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Measuring Actual to Expected Accuracy for Life Settlement Underwriting

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The secondary market for life insurance policies, otherwise known as the life settlement market, is a relatively new industry. Although its roots date back to the AIDS related viatical transactions of the 1980s and 1990s, the life settlement market as we know it today is less than 10 years old. Its participants, those who put their life insurance policies up for sale, are typically over age 65 (average age of approximately 77 years) and have above average income levels. (The average face amount of a life settled policy is in excess of $1 million.)

The life settlement market provides an interesting study for older age mortality. Our population continues to age and life insurers have an increased interest in senior insurance products. However, life insurance mortality experience at the older ages is typically from seasoned policies that initially were underwritten at standard or near-standard rates. The life settlement market, on the other hand, provides select underwriting experience for the over-65 market for both standard and impaired risks.

In order to fully tap the mortality information contained in this market segment, we need to be able to measure actual-to-expected mortality experience in a meaningful way, and to present results by impairment category, by durational band, by mortality rating, and by other differentiating variables, as well as in aggregate. The measurement of actual-to-expected accuracy from life settlement experience presents some unique challenges that we will discuss in this paper.

METHODOLOGY

Although life and reinsurance companies conduct actual-to-expected studies on a regular basis, their methodology, which derives expected deaths from the mortality rates assumed in developing premium rates, would not be relevant for life settlement business. Therefore, we have not considered a traditional life insurer's methodology as an option. Rather, we have considered two other possible methodologies:

1. A point estimate methodology, and
2. A mortality distribution methodology.

POINT ESTIMATE METHODOLOGY

The point estimate methodology is a straightforward way of measuring accuracy. It entails charting each predicted date of death, comparing those predictions to actual dates of death, measuring the differences and then taking a geometric average of those differences. This methodology is helpful on a retrospective basis. However, it is less useful in the early durations of portfolio experience, as the mortality experience will be weighted disproportionately with premature deaths from longer life expectancy predictions. By way of illustration, the average life expectancy prediction for Fasano Associates is in the range of 13 years. We have been estimating life expectancies for eight years, since 2001. However, when you take into account the fact that the life settlement industry did not develop critical mass until 2003 and that it has experienced significant growth since then, the volume weighted length of time we have been estimating life expectancies is probably somewhere between three and four years. Thus, use of a point estimate methodology would produce biased results, with the early maturities of life expectancies of four years and longer creating the appearance of greater conservatism (longer predicted than actual life expectancies) than measurement over the full mortality distribution would produce.

MORTALITY DISTRIBUTION METHODOLOGY

The mortality distribution methodology is a useful approach to use in the early and intermediate portfolio durations. It entails taking each life expectancy prediction, solving for the mortality rating that would produce that life expectancy, taking the mortality distribution associated with that mortality rating, and then aggregating the mortality distributions of all life expectancy predictions to generate an aggregate mortality distribution for the entire portfolio. Actual deaths are then compared with expected deaths as per the aggregate

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mortality distribution, to produce the actual-to-expected ratio. Results will often be shown in "claims triangle" format to facilitate presentation of cumulative actual-to-expected experience, as well as A to E by calendar year, by year of underwriting, or by any combination of consecutive years.

ANALYTIC ISSUES

There are a number of analytic issues that must be considered in using a Mortality Distribution methodology to evaluate actual-to-expected accuracy: 1. Anti-Selection; 2. IBNR; and 3. Choice of the proper Mortality Table.

ANTI-SELECTION

Anti-selection in the life settlement market is different than in the life insurance market. Whereas a life insurance applicant might suffer from selective memory and forget to disclose certain impairments, on the life settlement side, the applicant is incented to disclose every possible impairment he or she has, as the worse the applicant's prognosis, the shorter the life expectancy and the greater the sales price. It is much easier to conceal adverse health information from a life insurer than it is to selectively disclose only unfavorable information to the life settlement investor.

However, the pricing dynamics of the life settlement market facilitate a different kind of anti-selection that is a function of imperfect information in the bidding process. While it is not unusual for brokers to shop different life insurance companies for the best offer on a new policy, the life insurance database is extensive and life insurance underwriting is generally consistent. Life settlement data, on the other hand, is still developing, and life settlement underwriters have been less consistent than life underwriters, often with significant differences in life expectancies. The brokers who place life settlement proposals with investors have taken advantages of these spreads, and have often presented the lowest of the life expectancies available. Even if two life settlement underwriters, on average, produce the same life expectancies, the intermediaries will often present the underwriter's life expectancy estimates when they are shorter than the competition.

Thus the actual to expected experience of a closed portfolio of life settlements will usually be lower than the underwriter's experience, and this pricing anti-selection needs to be taken into account.

IBNR

Incurred but not reported death claims present more of a challenge in measuring the accuracy of life settlement underwriters than for life insurance underwriters. The life insurance underwriting function is typically inter-

Known Deaths after Development					
Yr of U/W	2004	2005	2006	2007	2008
2004	72.13	267.27	512.48	729.27	1,005.55
2005		133.10	390.74	693.11	1,029.19
2006			122.04	374.20	699.51
2007				141.48	481.15
2008					202.12
Total	72.13	400.38	1,025.27	1,938.07	3,417.52

Expected Deaths through end of Year					
Yr of U/W	2004	2005	2006	2007	2008
2004	73.26	261.14	518.90	841.39	1,204.20
2005		87.29	329.38	676.36	1,110.76
2006			97.28	347.87	699.80
2007				112.16	404.85
2008					124.15
Total	73.26	348.43	945.56	1,977.77	3,543.75

nal, and life companies learn of an insured's death when a death claim is filed or when the insured stops paying premiums. On the other hand, life settlement underwriters are typically independent contractors, and have no way of knowing which estimates they provide result in a closed sale, let alone which ones result in death.

Therefore, the life settlement underwriter has to develop its actual death statistics from public sources of information, such as the Social Security Administration Death Master File. Whereas the Social Security Administration's Master Beneficiary File is used on a day-to-day basis in managing its payment programs, the Master Death File is a statutory requirement of the Agency, and is not used in carrying out its operating programs. As a result, they devote less resources to maintaining the death master file and, as a result, there are a significant number of deaths that either don't make it into the Master Death File or that do so without a social security number, or with an incorrect SSN. (See Hill, Mark E. and Rosenwaike, Ira, "The Social Security Administrations Death Master File: The Completeness of Death Reporting at Older Ages." Social Security Bulletin, Vol. 64 No. 1 2001/2002.)

In addition to the incompleteness of the SSA Master Death File, there are inaccuracies in the commercial databases used for social security verification, such as Veris and Experian, in that incorrect social security numbers that are reported with a commercial transaction often find their way into the database. (For example, if a loan issued to a married couple is applied for based on the husband's social security number, that social security number will often get entered in the database as belonging to the wife.) These errors also need to be accounted for in the development of life settlement IBNR assumptions.

MORTALITY TABLES

A key element in the actual-to-expected analysis is the choice of the appropriate mortality table. If our suggested mortality distribution methodology is used, the specific table used is not as important as using a table with a reasonable slope, as solving for the mortality rating has the effect of normalizing the table used. For example: Underwriter A generates a life expectancy estimate of 7.5 years by applying a mortality rating of 100 percent to a table that reflects a relatively large percentage of deaths in the first 15 years of the table, while

A/E Ratios					
Yr of U/W	2004	2005	2006	2007	2008
2004	98%	102%	99%	87%	84%
2005		153%	119%	102%	93%
2006			125.5%	108%	100%
2007				126%	119%
2008					163%
Total	98%	115%	108%	98%	96%

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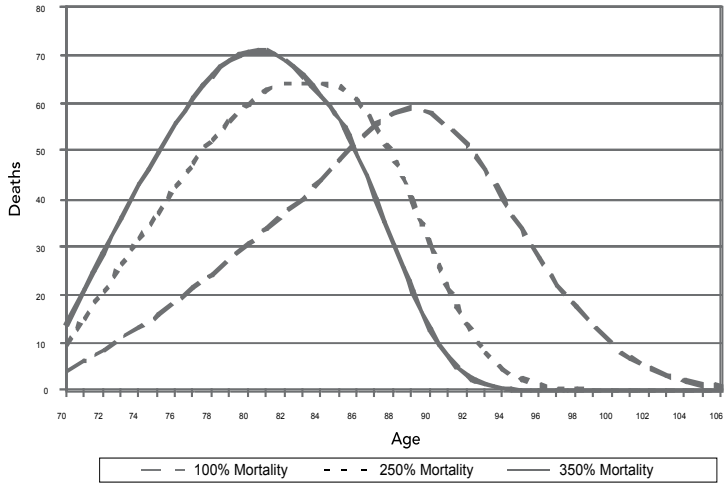
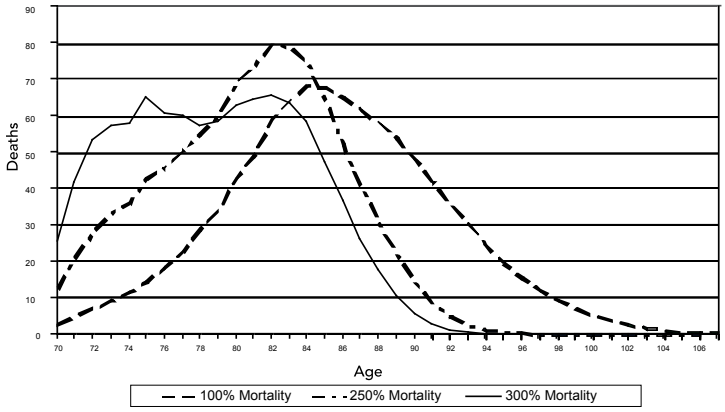
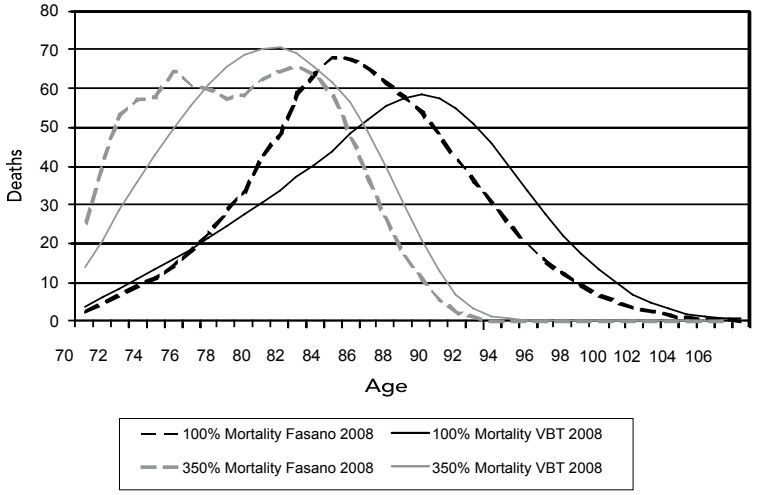
VBT 2008 Mortality Curves Impact of Increased Mortality Rates: No Change in slope of Mortality Curve



Fasano Associates 2008 Mortality Curves Impact of Increased Mortality Rates: Distinct Change in slope of Mortality Curve



Fasano 2008 & VBT 2008 Mortality Curve Comparison



Underwriter B generates the same life expectancy of 7.5 years by applying a mortality rating of 150 percent to a mortality table that reflects a smaller percentage of deaths in the first 15 years. The percentage of deaths that occur in earlier or later years is commonly called the "slope" of the mortality table. If, however, the slopes of the mortality tables used by Underwriters A and B are the same, then the pattern of mortality will be the same, as well, and the mortality rating corresponding to a given person's life expectancy will be the same when substituting one mortality table for the other and solving for the mortality rating. Nevertheless, there are some important issues that need to be considered in choosing a mortality table:

1. Life settlement mortality demonstrates lower mortality in the early durations than is predicted by either 2001 or 2008 VBT Tables. This is the result of at least three dynamics. First of all, the VBT tables were not developed for pricing purposes. Second, the average face amount of life settled policies is greater than the average size of life policies sold in the primary market. This income effect would be expected to result in less early duration mortality. Third, there is a likely lapsation effect common to life insurance mortality data, in which healthy lives lapse policies, often to take advantage of more favorable terms with a new policy. In life settlement pools, there typically is no lapsation—so the healthy lives stay in the life settlement pool—resulting in lower mortality.

2. The shape of the mortality table changes as a function of the overall mortality rate. Our experience demonstrates a bowing out of the left side of the mortality curve, as the mortality rate, or level of impairment, increases. This pattern is not reflected in VBT 2001 or VBT 2008, as the underlying mortality data was based on standard, non-rated lives.

CONCLUSION

Measuring actual-to-expected accuracy for life settlement underwriting presents unique methodological and analytical challenges. As the experience data for this market continues to develop, we would expect there to be new findings of older age mortality that will be beneficial for both life insurance and life settlement companies. ■