

Lapse Experience Term Products

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Term Lapse Experience

- Disclaimer
- Block of business
- Analysis
- Lapse experience
- Conversions
- What happens after the level premium period?
- Profitability considerations if lapse assumption wrong

Disclaimer

- Due to anti-trust issues, not able to provide exact experience – all information provided in relative terms.
- Any experience after the level premium period (especially mortality) is not yet fully credible.

Block of business

- Level premium term insurance written since 1988
- Premiums guaranteed for the entire level premium period
- Level premium periods of 10-, 15-, 20-, and 30-years
- Exposure (by # policies): 450,000
- Exposure (by face amt): \$139 billion

Analysis

- Important to look at experience from many different perspectives and relationship between such factors as:
 - duration
 - distribution channel
 - gender
 - issue age
 - issue amount
 - level premium pd
 - payment mode
 - payment type
 - smoking status

Analysis

- Generally viewed by # of policies
- Unless specifically stated, conversions included in data as additional lapses

Term Lapse Experience

Lapse Rate Varies by Length of Level Premium Period

- Lapse rate higher for shorter level premium periods
 - 10YT > 15YT > 20YT
 - 20 YT slightly < 30YT
- For 10YT, lapse rate 2% to 3.5% higher than for 15YT, depending on gender
- For 15YT, later lapse rates low single digits
- 20YT lapse rates about half those for 10YT plans
- 20YT lapse rates extremely low by durations 4/5

Lapse Pattern Varies by Length of Level Premium Period

- 10YT fairly level throughout level premium period
 - Not seeing a decrease towards end of level premium period
- 15YT level and then decreasing
- 20YT & 30YT – steadily decreasing pattern
- For 10YT & 15YT, year 2 rate slightly higher than year 1

Variation by Gender

- Do not see significant variation in experience between males and females
 - Other than for 10YT
- 10YT female experience about 1.3% < male experience

Variation by Smoking Status

- Experiencing significant variation by tobacco usage
- Tobacco/smoker classifications have significantly higher lapse rate than non-tobacco users/nonsmokers
- Differential greater the longer the level premium period

Variation by Smoking Status

- Differences most significant in earlier durations
- For 10YT and 15YT plans, overall tobacco user lapse rates 3-4% higher than for non-tobacco users
- For 20YT and 30YT plans, overall tobacco user lapse rate more than double rate for non-tobacco users

Variation by Smoking Status

Plan	TB Rate as % of NT Rate	Maximum Differential	Approximate Duration When Rates Converge
10YT	131%	6%	10
15YT	157%	7%	10
20YT	226%	9%	5
30YT	225%	10%	Not yet seen

Rate Varies Significantly by Payment Mode

- $M < A < S < Q$
- Quarterly lapse experience as much as 7 – 9% > Monthly experience
- Monthly and annual experience about the same for 20- and 30-year plans
 - As much as 2% < annual for other level premium plans

Variation by Payment Mode Not Consistent with LIMRA data

Payment Mode	By Policy Count	By Face Amount
Annual	10.0%	9.6%
Semiannual	12.3	12.5
Quarterly	17.4	18.0
Monthly	17.7	19.2

Source: LIMRA Individual Life Persistency Study, 2001

Rate Varies by Payment Form

- PAC/Bank draft significantly better experience than direct bill
 - 3.5% to 4.5% lower lapse rate
 - Quarterly bank draft shows experience consistent with other payment modes
- Quarterly direct bill exhibits highest lapse rate
 - Nearly 6% higher than aggregate lapse rate

Variation by Payment Form Consistent with LIMRA data

- LIMRA study shows lapse rates under bank draft scenarios to be about 2.4% lower than for direct bill

Lapse Experience Variation by Issue Age

- Lapse rate decreases by issue age
 - Regardless of length of level premium period,
- < 30 cohort experience more than double rate of 70+ cohort
- 40-49 cohort 1 – 1.5% < 30-39 cohort
- Pattern about the same between NT/TB risks and M/F risk

Other Considerations

- Not seeing significant variation by issue amount
 - \$250,000 - \$999,999 experience is lower than other groupings
- Including experience from 1999 issues can distort experience by as much as 1%
- Pre-XXX experience worse than post-XXX

Conversions

- Experience about the same between NT/TB and M/F
- Activity higher on 10YT plans than on other level premium plans
 - Generally 1-2% v. < 1% for other plans
- Conversion rate highest at end of level premium period

Conversions

- Rate does not seem to be sensitive to conversion programs and/or conversion credits
- Rate may depend on distribution channel, attractiveness of permanent products and compensation on converted policies

Conversions – Pricing Considerations

- Although conversion rates are low, mortality on converted policies emerging and significantly greater than mortality on underlying plan
 - Definitely seeing anti-selection
 - Should account for in either term pricing or UL pricing

What Happens After the Level Premium Period?

Experience starting to emerge for 10YT Plan

After the Level Premium Period

- Starting to see both lapse and mortality experience emerge
- Not yet fully credible
 - Close to 35 claims in duration 11; fewer, but more than 10, in duration 12

After the Level Premium Period – Shock Lapse

- Seeing a shock lapse at end of duration 10 but less than originally assumed
 - about a 50% increase over duration 9 rate
- Shock continues for few years after level premium period but at lower rate than duration 10
 - Decreases about 20% p/year in durations 11&12 from duration 10 then levels out by duration 14
- Female shock < Male
- Doesn't vary much by age
- Shock for NT and TB risks about equal

After the Level Premium Period – Mortality Experience

- Significant increase in mortality beginning in duration 11
 - Mortality about 2-3 times mortality in duration 10
- Seeing mortality in duration 12 about same level as duration 11
- Experience by count shows higher anti-selection than by amount

Pricing Considerations of Getting the Lapse Assumption Wrong

Getting the Assumption Wrong

- 20YT – often has losses in the tail
 - Too high a lapse assumption will inflate profits
- 10YT – if only price over level premium period, missing some potential profitability

Getting the Assumption Wrong

- If price on an annual basis and significant amount of business:
 - Pays quarterly or semi-annually, could significantly miss profit expectations by under-estimating the lapse rate
 - Pays monthly, could be over-estimating the lapse rate by 1-2%. For lapse supported products, may be overstating profit expectation

Getting the Assumption Wrong

- If use same assumption for non-tobacco and tobacco risks:
 - May be misstating profit expectation for tobacco risks by significantly underestimating the lapse experience for that block

Getting the Assumption Wrong

- The profitability impact is generally quite sensitive to the lapse assumption
 - e.g., Return of Premium Term
 - Timing of lapses and pattern can have up to 200 basis point difference to ROI on 30-year designs and up to 500 basis point difference on 20-year designs

Ultimate Mortality Implications of Lapse Assumptions

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SOA Product Development Symposium
May 7, 2004

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Time Spent Analyzing

- **MORTALITY**
 - Lapse

Experience

- Mortality
- LAPSE

Tidbit of the presentation

Every 1% of face amount above issue age 70 can be as much as 5-10% of the overall mortality expectation.

5% of the distribution above age 70 can be more than a quarter of the total mortality expectation of a product.

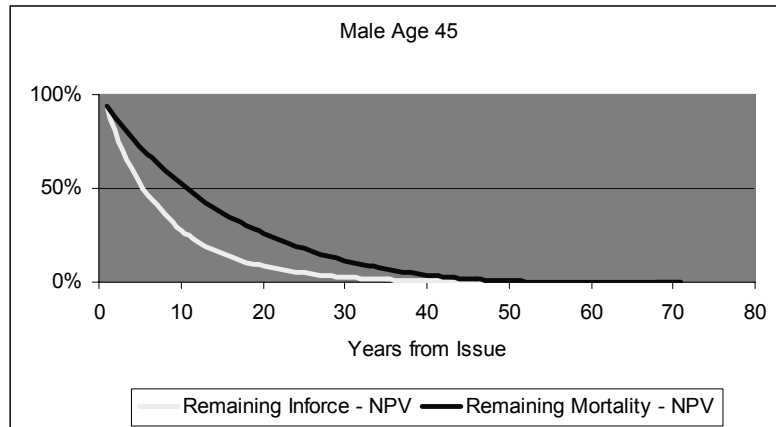
Inforce versus Mortality Runoff



What's the Point?

- Tendency to think one the inforce starts to diminish the “risk” goes with it
- In reality, mortality is obviously back-end weighted
- In 2024, someone will be explaining mortality results from 2004 issues!

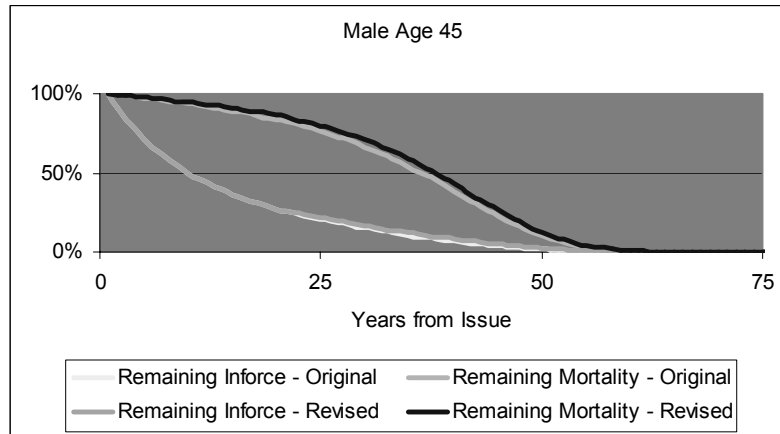
Inforce versus Mortality Runoff - NPV



Implications

- 50% of NPV of premium before duration 6
- 50% of NPV of mortality after duration 11
- Lifetime mortality....concept holds regardless of timeframe measured

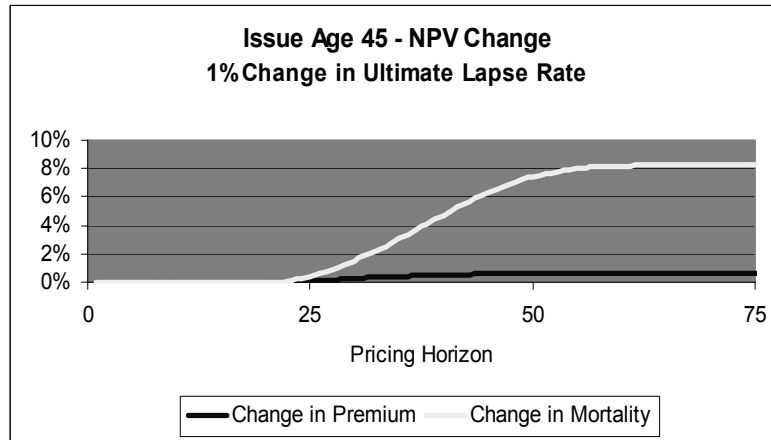
Inforce versus Mortality Runoff



Implication:

- Did I really change anything?
- Reducing ultimate (21+) lapse rate from 5% to 4%
 - Increased NPV of premium by less than 1%
 - Increased NPV of mortality by 8%

Effect on Premium and Mortality



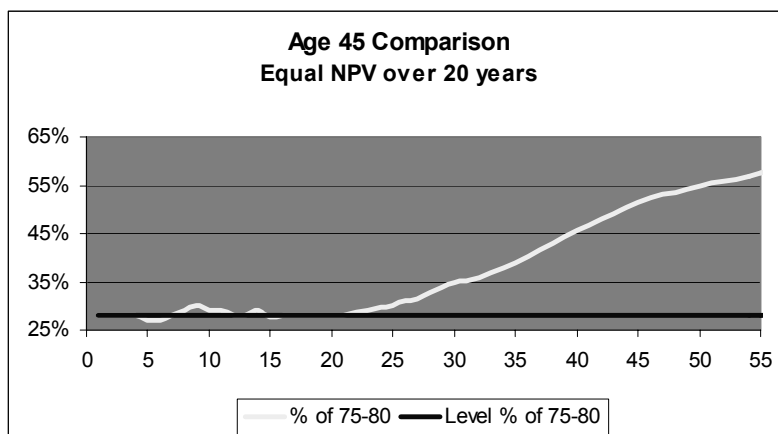
Ultimate Impacts

- Regardless of the pricing horizon, the later durations matter
- How many people are around
- What mortality expectations will they have

Pricing Horizon vs. Product Life

- Level percentage expectations
- Two Perspectives:
 - Flat % of 75-80 table forever
 - Basically flat for 20 years and then increasing

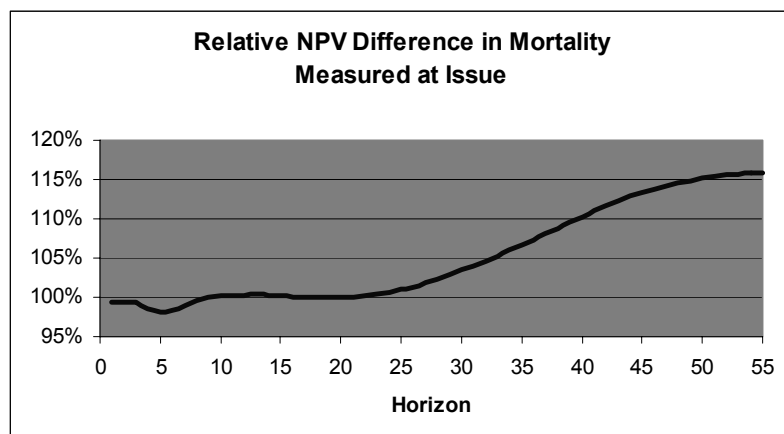
Level vs. Increasing Rate of 75-80 Table



Implication:

- Flat % is about \$100/1000 at attained age 100
- Even twice that could be argued as “light”

Level vs. Increasing Rate of 75-80 Table



Implication

- Lifetime horizon is a 15% NPV difference in mortality
 - More than ½ a table on each and every risk!
- 30-35 year horizon is approximately 5% difference

Actual Ultimate Assumption

- Lapse or mortality – it's a material assumption

Flat percentages

There is simply no indication to believe that a flat percentage of any table is sustainable.

What we do.....

- We make assumptions
 - Sometimes concrete data
 - Sometimes not.....we make a bet
- Understand the game you're playing and the bet made.
- Scenario test your assumptions....which ones are really sensitive and material.

Ultimately

- Appreciate the sensitivities and where to spend your time

Permanent Product Lapse Rates

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Northwestern Mutual
May 7, 2004

Permanent Product Lapse Rates

- Producing a lapse study
- Lapse rate experience
- Setting lapse rate assumptions
- Financial impact of persistency
- Universal life persistency
- Secondary guarantee products

Producing a Lapse Study

- Policy anniversary to anniversary study
- Most recent one-year experience where credible
 - Most recent 5-year otherwise
- Include total lapses and face amount reductions net of reinstatements
 - Should exclude not-taken policies
- Results by policy, face amount, and premium
 - Assumptions set by face amount

Producing a Lapse Study

- Maintain detail by
 - Product/Market
 - Tobacco status
 - Classification
 - Policy size
 - Issue age
 - Duration
 - Gender
 - Premium mode
 - Type of underwriting
 - General agency
 - Agent
 - Agent's length of service

Lapse Experience

- Block of Business
 - Large block of traditional permanent policies
 - Fixed and variable life
 - Very little universal life
 - Exposure
 - 2.8 million policies
 - \$228 billion of face amount

Lapse Experience

- Product (or Market)
 - Defined as personal, estate, joint, variable, single premium, or corporate business
 - Lowest for single premium products
 - Estate and joint about 1.5% higher
 - Personal market (split by variable vs. fixed)
 - Fixed 2.0% higher
 - Variable about 2.5-3.0% higher (lower in very early durations)
 - Corporate 3.0%+ higher

Lapse Experience

- Classification
 - Early duration rates increase by class
 - Additional 1.5% for each additional class
 - Rates in ultimate durations (16+) come together but still increase by class
 - Tobacco rates are 1.5 to 2.0 times the non-tobacco rates
 - Have similar increases by class

Lapse Experience

- Issue Age
 - Significant differences by issue age
 - Highest for issue ages 20-29
 - Generally decrease with increasing age
 - Rates at ages 60+ are half the rates at 20-29
 - Juvenile rates are similar to the 60+ rates
 - Differences by age wear off in ultimate durations

Lapse Experience

■ Duration

- Highest rates in first duration
- Generally decrease with increasing duration
 - Much different pattern for term
- Ultimate duration rates are about half of first duration rates
 - Steeper at younger ages
 - Flatter at older ages

Lapse Experience

■ Policy Size

- 3 groups
 - \$0-\$100,000, \$100,001-\$300,000, and \$300,001+
- Rates are lowest for the highest sizes and flat by duration
- 1.5% higher for the middle sizes
- Another 2% higher for the smallest sizes
- Differences by size wear off by 10th duration

Lapse Experience

- Gender
 - No significant differences
- Premium Mode
 - Increase by increasing payment frequency
 - Except for electronic funds transfers
- Type of Underwriting
 - Medical < Paramedical = Non-Medical
- Agents length of service
 - Experienced agents have significantly better lapse rates - even at very early durations

Setting Lapse Assumptions

- Actual pricing assumptions vary by
 - Market, class, age, and duration only
- Use actual experience in each cell
 - One-year or five-year average depending on amount of data
 - Smooth for nice pattern
- Oversimplification can lead to significant mismatches

Setting Lapse Assumptions

Experience Lapse Rates by Duration	
Duration	Lapse Rate
1	9.0%
2	7.5%
3	6.5%
4	5.5%
5	4.0%
Actual # of Lapses	975

Setting Lapse Assumptions

Lapse Rates by Issue Age & Duration				
Duration	Age 25	Age 35	Age 45	All Ages
1	12.0%	10.0%	5.0%	9.0%
2	9.0%	9.0%	5.0%	7.5%
3	7.0%	8.0%	4.0%	6.5%
4	6.0%	7.0%	4.0%	5.5%
5	5.0%	4.0%	2.5%	4.0%
Actual #	390	380	205	975
Expected #	325	325	325	975
A/E	1.20	1.17	0.63	1.00

Universal Life Persistency

- Policy Persistency
 - Same as previously discussed

- Premium Persistency
 - No required premium => model various on-going premium payment patterns
 - Premiums paid in duration_t / duration_{t-1} on policies remaining inforce

Universal Life Persistency

- NM has very small block
 - All early duration
 - Mostly COLI; some joint life; very little personal
 - Exposure
 - 3,000 policies
 - \$134m total premiums paid to date

- Look at ratios by
 - Plan, 1st year premium, issue age, definition of life insurance test, and death benefit option

Universal Life Persistency

- Plan
 - Steeper for single life than joint life (may be market driven)
- Total 1st year premiums paid
 - Lower ratios for higher 1st year premiums
- Issue age
 - No significant differences
- Definition of life insurance test
 - Flatter for CVA test than GLP test
- Death benefit option
 - No significant differences

Secondary Guarantee Products

- Typically sold in estate market at older issue ages
 - Provides long term guaranteed death benefit without cash values
- Ultimate duration lapse rate is a key pricing assumption
 - 4-5% is common in industry
- Lapse rates on products with cash values??
 - Expect to be higher than SG product
- Lapse rates on products without cash values??
 - T100
 - Expect to be similar to SG product

Financial Impact of Persistency

- Good persistency has positive impact in several areas
 - Investment Earnings
 - More premium to invest
 - Longer duration investments => higher return
 - Mortality
 - Improved mortality due to less anti-selection (healthy people more likely to lapse)
 - Expenses
 - Fixed costs spread over more policies

Financial Impact of Persistency

- Promoting good persistency
 - Agent training
 - Explain advantage of good persistency
 - Better values => satisfied customer => repeat sales
 - Agent compensation
 - Higher renewal commissions
 - Persistency related bonuses
 - New features / pricing extended to existing policyowners where appropriate
 - No incentive to re-write the business