Regression Model to Make Trends More Accurate

Listed below are articles on a regression model that uses macro-economic and other factors that are designed to make trend-setting more accurate:

Regression Model Shows Lower Insurer Underwriting Results in 2013 and 2014

By Jeff Adams   February 10, 2013

It is not surprising that a study would find that health insurance company underwriting gains might be 2% to 3% lower in 2013 and 2014 than in 2012. After all the Affordable Care Act ("ACA") will hurt insurer profits, right? Well, this study does not incorporate the effects of the ACA.   The regression model was developed before the Affordable Care Act was passed. The model was designed to determine facts that would affect underwriting gains and losses, presumably due to its impact on trend that were not predicted by actuaries setting trends for rating purposes.

The model, described in detail in a prior article, was updated using new unemployment, medical Consumer Price Index, hospital occupancy, increase in number of physicians, and National Health Expenditure data. Using this information it is estimated that underwriting gains will be 2% to 3% lower in 2013 than in 2012. Very preliminary results for 2014 show a 0.5% improvement over 2013 but underwriting gains that are still lower than the past few years.

Essentially, the entire decrease in underwriting gain is due to the impact of an unemployment rate that is no longer affecting rates in a positive way. The model had shown a strong correlation between underwriting gains and the change in unemployment rates three years prior. For example, 2013 underwriting gains will be less than 2012 by 2% to 3% due to unemployment rates not increasing from July 2009 to July 2010, as opposed to unemployment rates significantly increasing in the prior two years. The model was not able to determine why this impact occurs but two possible reasons are the impact of COBRA members on rating and the impact of an increasingly vibrant economy on health care costs.

What should be done with this information? Well, the 2013 estimates were done later than usual and too late to assist in estimating January 2013 rates. If claims per member are higher than anticipated in early 2013 then do not ignore them and hope claims go down as that may not happen. Claims may increase on a per member basis by 2% to 3% over what was anticipated. Starting to build that into a financial forecast may be appropriate as would effecting changes may increase underwriting gain, such as increasing rate increases for later in the year.

There are reasons why this increase in claims costs per member may not occur, however. The study was done a little over three years ago and incorporated many years of data. It looked at recent years and decades of data to see if there was an emerging pattern. It does not take into account any emerging patterns occurring since 2008, the biggest of these is the impact of the Affordable Care Act. It is unknown as to the impact of ACA on underwriting gains

(presumably also the accuracy of claims trend setting) as it is anticipated that actuaries will be significantly more conservative in estimating trends due to the substantial unknowns regarding ACA. In a scenario where actuaries are too conservative then ACA could have the near-term effect of actually increasing underwriting gains, everything else being the same. Most expect insurer profits in upcoming years to be slightly less due to ACA but its impact on 2013 is still unknown.

Insurers may want to perform their own regression models analyzing the impact of unemployment rates lagged three years on their own underwriting gain to determine if there is a correlation. This could then be added to the trend-setting process. Another factor that could be analyzed is hospital occupancy rates (increase in percent of beds full) lagged two, three, and four years. The percent increase in number of physicians lagged three and four years could be analyzed along with the percent increase in the number of physician specialists lagged three and four years.

In summary, act quickly if you find this model is correct and underwriting gains are less than forecasted for the first couple months. Meeting a forecast is a 24/7 process and acting quickly could make or break the possibility of meeting forecast this year. If nothing else it may give a tool for increasing the accuracy of future forecasts and rates. The key to hitting our forecasts is always adapting and developing new tools.

Statistical Analysis to Make Health Care Trends more Accurate
By Jeff Adams   *November 19, 2012*

A first-of-its-kind study, a joint venture between Jeff Adams and Computer Task Group, shows an 87% statistical correlation in a model developed to find additional variables which could be used to make health trend estimation more accurate. The model shows that using lagged data for change in hospital occupancy rates, change in number of physicians, and unemployment rates can eliminate a significant portion of the unknown trend variability.

The model shows that if hospital occupancy rates increase two years prior to the year the trend is to be estimated (hospital occupancy rate change from 2010 into 2011 if a trend from 2012 into 2013 is to be estimated) then the trend into 2013 is likely to beoverstated. Rationalization of this dynamic is that higher hospital occupancy means more income for a hospital and lessen its desire to seek out additonal income in subsequent years, i.e.-lower trends for insurers two years after.

Increases in the number of physicials four years prior to the year for which the trend is to be estimated (incease in the number of physicians from 2008 to 2009 if a trend is to be estimated for 2013) has a significant effect on the trend. The rationale is that an increased number of physicians increased the supply of services, especially since the number of specialists is increasing at a higher rate than the number of Primary Care Physicians. If a town has 5 physicians that perform twelve services a day for a total of 60 services in that town, how many services will each physician perform if a 6th pysician opens up an office in that town? The answer? It may vary depending on the specifics but the total number of services will be

greater than 60. If it increases to 66 from 60 then each physician will perform 11 services. This dynamic increases health care costs. The dynamic may be caused by the physician supplying needed additional capacity or it may cause additional unnecessary services to be performed.

The change in unemployment rate 3 years prior affects the trend as COBRA benefits run out for persons. As these persons approach the end of health care coverage they may have additional services performed knowing that coverage ends (up to 2 years after they become unemployed). Thus, an insurer's trend will actually decrease due to these high cost claimants losing coverage two years after an increase in unemployment.

The comments above are designed to assist actuaries at health insurance companies set trends more accurately. These comments are not meant as a criticism of any component of our health care system.