



**SOCIETY OF
ACTUARIES®**

Article from

Risk Management Newsletter

August 2018

Issue 41

Proactively Managing Life Insurance Risks

By Feng Sun and Amy Tran

For life insurance companies, investment risks are actively managed; however, insurance risks are usually managed on ex-post basis. Other than scheduled activities such as crediting interests, adjusting certain charge or distributing dividends, life insurers rarely take actions during the lifetime of in-force policies. Strategic decisions such as stopping selling or conducting repricing exercise are made only when evidence have indicated that the experience deviated considerably from the initial pricing assumptions or the existing products are no longer feasible for the company and/or for the market.

The reason that the life insurance risks are passively managed is because life insurance contracts have limited flexibilities in the contract terms, in many cases the insurers are not allowed to make any changes, even when experience has suggested that certain intervention becomes necessary. In addition, implementing and maintaining real-time Dynamic Monitoring and Intervention System (DMIS) over long period of time can be costly.

Today's evolving technological advances could allow life insurers to change the traditional risk management practice. There are high-tech devices such as activity trackers that can be used to monitor fitness related metrics of policyholders. The information obtained through these devices can be further analyzed using data analytics, artificial intelligence (machine learning, deep learning) to assess policyholders' health status and better predict insurance risks on real-time basis with increased efficiency and affordability. Insurers can then use these results to see if certain critical actions need to be addressed sooner.

This paper will discuss the challenges facing life insurers, if proactively managing life insurance risk, and explore the potential applications of new technologies to the life insurance industry in regard to life insurance policy monitoring and intervention program for risk management.

INSIGHTS FROM PEERS

Research shows that providing timely developmental feedback can help systematically improve individual performance by

recognizing past behaviors and to help influence and reshape their future behavior.

Progressive, one of the largest carriers of auto insurance in the United States, is among the first to leverage the power of new technology. The company allows its customers to use a mileage-based tracking device. For those policyowners who are willing to participate, Progressive offers potential discounts on their premiums based on the past driving records and habits to predict likelihood of future claims using data analytics.

The Vitality program (Vitality) has been successful around the globe in the life/health insurance space. The program allows policyholders to exchange activity data for insurance premium discounts. Upon signing up for the program, Vitality sends those insured wearable activity tracking devices such as Apple Watch or Fitbit to collect fitness activity data. Insured earn points for their activities. The more points they earn, the more they save each year on their life insurance premiums. The points also allow them to enjoy other benefits such as discounts on healthy food.

Today's evolving technological advances make it possible to better manage the insurance risks and ensure the profitability.

While those programs have been proven effective, there are costs associated with providing tracking devices, establishing and maintaining DMIS and researching the latest technology in order to manage the business. How do insurers benefit from this?

Refine Underwriting and Manage the Risks

During the lifetime of an insurance policy, the risks associated with the policy evolve overtime. The discrepancy between pricing assumptions and emerging experience can grow, either favorably or unfavorably. Worst case scenario, if it turns out to be the case and left unattended, it could cause the company to be insolvent.

By tracking the insured's activities, through use of advance technology, the insurers are able to better predict the future claim occurrences (or timing of occurrence) and the size of the claim on real-time basis. This can lead to better pricing, better risk assessment and more effective risk management at the policyholder level.

Insurers can take certain action based on the real-time analysis. For example, insurers can raise the premium for the risky insured and reduce the premiums (or offer discount) for less risky (or preferred) ones. As the price for preferred insured drops, the product becomes more competitive in the marketplace and attracts more preferred customers. At the same time, the price for risky insured makes the product less competitive; as a result, those risky individuals are expected to shop around and may eventually go to the company's competitors for a better price. This helps the company to become more selective in terms of taking on risks, which is the more effective way to manage the business.

This not only helps the insurers make the price relatively fair across existing customers and ensure the profitability at policy level, but also helps insurers quickly react to any potential financial distress rather than living with outdated underwriting results for years.

Prevent Anti-selection and Enhance Transparency

Treating the customers fairly across the board prevents anti-selection, it is an effective way to make policyholder distribution risk (such as age, gender, smoking status, etc.) for life insurers.

The insurers' price differentiation practice could help customers understand the price they receive and the mechanics behind how that price was calculated. Making the pricing transparent educates customers and drives positive behavior. If policyholders want to have a better price, they need to manage their behavior to reduce the risks. Whether to change their driving habits or to eat healthier or workout more to enjoy the discount or rewards, it ends with naturally building and maintaining stronger relationships between policyholders and insurers.

CHALLENGES FOR LIFE INSURANCE

Vitality sets a good example to pioneer the application of the new technology in the life insurance space. However, the program is limited to enhance policyholders' positive behavior only. In order to effectively manage the risks associated life insurance policies, we need to expand the practice to influence both positive and negative behavior, and cover all products in the life insurance industry. This creates a number of challenges for life insurers.

Flexibility in the Life Insurance Contracts is Difficult to Obtain

As mentioned before, developing products with flexible terms is the prerequisite to allow insurers to build DMIS. However, under the current regulatory regime, the filing is required beforehand when insurers launch a new product or request rate changes. It is a cumbersome and time-consuming process.

The regulators and/or legislators do not like the flexible terms. The regulators or legislators want to insurance terms to be predetermined at outset of a policy so that consumers have a peace of mind. They want to see options and guarantees for policyholders. Besides, they believe that refinement of risk classification diminishes the benefits of the risk pooling mechanism, and could potentially lead to discriminatory pricing, which poses potentially political, regulatory or legal challenges for insurers.

Policyholders do not welcome flexible terms either. Flexibility for insurers means uncertainty for the policyholders; this flexibility is essentially an option for insurers and this type of option has value, which is reason why policyholders do not want to give it away. Therefore, imposing more options make the insurance products less attractive to policyholders, less competitive in the marketplace as well.

While Positive Feedback is Easy to Accept, Negative Feedback Faces Resistance

While policyholders enjoy discounts or rewards, they do not like price hikes or being punished for certain behavior. How about setting the price high enough to cover the loss from the worst case to start with? This leaves insurers enough room for applying the discount later and can avoid a price increase. This could work, but because of the high price, the product is less competitive. As a result, the competitors will take over sales.

Some Products Are Suitable, Some Products Are Not

While providing a premium discount or reward to the healthy lives creates a win-win situation for life (mortality) and health products, it does pose a challenge for annuity (longevity) products.

Using payout annuity as an example, if the real-time tracking and data analytics tells an insurer that the health of an individual is deteriorating or the mortality is higher than expected, the insurer should pay higher annuity benefit by pricing principle. On the other hand, if an individual's health has improved, the insurer should reduce the benefit payments. This appears to contradict the mechanism to enforce the positive behavior and punish the negative behavior. Although the extra payment for an unhealthy individual can be interpreted as wish-you-well gifts from insurers to reinforce the customer relationship, there is no good reason to discourage policyholders from living longer by reducing the benefits.

Benefit the Society? Maybe Only to a Certain Extent

Insurers are for-profit entities just like other financial service firms. Rewarding the positive behavior for life and health products happens to create a win-win situation, but the opposite can



also be true. When charging the high premium for the higher risk individuals, it makes the products less affordable for those who are in need; this could hurt society as a whole because it increases the uninsured or underinsured population. In this situation, the government or regulators have to step in either to force the carriers to take the risks or to create a mandatory/subsidizing program for those individuals. Otherwise, uninsured or underinsured could pose a threat to the public safety or social stability. At the end of day, these aforementioned programs are simply business management tools with both positive and negative societal impacts, but serve the insurers.

APPLICATION TO LIFE INSURANCE

To ensure the profitability of the business and the solvency of the company, it is necessary to build an integrated DMIS to address some business issues in timely manner. In order to do that, insurers need to consider the following steps:

Strive to Obtain Flexible Terms In Life Insurance Contracts

Lack of flexibility hurts both insured and insurer. As an example, if the policyholders' health status improved and there is no flexibility, they might have to surrender the policy and get a better deal, which may not be available in the marketplace; or the policyholder may incur a loss by doing the exchange. When the insurers feel a policy is mispriced and there is no flexibility, they have to live with it. If enough losses accumulate, it could potentially make the company insolvent, which ends up hurting the taxpayers and the economy.

To obtain flexible terms is difficult, but not impossible. Insurers should work with regulators and policyholders to demonstrate that the flexible terms are used for good, similar to Yearly

Renewal Term (YRT) or experience rating in the reinsurance treaties; it is used to share the risks and share the profits. Insurers not only need to achieve flexibility in the design of new products, but also need to explore the flexibility within existing policies.

The flexible terms can vary significantly across products. They can be straightforward—such as the future premiums or face amount will be adjusted based on the emerging experience for term insurance—or the future payout benefits will reasonably increase or decrease based on the real-time assessment of longevity factor of the insured for payout annuity products. As long as the adjustment is used to ensure the fairness across policyholders and to benefit the policyholders as a whole, it should be acceptable by both regulators and policyholders.

Develop an Integrated DMIS

After launching new products with certain flexible terms, insurers may start to explore the feasibility of building ongoing DMIS. If deemed feasible, insurers need to go through a few steps such as the chart in Figure 1.

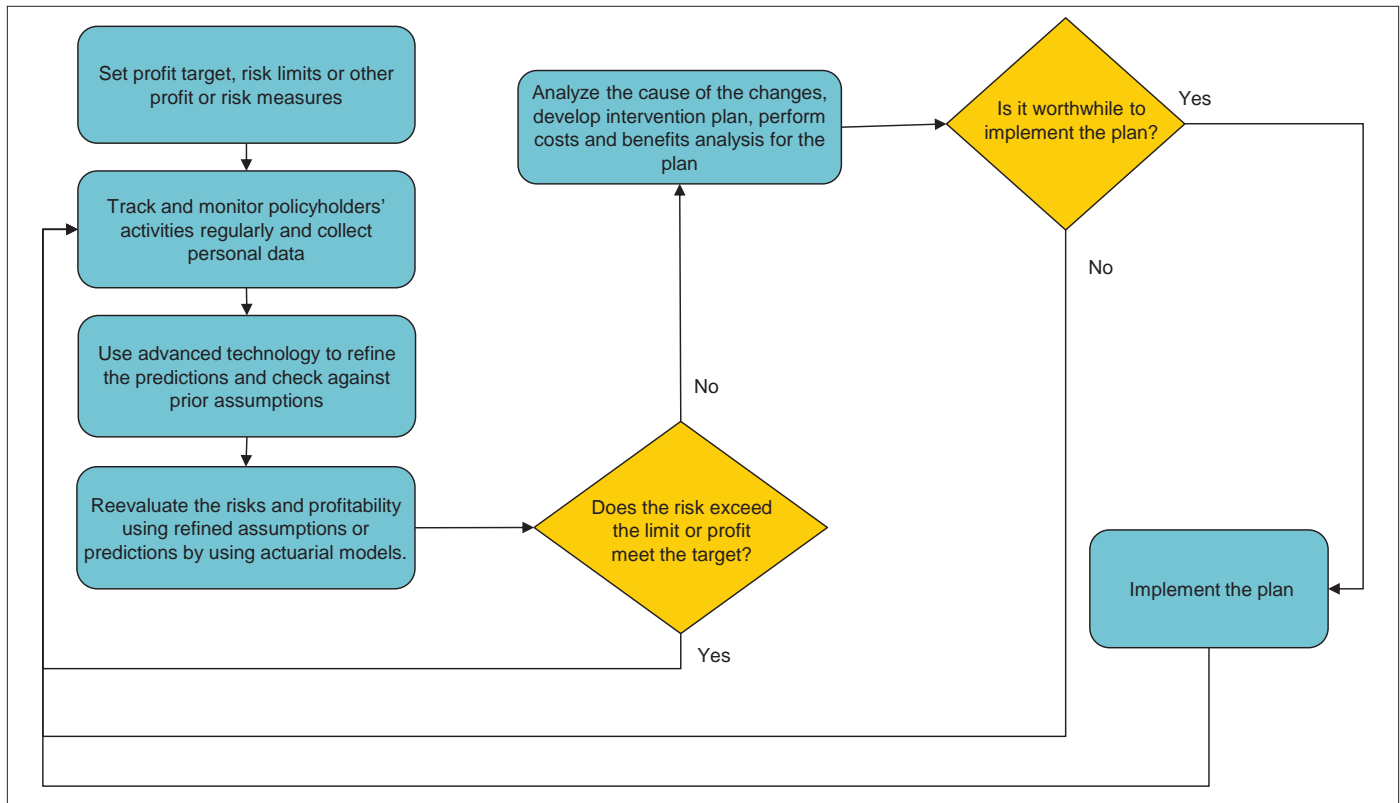
Use the DMIS to Manage the Profitability and Monitor Risks

Once the DMIS is developed, the insurers can use it regularly to manage the risks. Assuming an insurer has developed the technology that can better predict the mortality and surrender for an in-force policy. Depending upon the updated profitability results by using actuarial models, the company can choose to intervene or not intervene. If they choose to intervene, depending upon the product design, the company can use the flexible feature identified earlier to take certain actions.

For example, for Universal Life (UL) product, if the insurer wants to encourage more premiums, they can offer an extra bonus (as percentage of the premium) to policyholders on the additional premium received. Alternatively, if the morality turns out to be worse than pricing, the company can increase Cost Of Insurance (COI) charges. In reality, there is a limit because the adjustment is subject to the guaranteed COI written in the UL contracts, therefore the full flexibility may not be able to obtain.

Predicting surrender is relatively more difficult than predicting morality because the surrender is usually voluntary. However, if analytics can be developed to better predict which individual is more likely to surrender the policy than others are, and if the test shows that the policy can bring more profits and the effort is worth taking, insurers can intervene and prevent it from happening. To do that, depending upon how much more profits the policy can generate, the insurer can create incentives to make the policyholder stay by providing a persistency bonus. Alternatively, the insurer can offer discount in premium or COI.

Figure 1



The intervention should be considered as a whole for a single policy. For instance, the policyholder has a UL policy, the system told an insurer that this person is healthy, has significantly improved recently and he/she is highly likely to surrender in the next month or two. A major intervention effort to prevent the person from surrendering becomes necessary.

Due to the long-term nature of life insurance contracts, before any action can be taken, long-term and short-term effects of the intervention need to be considered. If the system indicates that a certain change in a policyholders' prediction is temporary, taking no action may be appropriate.

In summary, the DMIS serves as a risk monitoring system, where insurers can use technology to influence policyholders' behavior and achieve the profitability goal as well as take actions to address unfavorable situations in a timely manner to prevent insurers from insolvency.

CONCLUSION

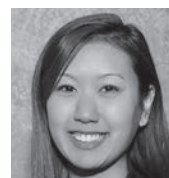
Currently, life insurance risks are managed on the ex-post basis because of challenges facing life insurers. Emerging technology

can help remove some of the obstacles and enable insurers to proactively manage insurance risks by building an integrated DMIS. The life insurance carriers should consider learning from their peers; redesign the products with more flexibility in contract terms, and embrace advanced technology to better manage the risks and profitability. ■

Disclaimer: The views in this paper represent the authors' personal opinions. It does not represent any statements or views of the corporation the authors affiliate with.



Feng Sun, FSA, CERA, MAAA, is a chief marketing officer at Sunshine Life Insurance Company Ltd. He can be reached at sunfengjiowa@gmail.com.



Amy Tran is a project manager at MassMutual Financial Group. She can be reached at AmyTran@MassMutual.com.