Supplemental data
- Regression line fitting
- Data Mining
  - Cluster algorithms to define grouping
  - Predictive algorithms to manage experience
- Source of Earnings
  - Contingency sources should be consistent with experience

Appendix

Types of Study

- Withdrawal
  - Surrender
  - Lapse
  - Conversion
- Mortality
- Premium Persistency
- Transition
  - Incidence/Termination

Purpose of Experience Studies

- Experience for pricing, re-pricing
- Dividend setting
- Assumption setting for management projections, Embedded Value, other reserves
- Improve performance – symptom not problem

Key Concepts

- Principle of Correspondence
- Rate Interval
  - Life Year
  - Calendar Year
  - Policy Year
- Study Period
- Exposure Type
  - Initial
  - Central
- Dependent vs. Independent Rates

Guidance

- Standards of Practice
  - No. 10. Methods and Assumptions for Use in Life Insurance Company Financial Statements Prepared in Accordance with GAAP (March 2000)
  - No. 23. Data Quality (July 1993)
- Expected Mortality: Fully Underwritten Canadian Individual Life Insurance Policies (July 2002)