

Risk Management

ISSUE 40 • DECEMBER 2017

JOINT RISK
MANAGEMENT
SECTION



Strategic Portfolio and Capital Management

By Vincent Y. Tsang, Steve Cheung and Dave Cosentino

Page 6

- 3 Chairperson's Corner**
By C. Ian Genno
- 4 Editor's Note**
By Baoyan Liu (Cheryl)
- 5 Staff Corner**
By David Schaub
- 6 Strategic Portfolio and Capital Management**
By Vincent Y. Tsang, Steve Cheung and Dave Cosentino
- 10 ERM in Five Words Part 1: Resilience, Transparency and Discipline**
By David Ingram
- 16 Defining Company Culture in Five Questions**
By Paul Harwood
- 19 Zoonotic Diseases: Heightened Risks to Industry and Government**
By Petra Wildemann and Patrick Ayscue
- 23 General Insurance Actuarial Risk Assessment Overview**
By Syed Danish Ali
- 26 Universal Life with Secondary Guarantees Survey Summary**
- 27 Recent Publications in Risk Management**
- 27 JRMS e-Library Update**
By Frank Reynolds

Risk Management

2018 SECTION LEADERSHIP

Officers

C. Ian Genno, FSA, FCIA, CERA, Chairperson
Mario DiCaro, FCAS, MAAA, Vice Chairperson
Florian Leo Richard, FCAS, Secretary
Yangyan Hu, FSA, EA, Treasurer

Council Members

Ribhi Alam, FSA
Rahim Hirji, FSA, FCIA, MAAA
Leonard Mangini, FSA, MAAA
Mark Mennemeyer, FSA, MAAA
Siew Chen Ow, FSA, CERA, MAAA
Chester Szczepanski, FCAS, MAAA
Thomas Weist, FCAS, CERA, MAAA
Fei Xie, FSA, FCIA

Newsletter Editor

Baoyan Liu (Cheryl), FSA, CFA
cheryl.by.liu@fwd.com

Program Committee Coordinators

Frank Reynolds, FSA, FCIA, MAAA
2018 CIA Annual Meeting

Chester Szczepanski, FCAS, MAAA, and Thomas Weist, MAAA, FCAS, CERA
2018 CAS Spring & Annual Meeting

Mark Mennemeyer, FSA, MAAA
2018 Valuation Actuary Symposium

Mario DiCaro, MAAA, FCAS
2018 Health Meeting

Yangyan Hu, FSA, EA, and Fei Xie, FSA, FCIA
2018 Life & Annuity Symposium

Rahim Hirji, FSA, FCIA, MAAA, and Leonard Mangini, FSA, MAAA
2018 SOA Annual Meeting & Exhibit

S. Michael McLaughlin, FSA, CERA, FIA, MAAA
2018 ERM Symposium Chair

SOA Staff

David Schraub, FSA, CERA, MAAA, AQ, Staff Partner
dschraub@soa.org

Ladelia Berger, Section Specialist
lberger@soa.org

Julia Anderson Bauer, Publications Manager
jandersonbauer@soa.org

Kathryn Baker, Staff Editor
kbaker@soa.org

Julissa Sweeney, Graphic Designer
jsweeney@soa.org

Issue Number 40 • December 2017

Published three times a year by the Joint Risk Management Section Council of Canadian Institute of Actuaries, Casualty Actuarial Society and Society of Actuaries.

475 N. Martingale Road, Suite 600
Schaumburg, Ill 60173-2226
Phone: 847-706-3500 Fax: 847-706-3599
www.soa.org

This newsletter is free to section members. Current issues are available on the SOA website (www.soa.org).

To join the section, SOA members and non-members can locate a membership form on the Joint Risk Management Section webpage at www.soa.org/jrm

This publication is provided for informational and educational purposes only. Neither the Society of Actuaries nor the respective authors' employers make any endorsement, representation or guarantee with regard to any content, and disclaim any liability in connection with the use or misuse of any information provided herein. This publication should not be construed as professional or financial advice. Statements of fact and opinions expressed herein are those of the individual authors and are not necessarily those of the Society of Actuaries or the respective authors' employers.

Copyright © 2017 Society of Actuaries.
All rights reserved.

Publication Schedule

Publication Month: March 2018
Articles Due: Dec. 12, 2017

Chairperson's Corner

By C. Ian Genno

The Joint Risk Management Section is a collaborative initiative that brings together the experience and perspectives of the Casualty Actuarial Society, Canadian Institute of Actuaries and Society of Actuaries, focusing on both the actuarial aspects and the broader applications of risk management. In concert with other collaborative work (such as the North American Actuarial Council, various inter-organization research projects, etc.), it offers the CAS, CIA and SOA an opportunity to do more of what our members frequently say they want us to do—find ways for the various actuarial organizations to cooperate and collaborate on issues of common interest to our profession.

While all areas of actuarial practice are based on a set of underlying principles, in many areas the ability to practice is also based on detailed knowledge of specific local regulatory requirements. By contrast, risk management tends to be less country-specific—which further enhances the section's ability to draw the interest and serve the needs of members in various countries globally. For example, Own Risk and Solvency Assessment (ORSA) rules have been adopted in every developed country, and follow consistent principles that an actuary practicing in risk management in the U.S., Canada, Europe or Asia would understand.

Our section is currently sponsoring a number of interesting initiatives. You can read more about these in this and other issues of the section newsletter, as well as on the section's webpage (soa.org/jrm).

- In addition to helping to organize risk management related sessions at various actuarial meetings, our flagship meeting is the ERM Symposium, held each year in the spring.
- We sponsor a variety of research initiatives—some of which we have our own section funding to conduct, and some that we steer to other funding sources such as the SOA's Research Expanding Boundaries pool.
- Examples of research work include our periodic Emerging Risks Survey, research on the impact of continuing low

interest rates, and our collaboration on the Actuaries Climate Index to help address the needs of actuaries involved in the modeling and pricing of catastrophic risk coverage.

- We also have our sights on research on approaches for quantifying operational risk, and applications of predictive modelling in risk management and insure-tech.
- To provide section members with access to relevant in-depth reading material, we maintain an e-book library with links to a curated selection of books and articles, which we review and update on a regular basis.

Arguably, one doesn't need to join the section to benefit from a number of these initiatives; risk management related research reports, for example, are freely available to anyone through the research pages on the SOA's website. But some of the benefits, such as our e-book library, are exclusively available to section members, along with periodic "heads up" notices that will keep you aware of risk management webcasts and research reports. And your membership in the section is an entrée to opportunities to contribute as a volunteer on various initiatives, is a key element in providing funding for our work, and demonstrates your support for the idea of finding ways for the CAS, CIA and SOA to build bridges and work together collaboratively. It is part of branding yourself as a risk manager. So ... thank you for supporting our work, through your decision to be a member of the section!

I'd like to thank several section members in particular. The end of October marks the transition point from one year's leadership team to the next on the section council. Thank you to our outgoing section council members: Robert He, Hugo Leclerc (secretary), Baoyan Liu (Cheryl) (also our current newsletter editor) and Frank Reynolds (vice chair). Thank you also to Tom Weist, who has led us as chair for the past year, and will continue on the council for the coming year.

Finally, congratulations to our incoming newly-elected members of the section council: Ribhi Alam, Siew Chen Ow, Florian Richard and Chet Szczepanski. I'm looking forward to the opportunity to work with you over the coming year ■



C. Ian Genno, FSA, FCIA, CERA, is director and head, Mortgage Insurance Group at the Office of the Superintendent of Financial Institutions Canada. He can be reached at ian.genno@osfi-bsif.gc.ca.

Editor's Note

By Baoyan Liu (Cheryl)

When this newsletter reaches you, it is holiday season already. I wish you very merry holidays and a prosperous new year!

Recently I read some posts on a fashionable risk management term “Grey Rhino.” The term refers to a big, yet neglected threat, which when it charges, can cause severe damage. This term was coined by Michele Wucker in “The Gray Rhino: How to Recognize and Act on the Obvious Dangers We Ignore.”

This year we are at the 10th anniversary of the global financial crisis. From time to time, we like to revisit the story of the financial crisis. The 2008 global financial crisis is well-described as a black swan—a low-probability but high-impact event. Before it became a black swan, it was preceded by a few early warning signs. So, wasn't it also a grey rhino? While most risk managers can recognize the grey rhino, how to control grey rhino risks is a real challenge. Wucker's advice is to not ignore the rhinos, but to tackle the issues head on.

Before the introduction of articles in this issue, I'm excited to introduce our new column, “Staff Corner,” by David Schraub. This sheds some light on the support role provided by the SOA and shares some reflections on where risk management roles are going.

In this issue, we have a nice collection of articles from corporate risk management schemes to emerging risk of infectious human disease globally.

After the 2008 financial crisis, most regulators are in favor of incorporating effective ERM schemes and determining minimum capital requirements based on the risk profile of financial institutions. Instead of discussing the technical aspects of the capital requirements, this issue's feature article “Strategic Portfolio and Capital Management” focuses on their implications on business strategies, as the solvency requirements affect product design and in-force management in addition to risk management strategy.

Effective ERM can be a lengthy discussion. Can we simplify it into five words? Dave Ingram will show us how in a series of two articles, “ERM in Five Words.” Most companies want to do much better than “just surviving.” Surviving requires resilience. In order to achieve resilience, the ERM process draws its power from

transparency and discipline, its direction from alignment, and maintains its effectiveness over the long term with adaptability. In this issue, part 1 describes resilience, transparency and discipline. Stay tuned for part 2 (coming in the March 2018 issue) which will illustrate the importance of alignment and adaptability.

I'm glad to share with our readers the continued risk culture discussion in this December issue. An “inappropriate culture” often takes the blame for all kinds of corporate misdemeanors, but judging the culture and correcting the failings can challenge the best of firms. It feels like there is convenient circular logic at play: poor outcomes are the result of the wrong culture; what is the wrong culture? One that results in poor outcomes. The starting point is the question “what action can management take that affects culture?” Paul Harwood suggests a strategy to help management get it right in his article, “Defining Company Culture in Five Questions.”

Pandemic and epidemic risks appear in the headlines every day. “Zoonotic Diseases: Heightened Risks to Industry and Government” highlights the significant economic loss caused by the over 400 high priority human disease outbreaks, globally, within the past 10 years. Through analyzing the data on hundreds of pathogens that threaten human health, the authors discuss that how (re)insurance companies monitor their own exposure to infectious disease risk and thereby gauge their potential mortality shock from epidemic diseases of various types and sizes.

Rate-making is one of the fundamental areas in property and casualty insurance. The author of “General Insurance Actuarial Risk Assessment Overview” provides an overview of the rate-making process and the common errors encountered during its operation. As the author summarizes in the article, ensuring that adequate premiums are charged for the commensurate risk is a part of this overall risk management.

We have an update on the latest in a series of surveys from The Society of Actuaries. The SOA has published a new report summarizing the results of its most recent assumption survey for Universal Life Insurance with Secondary Guarantees. Frank Reynolds provides an update on the JRMS e-Library and as usual, we provide a list of recent articles and papers that may be of interest to our members. These pieces can provide further information on a broad range of topics.

I would like to give a special thank you to David Schraub and Kathryn Baker for helping me pull together this December issue of *Risk Management*. Happy Holidays and enjoy reading! ■



Baoyan Liu (Cheryl), FSA, CFA, is senior manager, financial risk management at FWD Life Insurance Company (Bermuda) Limited in Hong Kong. She can be reached at cheryl.by.liu@fwd.com.

Staff Corner

By David Schaub

Volunteers are the true engine for actuarial organizations. This is true for the three organizations that jointly created the Joint Risk Management Section. In this new column however, we will be shedding some light on staff that works in the shadows to support the section.

French accent with a German last name, I am an actuary on staff at the SOA and guide the volunteers' efforts in the risk management space. I first studied and worked as an actuary in France for a few years before moving to the U.S. where I worked both as consultant and in companies on risk management topics in the life and annuity space. I did some volunteer work for the JRMS, which includes serving on the JRMS council, prior to joining the SOA five years ago.

I now support the section I was once a council member of. This means a wide range of activities from peer reviewing newsletter articles, playing the devil's advocate on research projects, suggesting speakers and providing feedback on draft presentations or liaising with various internal SOA stakeholders and/or with our friends at the CAS/CIA to move a project forward. I am deeply involved in the ERM Symposium, our yearly flagship event. As I am supporting other sections, I can leverage ideas seen elsewhere and suggest them to the council.

What do I see in the industry? We are clearly experiencing a growing maturity in the role of risk manager. Risk appetite/tolerance/metrics/dashboard/culture ... are concepts that have been around for more than a decade now. Most, if not all, organizations have a CRO and have implemented an ERM program. Of course, not every corporate employee will know the differences between appetite, tolerance and limits and general education remain important. But after the initial push by rating agencies, then by the regulators, risk management is at a crossroads. There are some aspects that are clearly gaining traction, like formal model validation. But the role of risk manager has to be justified over and over, running the risk of being pushed aside



as a compliance function during the ORSA season. And the role of actuaries within the risk management team, has to be justified when compared to other professions. While we definitely know the liability side of the balance sheet, we need to be relevant on the asset side, understand operational risk and understand the broader business impact of the risk the organization is taking. Cybersecurity, predictive analytics, the Internet of Things, and Department of Labor rules are challenges on which risk managers need to know enough to ask the right questions in order to kick the tires.

"None of us is as smart as all of us," says the Japanese proverb. Please let me know if you have any suggestions that could help risk managers, any ideas to bounce off or any interest for volunteering. I am always ready to take a cup of coffee and discuss. Look forward to hearing from you. ■



David Schaub, FSA, CERA, MAAA, AQ, is staff fellow, risk management at the Society of Actuaries. He can be reached at dschaub@soa.org.

Strategic Portfolio and Capital Management

By Vincent Y. Tsang, Steve Cheung and Dave Cosentino

After the 2008 financial crisis, most regulators are in favor of incorporating effective enterprise risk management (ERM) schemes¹ and determining minimum capital requirements based on the risk profile of financial institutions. Some of the adopted solvency regimes for the insurance industry include Solvency-II in Europe, C-ROSS in China, and advanced versions of risk based capital in United States and certain Asia-Pacific countries. This global trend is consistent with the Insurance Core Principles (ICP) published by the International Association of Insurance Supervisors (IAIS) which call for transparent disclosure of a risk-oriented balance sheet, adoption of an ERM scheme, and economic valuation such as market consistent valuation.

Instead of discussing the technical aspects of the capital requirements, this article focuses on their implications on business strategies because the solvency requirements affect product design and in-force management in addition to risk management strategy.

In order to optimize the liability portfolio and identify proper business strategies, insurers may choose to perform the following:

- Identify and rank lines of business in accordance with their capital efficiencies under both the current and proposed solvency regulations
- Use reinsurance to shape the current liability portfolio
- Study the feasibilities of financial reinsurance or other asset solutions to improve the capital position
- Evaluate the advantages of natural hedging among existing blocks of business
- Re-price or re-design products under the proposed solvency requirements with assumed parameters

IN-FORCE MANAGEMENT

Similar to the concept of efficient frontier, where an investor either (a) maximizes investment return under a given risk pro-



file of an asset portfolio or (b) minimizes the risk profile of an asset portfolio with a required investment return, an insurance company can maximize the embedded value (EV) of its in-force business while maintaining the company's solvency capital requirement (SCR) at a certain level. Alternatively, a company can minimize the SCR while maintaining the desired EV.

Strategic portfolio management can be achieved in several steps. First, a company examines its liability portfolio and prioritizes each block of business in accordance with their capital efficiencies. For instance, a company may calculate an index (such as the ratio between the embedded value and the allocated capital) to measure each block's capital effectiveness. Based on the capital efficiency indices, a company may then prioritize the lines of business in terms of their risk and value.

Required capital is normally determined at the company level as opposed to the line of business level. If a company's internal process for allocating the required capital to each line is subjective, the capital efficiency indices may be heavily influenced by the subjectivity of the allocation method. We can perform a sensitivity analysis by removing a line of business from the

SCR calculation and measure the change in SCR for the overall company. The ratio between the change in embedded value and the change in SCR may then be used as a capital efficiency index for the removed line of business. This method may also be used as an alternative or a validation of the current capital allocation method.

For the blocks of business whose EV is not material and the capital efficiency is below a threshold level, the company may consider ceding these blocks using assumption reinsurance, 100 percent coinsurance, financial reinsurance, or asset solutions² to improve the capital efficiency of the company. The proceeds may be used to (a) improve the company's solvency position, (b) finance business strategies such as exploring emerging markets or new product lines, (c) absorb surplus strain due to a higher than expected volume of new business or (d) acquire external blocks of business from other companies to supplement the existing core lines. For lines of business which are sensitive to economies of scale and require a minimum critical mass such as variable annuities, this type of capital efficiency analysis is vital for making appropriate management decisions.

Reinsurance and asset solutions require patience, discipline, and extensive analysis. A company would need a task force to work closely with local and global reinsurers or investment banks to design the treaty structure and monitor the counterparty risk.

Due to prior abuses, special purpose vehicles (SPV) received a bad reputation even though it is a legitimate business tool when implemented properly. Recently, some regulators opened the door for wider use of SPVs or joint-ventures as long as they are properly disclosed and the risk transfer between the contractual parties is valid.

Business decisions do not only involve financial aspects. Operational aspects such as capacity of the distribution channels, underwriting, internal controls, and other operational functions should also be considered. The goal is to utilize the company's

limited resources to maximize the performance of the company and increase the shareholder value.

STRESS TEST AND UTILITY FUNCTION

Currently, only major financial institutions are subjected to stress tests.³ In some jurisdictions, these tests are likely to be expanded to all financial institutions going forward and may result in higher competition (e.g., risk premium) for available capital. Accordingly, the capital efficiency index mentioned earlier may not be just a simple ratio between the embedded value and the required capital. For companies that have difficulties in raising capital, their capital efficient frontiers may look like a geometric curve instead.

For companies which have excess capital beyond the desired solvency level, there is an opportunity to exploit the idling capital and enhance the financial performance via reinsurance. Branching out as a reinsurer and leveraging on other companies' distribution channels and customer bases for cross selling could be key forward-looking business strategies in the future.

INTERDEPENDENCE OF RISKS AND NATURAL HEDGING AMONG BLOCKS OF BUSINESS

Under the Solvency-II regime, SCR is determined using either the standard formula or internal model. One key question is whether or not companies have structured their asset and liability portfolios to optimize their solvency and value position with reference to the covariance matrix. This exercise would require extensive analysis under numerous "what-if" scenarios where different mixtures of asset and liabilities are tested for their implications on SCR and the resulting EV. Through simulation analysis, companies may find an optimal combination of in force lines of business and asset mixtures so that the value of company is enhanced under the current capital requirement.

NEW BUSINESS PRICING STRATEGY

While companies have limited avenues to adjust the current liability portfolio, the design of new products and the influx of new business mix are partly within a company's control. For new products, the capital efficiency index should be a key profitability measure. Results of the sensitivity analysis enable senior management to optimize the product features in terms of their capital requirements and target the optimal composition of the new business mix.

Within the spirit of treating the customer fairly, new products should be designed to provide senior management with more flexibility to manage the business going forward. The appropriateness and effectiveness of management actions⁴ are important inputs for determining future capital requirement.

One key question is whether or not companies have structured their asset and liability portfolios to optimize their solvency and value position with reference to the covariance matrix.

As the proposed new solvency regulation maybe applicable to all policies regardless of their issue dates, the solvency requirement for policies of existing products may be substantially changed under the proposed solvency regime.

Many existing products were priced under the former solvency requirement where the required capital is based on statutory reserves and sum at risk. As the proposed new solvency regulation maybe applicable to all policies regardless of their issue dates, the solvency requirement for policies of existing products may be substantially changed under the proposed solvency regime. The adverse consequences include reduced embedded value due to higher cost of capital and the need to raise capital to maintain a reputable risk-based capital (RBC) ratio and/or credit ratings. Thus, it is prudent for companies to either shelve these existing products or reprice them under the new solvency requirement with assumed parameters.

CONCLUSION

There are many other innovative ways to manage the upcoming regulatory challenges on solvency regime. The first step may involve examining the company's current status in managing its capital effectiveness. Thereafter, senior management may then

develop a proactive process to optimize the capital usage, generate capital, and increase shareholder value.

Disclaimer: The views reflected in this article are the views of the author and do not necessarily reflect the views of the global EY organization or its member firms. ■



Vincent Y. Tsang, FSA, MAAA, was an executive director with Actuarial & Insurance Advisory Services at Ernst & Young Advisory Services Limited. He is now working as a regulator for the State of Illinois and can be reached at Vincent.Tsang@Illinois.gov.



Steve Cheung, FSA, is senior manager, Actuarial & Insurance Advisory Services at Ernst & Young Advisory Services Limited. He can be reached at Steve.Cheung@hk.ey.com.



Dave Cosentino, FSA, MAAA, is manager, Actuarial & Insurance Advisory Services, Ernst & Young Advisory Services Limited. He can be reached at [Dave.Cosentino@hk.ey.com](mailto:Cosentino@hk.ey.com).

ENDNOTES

- 1 E.g., Own Risk and Solvency Assessment (ORSA).
- 2 E.g., Securitization or spin-off.
- 3 Regulatory reporting due to the 2010 Dodd-Frank Act, Comprehensive Capital Analysis and Review (CCAR) documentation, and European Insurance and Occupational Pension Authorities Stress Test.
- 4 E.g., crediting strategy for universal life and dividend strategy for participating whole life.



Certified Actuarial Analyst



Meeting the Growing Need for Professional Analysts

The Certified Actuarial Analyst (CAA) is an international professional qualification offered by CAA Global to qualify those who excel in technical and analytical skills as trained analysts, giving financial institutions qualified professionals to fill key roles.

The CAA qualification equips professionals with financial business, analytical and modeling skills. The qualification ensures that those working in technical roles within the insurance and financial services industries have the required skills and methodologies to allow businesses to provide assurance to regulators, stakeholders and the public at large.

Becoming a CAA

The CAA is most suited for those interested in financial and statistical work.

Whether you are currently working in an analytical role as a pricing analyst, data modeler or finance analyst, or trying to break into the analytics and data world, then the CAA qualification is ideal for you.



For more information visit caa-global.org or email info@caa-global.org

ERM in Five Words

Part 1: Resilience, Transparency and Discipline

By David Ingram

Editor's note: "ERM in Five Words" will be published in a series of two articles. In this December issue, Part 1 illustrates the importance of Transparency and Discipline. Part 2, with a focus on Alignment and Adaptability will be published in the March issue of Risk Management.

Billy Joel sang that survival alone is a noble fight, but most companies want to do much better than just surviving. But the world is a dangerous and complex place. Surviving itself may be difficult, but the focus is most often on less extreme situations such as:

- Not making bonus
- Not beating last year
- Not beating competitors
- Not making a profit

In other words, a common goal that is informally set for risk managers is "no surprises."

Unfortunately, that goal forces risk managers to keep their focus on the small bumps in the road ahead. That may mean that there may not be anyone at all focused on the places where the entire road is washed out by a flood or blocked by an avalanche.

SURVIVING THE BIG CRISES REQUIRES RESILIENCE

In the case of the really big disturbances, survival is the noble fight, and survival will often require resilience. As originally envisioned by the biologist C.S. Holling in 1976, resilience is achieved by constantly changing, renewing and reorganizing in order to survive, despite an extremely adverse situation. Resilience includes not just reactions to adversity, but the preparation for adversity, and the avoidance of adverse events and the worst effects of the disturbance.

Enterprise risk management (ERM) is the name for an approach to organizing risk management. I often describe ERM as a set

of "n+1" control cycles, one for each of the "n" key risks and one more for control of the aggregate risk in comparison to the aggregate ability to absorb losses.

THE FOUR KEYS TO RESILIENCE

There are four key aspects of ERM that take it beyond "n+1" control cycles. The ERM process draws its power from transparency and **discipline**, and its direction from **alignment**, and can only maintain its effectiveness over the long term with adaptability. While each of the four keys to ERM provide these tangible benefits, resilience can only be achieved with all four.

1. **Transparency**—around level of exposures of key risks, the success or failure of risk mitigation activity and the gains or losses associated with risk exposures.
2. **Discipline**—the commitment to reliable management of all key risks and to the aggregate risk of the firm.
3. **Alignment**—consistency between the primary strategic objectives of the firm and the objectives of the risk management programs, so that ERM supports the primary goals of the firm.
4. **Adaptability**—planning to react to information about the changing risk environment to keep the focus on the risk management needed to succeed next year, not last year.



TRANSPARENCY

When banking regulators looked around at the financial institutions that fared less poorly during the financial crisis, one of the common themes that distinguished them was their dedication to internal transparency regarding their risks and risk management activities.

Risk management has been a part of business practices for thousands of years. ERM is a relatively new approach to risk management that, when taken to extremes, may noticeably increase the cost of doing business, and can take the attention of executives away from running their firms.

The executives in central roles at those firms had constant access to the best information available. Those banks tended to react faster when their aggregate level of risk looked like it was headed above their risk tolerance. They also seemed to get into less trouble with risk concentration caused by people in different parts of the firm unintentionally piling onto similar and likely highly correlated risks. Transparency is not expected from traditional risk management activities—business managers are taught to concentrate on sales and profits, with a third focus on expenses. Risk management is viewed as the fourth or lower priority of the business.

When Middle Managers Inherit Risk

Middle managers are most often charged with handling risk, and they get that responsibility sometimes as a (possibly private) inheritance from their predecessor. It may not even be included in their job description. Executive management may not know and seldom asks about risk as long as sales and profits are meeting expectations and expenses are within budget.

In those traditional risk management situations, the degree to which risk is tightly controlled or loosely allowed is often a personal decision made by the middle manager who inherited the responsibility for a particular risk. That person may make the best decision based on full knowledge of the nature of the risk and the availability and cost of mitigation of the risk, or they might just choose an approach based on poor or even inaccurate information because that is the best that they can find with the time they can spare.

ERM is a commitment to executive and board attention to the important risks of the firm. In a fully realized ERM program, the risk profile of the firm and the plans to change or maintain that profile from one year to the next—while exploiting, managing, limiting or avoiding various risks that are tied to their general business strategy—are shared among the management team and with the board.



In the best programs, it is not only shared, it is a topic of debate and challenge. These firms realize that a dollar of profit usually has the exact same value as a dollar of loss, so they conclude that risk management, well-chosen and executed, can be as important to success as marketing.

Transparency and Company Executive Management

Generally, executives are aware of the firm's risks, but until ERM comes along and forces an actual discussion of risk, there is rarely a spontaneous agreement on priorities. In a firm without ERM, the top executives would likely not even have the same list in mind for the company's top 10 risks. And different executives would have different Borel risk points.¹ With the transparency that comes from an ERM risk identification and prioritization exercise, the executives will come to agreement on the list of risks that will be the priority as well as the firm's agreed upon Borel point.

As risk transparency becomes common practice, management discussions can shift from simple risk avoidance and minimization to risk reward trade-offs and cost benefit alternatives of different risk mitigations. Management can also exploit the development of expertise in detecting and assessing shifts in the risk environment.

Transparency and the Board

Transparency of risk information is highly desirable to the board. While the details of a hundred risks are not necessary,

they do want to know—before the next board—meeting that someone is attending to the risks that might end the company.

We usually recommend that management highlight five or six risks that are board-level concerns—the risks to the “enterprise.” These most significant risks to the firm would all have the potential to cripple the enterprise either financially, operationally or reputationally.

Management would then regularly keep the board apprised as to:

- the level of exposure to these risks,
- the success or failure of risk mitigation activities and
- the gains or losses associated with these risk exposures.

These discussions of aggregate risk and the top enterprise risks should go through the normal management control cycle discussion of plans, execution, success or failure, reactions to changing conditions, and new plans.

Transparency and Staff

Transparency of risk information is important if a company wants to “get everyone involved” in risk management. For over 20 years, some companies have practiced open-book management (OBM), sharing detailed information about their financial statements and business plans. But financial statements rarely provide actionable information about risk. Therefore, even in the OBM firms, there is generally a lack of knowledge about risk. With the transparency of risk and risk management information that comes from ERM, risk communication can become a part of the “open book.”

There may be a paternalist urge to protect employees from scary information about risk, but ERM provides a language for talking not just about bad things that can happen, but also about what is being done about it. By including more employees in the risk discussion, there is also an increased chance that the firm will become aware of critical changes in the risk environment and possibilities for enhancing mitigation activities to better achieve the firm objectives with less disruption from unexpected adverse events.

Transparency Outside the Firm

Few, if any, U.S. firms will actually publically describe their risk management activities. In the U.S., publically traded firms have long been required to disclose the company’s risks in securities financial filings. But conventional wisdom holds that it is too risky to disclose anything about risk management. So, the reader of the financial statement is left wondering whether management is doing anything at all about the sometimes dozens of risks that are noted in the 10K. Other disclosures about very

specific risk management activities such as hedging and reinsurance are included, but few, if any, U.S. firms will actually publically describe their risk management framework.

The story is completely different outside the U.S. With the development of ERM, large global insurers and reinsurers have been telling the story of their ERM programs for over 10 years. It is common for the largest non-U.S. insurers and reinsurers to disclose 10 to 40 pages of discussion of their risk management program. One reinsurer even discloses its risk limits and risk positions compared to those limits for a dozen major perils.

There also seems to be an emerging standard for insurers to provide a clear tabular exposition of their top risks, along with their main risk mitigation activities regarding each risk. These firms frequently have the Chief Risk Officer delivering presentations to investors, and joining the CEO and CFO in presenting quarterly financial results where the risk and capital position is considered to be one of the key financial results.

This transparency outside of the firm provides valuable information to investors who might be concerned with the risks retained by an insurer they invest in. Time will tell whether the insurers with better disclosure of risk management actually end up experiencing fewer or less severe losses and better return for risk retained.

DISCIPLINE

Risk management matters the most when it is the most expensive and most difficult. But unless the regular steps of risk management have already become muscle memory, it is much less likely that you will even think to do your risk management when times get tough.

ERM brings discipline to both the mitigation of individual risks and to aggregate risk management while also promoting a disciplined commitment to a comprehensive approach to risk management.

Disciplined Management of Individual Risks

Risk management is much like investing. Looking over the long term, a huge percentage of long-term gains come from being in the market for just a few days. The same is true for risk. The risk management benefits of limiting losses come in just a few quarters. Most of the time, risk management can be skipped without any harm being done. The harm comes when risk management is not already “on” when the lights go out.

It does not help at all to know after the fact when those good days for investing happened. And when “everybody knows” that



bad times are upon us, risk mitigation gets more expensive or even impossible. You will have a hard time buying insurance when the house next door is on fire or when the hurricane is racing up the coast.

To obtain the gains from investing, most investors need to consistently be in the market. And to get the benefits of risk management, companies need to practice it all of the time. Discipline is how you acquire the muscle memory to conduct the continuous risk management so that it is in place and ready to respond when the bad times finally come.

Making explicit plans for managing risk and then following up, checking on the execution of those plans, and reporting the results of those checks may seem like lots and lots of needless redundancy to some, but they miss the point. Discipline makes risk management reliable instead of being another wild card in an uncertain world and ERM brings this discipline to traditional risk management.

Traditional risk management (that is, pre-ERM risk management) is more ad hoc. Risk mitigation and control usually happens but there is typically not an explicit commitment to assuring that takes place.

Aggregate Risk Management

ERM also adds a new layer of discipline to risk management as it addresses the level of aggregate risk. The formation of a risk appetite and tolerance statement for a company itself imposes discipline on a conversation that previously, if it was addressed at all, was discussed in vague terms.

Clear and coherent communication is an often-underappreciated discipline that is much more difficult than it appears. ERM encourages insurers to clearly state their approach to risk as well as the amount and types of risks that they will accept and provides a script and outline that makes it easier to speak clearly about risk and risk management.

True discipline for aggregate risk management involves actually enforcing a control process for aggregate risk that is similar to the process of individual risks. This may involve management setting both

- a risk capital base (or limit), which the risk managers do not want the company to fall below under most circumstances, as well as
- a risk capital target, which is where they expect the relationship between aggregate risk and total actual surplus to end up.

Discipline involves not only setting these goals and limits, but also monitoring activities to track progress compared to said goals and limits.

It also requires making mid-course corrections when they are needed. In the rare situations where surplus is much closer to the limit than the goal, making the hard decisions about how the company must make serious changes to plans.

Comprehensiveness

Discipline is also needed to address the comprehensiveness of risk management. ERM includes the discipline of a commitment to addressing all of the significant risks of the firm and always starts with a risk identification and prioritization step, so that while all risks are considered, time and resources are used wisely by focusing only on the most significant risks.

Risk management matters the most when it is the most expensive and most difficult.

Traditional risk management is also more ad hoc about which risks are addressed. People are not necessarily even asked whether they are paying attention to all of their risks. Sometimes the only risks that are addressed are the risks that the company is used to dealing with or the risks that have most recently affected the firm, other times it might be that just the risks that are convenient and easy to manage are addressed.

The emerging risks identification process within ERM brings a belt-and-suspenders approach to risk identification. Not only is there an explicit effort to identify all presenting risks, but with emerging risks management, there is a periodic effort to identify and prepare for future risks.

Transparency and Discipline are Keys

Transparency helps to enforce and encourage discipline. In a transparent organization, everyone will know if risk management stops or if there is a failure to maintain risk exposures within their established risk limits. Actual transparency is even better than guilt to hold people accountable to risk management, because transparency works even on those who are able to overcome their guilt in pursuit of riches.

Discipline is what makes risk management pay off. Without discipline, it is most likely that a company will incur the cost of

performing risk management when times are good and losses from risks are light, but fail to consistently apply risk mitigations when risk is high and losses are large.

Transparency and discipline make ERM Strong. They are two of the keys to ERM.

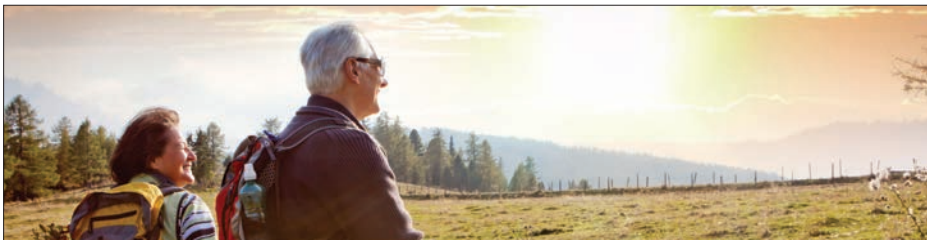
The next two keys to ERM—alignment and adaptability, keep the ERM process on the right direction and maintain its effectiveness over the long term, will be discussed in part 2 of “ERM in Five Words” in the next issue. ■



David Ingram, FSA, MAAA, CERA, is executive vice president at Willis Re. He can be reached at dave.ingram@willistowerswatson.com.

ENDNOTE

- 1 The Borel Risk Point is the probability at which someone would choose to ignore a risk because it is too unlikely. One might have a one-in-10 year (90 percentile) Borel point because he is 10 years away from retirement. Another might have a one-in-50 year (98 percentile) Borel point because that is her guess of the rating agency sensitivity. A third a one-in-three (33.3 percentile) Borel point because that is the timeframe for the company's long-term incentive compensation.



LIVING to 100

SOCIETY OF ACTUARIES
INTERNATIONAL SYMPOSIUM



Human Longevity Around The World

During the sixth [Living to 100 Symposium](#), leaders from around the world shared ideas and knowledge on aging, rising survival rates and implications caused by increases in aging populations. The monograph is now available and captures the conversations on living longer, its impact on social support systems and the practical needs of advanced-age populations.

[Discover featured sessions and material from the Living to 100 Symposium.](#)



livingto100.soa.org

SOA Explorer Tool

Find Actuaries Around the Globe

The SOA Explorer Tool is a global map showing locations of fellow SOA members and their employers, as well as actuarial universities and clubs.

Explorer.SOA.org



**SOCIETY OF
ACTUARIES®**

Defining Company Culture in Five Questions

By Paul Harwood

Editor's note: This article was originally published on www.insuranceerm.com. Reprinted by permission.

An “inappropriate culture” often takes the blame for all kinds of corporate misdemeanor, but judging the culture and correcting the failings can challenge the best of firms. Paul Harwood suggests a strategy to help management get it right

It feels like there is convenient circular logic at play: poor outcomes are the result of the wrong culture; what is the wrong culture? One that results in poor outcomes.

The problem with the culture agenda is definition. Culture descriptions tend to involve lists of positive attributes, which are sometimes linked to outcomes, sometimes to activity, but overall can feel newspaper lonely hearts ads.

This language does not define something that can be managed, let alone measured. It feels like there is convenient circular logic at play: poor outcomes are the result of the wrong culture; what is the wrong culture?

One that results in poor outcomes.

Managers have no chance of succeeding in these circumstances. Facing a stacked deck, good managers leave the table. No wonder culture change exercises meet cynicism and disengagement from the sincere.

What's needed is a way to understand culture that goes beyond motherhood statements. Culture has to be described using words and concepts that are familiar to managers and that help them direct effort to achieve the desired result.

The starting point is the question “what action can management take that affects culture?”

Can this be done? It's certainly worth considering. The starting point is the question “what action can management take that affects culture?”

This quickly decomposes into “what action can management take?” because all management action affects culture.

REWARD—AND THE REST

Management action can be split between reward and the rest. Rewarding people is the easy, fun part of management: recognition of success, payment of bonuses, vesting of incentives and suchlike. What's rewarded is a driver of culture. It's the area that has received significant regulatory attention, because poorly designed incentive schemes drive activity in perverse ways.

It's also perhaps a minor component of culture. The bulk of management time is spent managing performance, trying to ensure success, through recruitment, resource management, people and process management, plus all the work required to address achievement by attitude, contribution and outcome.

Reward can't be the only driver of culture. Remove reward mechanisms from the management playbook and what remains, everyday management, has a role in impacting culture. It may not be fashionable to say, but everyday management might have a greater impact on culture than managing reward. Significant rewards accrue to the few and for most, rewards are side effects, not drivers. Everyday management affects more people, involves more time and effort, and arguably has a greater impact on culture than rewards.

WHAT MANAGEMENT IGNORES

There is a further dimension to how management affect cultures: what management ignores. Managers can't be everywhere all of the time.

Especially in knowledge-based industries like financial services, professionals and practitioners are largely left to get on with their work, with varying degrees of autonomy. This thinking leads to a hitherto unexpressed perspective on culture. What if culture is primarily determined by what management ignores?

Ignoring activity sounds like a dereliction, but that's not the thinking behind the assertion. Culture may be what develops in the gaps left by management, and filled by people going about their work professionally, conscientiously, organizing their working lives to meet management requirements and then to suit their own ambitions, tastes and timetables. Culture may thus be dependent on the outlook of those who are trusted to organize their own work and that of others outside formal lines.

It doesn't take much probing to find influencers in organizations whose approach to work drives the atmosphere and diligence of

many of those around them. Indeed, research into change management suggests that finding and convincing these individuals, whose importance may well be informal rather than stemming from their position, can be a significant factor in the success of any change effort.

FTSE 100 CULTURE/VALUE STATEMENTS EXPRESSED AS LONELY HEARTS ADS. CAN YOU IDENTIFY THE FIRM?

Behemoth seeks edgy other to join crazy care of customers, never sleeping, continually creative and thinking about their legacy.

Are you a blunt-talking team worker? Are you determined, no matter the realism of the goal?

Desperately seeking ambitious people to be strategic and joined up (as opposed to the opposite). Must not mind long-term goals being continually assessed in the short term. Should be motivated by a multiplicity of adjectives (clear, consistent, transparent, regular, fair, effective).

IT'S ABOUT PEOPLE

Talk of management approaches alone misses the crucial point about culture: it is about people. To the individual employee, cultural cues come from sources that are more explicit and closer than the Board. In the game of work, keeping the immediate boss sweet is (usually) the key to keeping a job. There will be side considerations such as making the boss look good to her/his boss and making sure that activity is seen in the right light by others higher up.

Individuals are adept at identifying those with the power to influence their careers and taking steps to optimize perceptions. Being seen to do good work by those with power is a natural part of survival at work, or in any hierarchical human system.

How does this drive culture? The predilections and foibles of individual managers and influencers will be magnified across their sphere of influence, depending on their perceived power, demonstrating what is acceptable and what is not.

ASSESSING CULTURE IN PRACTICE

The challenge is to understand culture in terms that link directly to the management toolkit. The thinking developed thus far can be consolidated into four headline questions for employees throughout any organization: from your perspective (not from the Board room)

- What is rewarded?
- What is managed?
- What is ignored? And
- Who has most power over your activities?

To understand culture, a firm should ask its employees these four questions and collate the responses to give a picture of the impact of management action, or inaction, as seen by those on the receiving end.

Skillful collation of the responses will produce a summary which reflects culture at the required level, be it overall or by functional unit or geographic entity.

These are not survey questions. Surveys oversimplify and tend to be managed, perhaps unconsciously, to drive responses in particular directions. They cannot be posed by managers or HR, however well intentioned, because of the implicit tendency that good employees have to toe the party line.

“Have you see anything which gives you a qualm of conscience?” might (only might) lead to a concern being raised about payment protection insurance, or the engineering of emissions data, or the process to set Libor.

The headline questions are not designed as feel-good questions. They demand evidence. Employees should be asked to give examples of what management rewards, of what management manages and what management ignores. This sort of probing questioning requires skilled moderators.

To understand culture, the questions need to be presented face to face, by a trusted third party who can dig for evidence.

One consequence of this questioning might be that employees change their opinions when forced to confront their perceptions of management action.

This is unapologetically counter to anthropological investigations of culture, which seek to understand without disturbing. Reflection is a well-established technique for changing behavior. If the headline questions help to embed culture, that's a plus.

USING THE RESULTS TO MANAGE CULTURE

The responses to the headline questions are designed to show the Board the impact of management on culture and to identify those with significant influence. With this knowledge, the Board can consider how to adjust management approaches and span to affect culture and who might carry those changes.

Alternatively, Boards could, quite independently of intra-firm research, ask themselves what should be rewarded, managed (more particularly, how performance, contribution, attitude and output should be managed) and ignored (that is, where professionals and practitioners should be encouraged to pursue their work without excessive oversight) to meet their goals on culture. Boards can determine the cultural power brokers in their firm and how the use of their power should be monitored.



The resulting culture programmer is implemented, and the headline questions are used to check that it is having the desired impact, or otherwise allow appropriate changes to be made.

THE KILLER FIFTH QUESTION

Culture is universally accepted as a sensible route to preventing financial malfeasance. But looking over the financial scandals that have emerged in recent years, what questions about culture could have prevented them? It's hard to think of any, not least because bad things happen in good cultures, and angels persist in the most noxious cultures.

Perhaps, instead of asking about culture, firms should ask about conscience?

“Have you see anything which gives you a qualm of conscience?” might (only might) lead to a concern being raised about payment

protection insurance, or the engineering of emissions data, or the process to set Libor.

Conscience is personal. Individuals assess what is right, what is wrong, and what is in-between, without the need for corporate culture or value statements, and without the need to justify the feeling from evidence. Considering matters from conscience implicitly requires the individual to take responsibility.

Using conscience at work chimes with the Financial Conduct Authority's re-framing of the conduct agenda around the actual or potential harm, and plays to the already-established focus on personal responsibility.

Boards need to know what is taxing the conscience of their employees. They may not agree with a given view, but they should have the opportunity to consider it. Publishing the Board's response to a conscience concern could be a genuine and practical demonstration of tone from the top.

SUMMARY

By asking employees what they see being rewarded, managed and ignored and establishing who really drives culture, Boards can design their management programs to drive the culture as they see fit.

More importantly, they can seek feedback that directly demonstrates whether they are succeeding.

By asking about conscience, Boards can understand what taxes their employees at a deeply personal level, and perhaps receive early warning of the next scandal or a catastrophic fault point in the making.

It's a brave Board that really wants to know about their firm's culture. But is there any alternative? ■

Paul Harwood is CRO and CFO at Holloway Friendly.

Zoonotic Diseases: Heightened Risks to Industry and Government

By Petra Wildemann and Patrick Ayscue

Pandemic and epidemic risks appear in the headlines every day. Whether it's Zika, SARS, MERS or measles, the damages due to pandemics and epidemics are higher in both number and total cost than those due to wars or natural catastrophes. Calculations show costs vary from a relatively modest 450 million US dollars (due to the 2013 Enterovirus 71 outbreak in China) to the staggering sum of 77 billion US dollars (due to a large 2012 case of foodborne illness in the US).

The number of cases or deaths in outbreaks is not always a good predictor of the extent of the associated economic damages. Other factors also play a significant role. As an example, the costs of Ebola between 2014 and 2016 in Guinea, Sierra Leone and Liberia were relatively modest at 2.8 billion US dollars, as the victims of that epidemic in those regions tended to either die or recover rather quickly. On the other hand, the

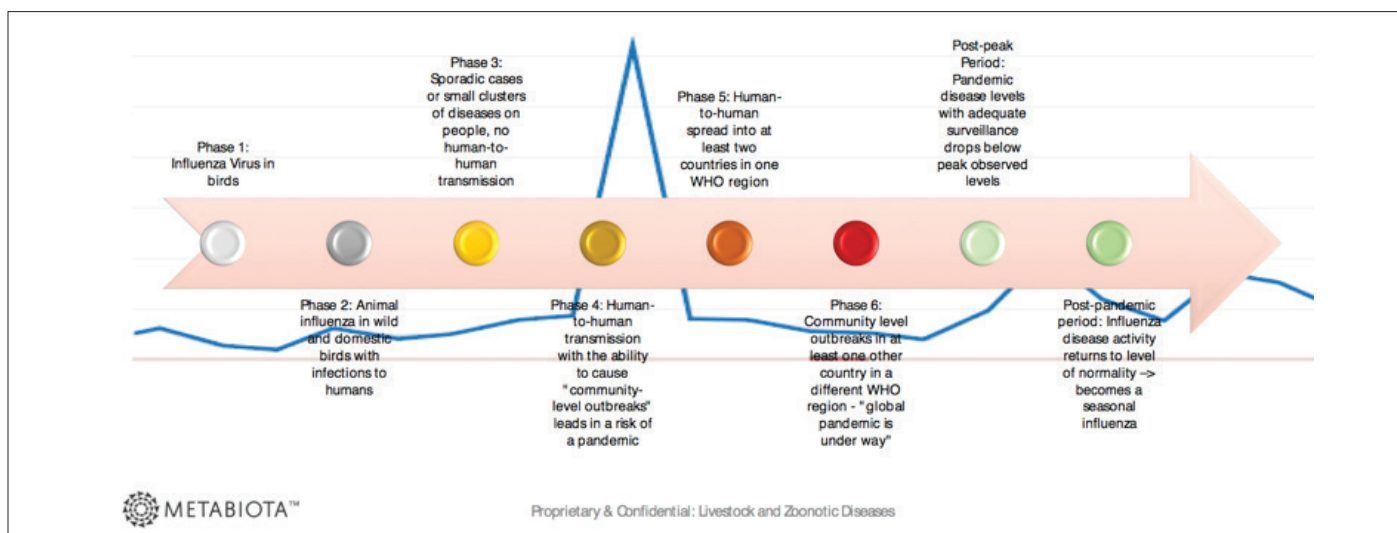
persistent foot-and-mouth epidemic in the United Kingdom in 2001, resulted in damages of 11.7 billion US dollars after 10 million cows and sheep needed to be culled in order to prevent the highly contagious disease from spreading beyond the 2,000 reported cases.

Globally, there have been over 400 high priority human disease outbreaks within the past 10 years, causing significant economic loss, the bulk of that uninsured. The World Bank estimates that infections from Zika virus cost the world nearly 3.5 billion US dollars last year; while regional losses due to the 2015 Ebola outbreak were moderate, global losses exceeded 32 billion US dollars; and the MERS 2008 loss in South Korea cost approximately 8.2 billion US dollars. Such economic losses will continue to escalate due to the fact that the underlying factors driving the emergence of infectious disease are individually and collectively increasing.

Metabiota has made it our business to carefully track both animal and human infectious diseases, collating and analyzing data on hundreds of pathogens that threaten human health. We place a particular emphasis on those with the potential to cause pandemics or emerge as novel threats to human health.

Zoonotic diseases—or those bacteria, fungi, viruses, and parasites that can transmit from animals to humans—are at the forefront of those pathogens which can cause devastating pandemics. Currently, approximately 1,400 species of human pathogens are known, however, an increasing number of the over 50,000 reported animal diseases are managing to make the jump to humans. Once a pathogen becomes zoonotic and humans are infected in a number of countries, a pandemic status has been reached (represented in Phases 2–6 in Figure 1).

Figure 1
Pandemic Alert—Influenza Phases (WHO)



Source: World Health Organization; example portrayed, Avian influenza.

Changing patterns of humans’ interaction with animals are increasing the risk that zoonotic pathogens will emerge in human populations. A number of behavioral and environmental changes have driven these changes, as well as the burgeoning threat of release of genetically modified bioterror agents (see Figure 2). As humans become increasingly clever in their attempts to improve upon nature, new sorts of epidemic and pandemic risk arise..

While epidemics in humans and livestock may appear inherently stochastic, they rather demonstrate distinct patterns, just as other natural catastrophes do. This means that their risks can be quantified, analyzed, and used to insure against their impacts, despite their substantial diversity.

MEASLES

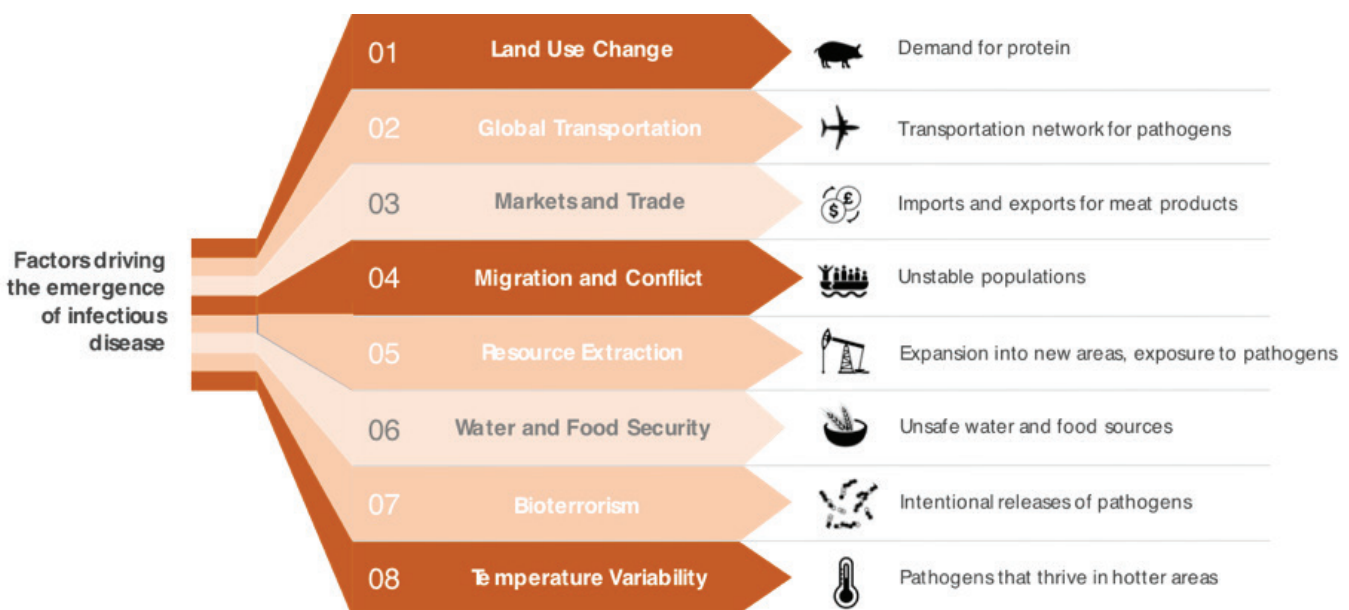
For years, measles has been seen as a relatively rare disease in the United States and certain European countries. But times have changed. Nine European countries, including Austria, Belgium, France, Germany, Hungary, Italy, Romania, Spain, and Switzerland, have reported a total of more than 7,500 cases since the beginning of 2016 with 25 deaths.

Romania is most affected, with approximately 3,800 cases and 17 deaths from September 2016 to March 17, 2017. Of reported cases, 96 percent occurred in individuals who had not been vaccinated. Additionally, Italy has reported 700 cases thus far in 2017—more than three times the number of cases in the same period last year. On March 24 of this year, a measles-related death of a young man was reported in the Swiss press. While this man’s death was attributed to a weakened immune system resulting from the leukemia treatment he was receiving, Switzerland has experienced 52 cases thus far in 2017—a tenfold increase from the prior year.

Measles outbreaks highlight the classic “spark and spread” nature of infectious diseases. As a case in point, an infected traveler brought measles to Disneyland-USA in 2014 (the spark), and the virus was transmitted (the spread) to over 120 people in three countries. Therefore, mitigating the risk of disease involves understanding both the risk of introduction of disease as well as the cultural and demographic factors associated with transmission, vulnerability and preparedness.

Figure 2
Why Are Epidemics and Pandemic Risks of Concern?

What are the triggers of disease risks that threaten people and animals, such as the Zika virus or SARS? There are many points of contact between people and nature which present viruses with opportunities to find new hosts.



Avian Influenza

Losses in poultry production and related businesses due to avian influenza are estimated at 309.9 million US dollars in greater Minnesota, according to a newly released emergency economic impact analysis from University of Minnesota Extension. Poultry production and processing is a 3 billion US dollars industry in the state; overall, poultry growers represent about 7 percent of the agricultural and forestry economy.

The cost of the birds lost to avian influenza, according to economist Thomas Elam of the Indiana-based consulting group FarmEcon, was 1.57 billion US dollars. However, the additional costs associated with businesses that support farms (i.e., egg and poultry wholesalers, food service firms) pushed the total loss to 3.3 billion US dollars. In addition, the US Department of Agriculture committed 500 million US dollars to emergency efforts to block the disease, and paid out 190 million US dollars to farmers whose birds were destroyed.

A study conducted by the University of Minnesota focuses on the state's 80 non-metro counties, where nearly all poultry production occurs. Among the findings:

- The industry that produces feed for poultry and other animals will be hardest hit by poultry production losses. For every \$1 million of lost poultry production, nearly 230 thousand US dollars of demand for poultry feed is lost.

- For every 100 jobs lost due to reduced poultry processing, nine are in the trucking industry.

It's been almost a month since a case of avian influenza was detected in poultry in the central United States. Therefore, one might draw the conclusion that the epidemic (which, over several months, caused the destruction of 49.5 million chickens and turkeys) can safely be considered over. In fact, it may have only taken a break. If it returns, as some experts predict it will, what one government official calls "the largest animal-health emergency in this country's history" may turn out to be just an opening act. At risk, the next time, will be not just the egg and turkey farms of the Midwest, but the billions of birds being raised in the poultry-producing centers on the east and west coasts—effectively, most of the poultry economy of the United States.

Business interruption due to employee absenteeism

Insurers should understand the preparedness of a country, and its neighboring countries to handle business interruption such as due to employee absenteeism for an event with a 20-to-50-year return period. The Metabiota Preparedness Index gives insurers deep insight into where each country sits relative to the world and to the region (see Figure 3).

Figure 3
The Metabiota Preparedness Index

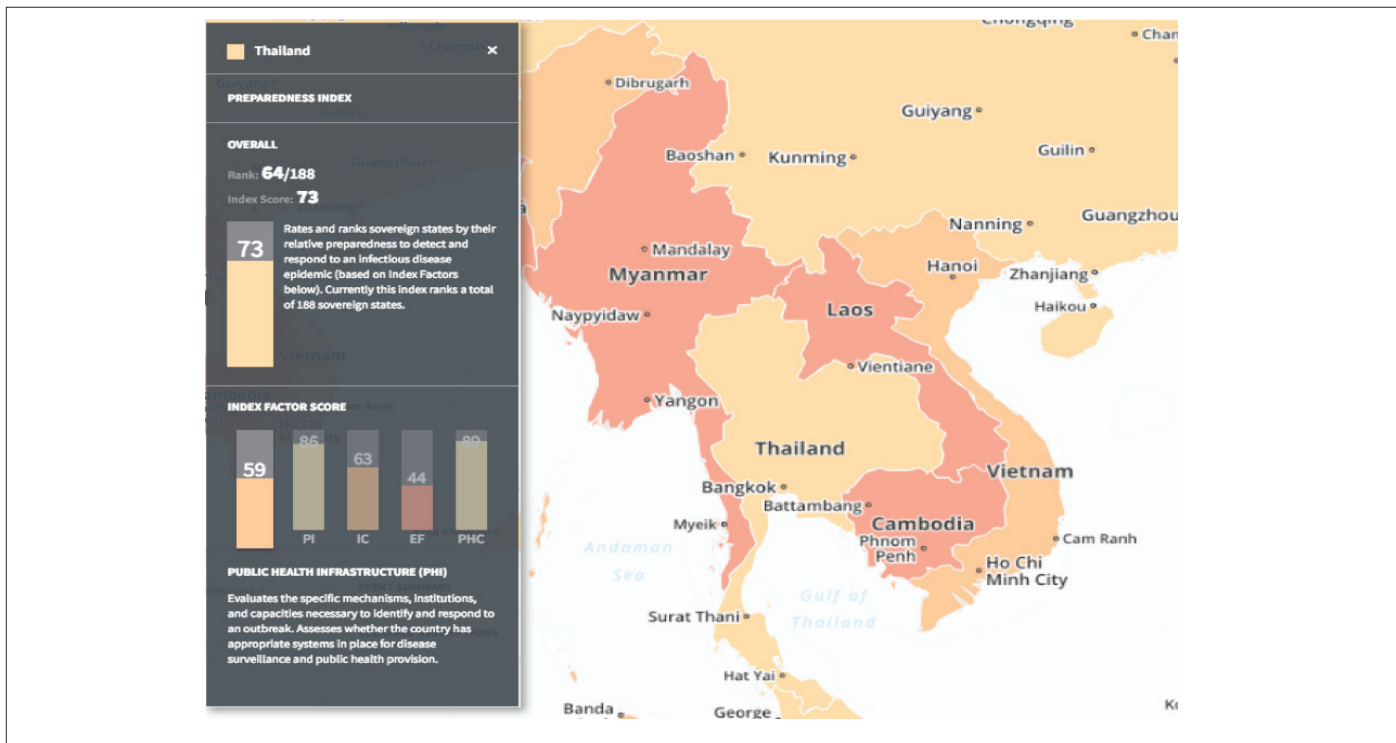
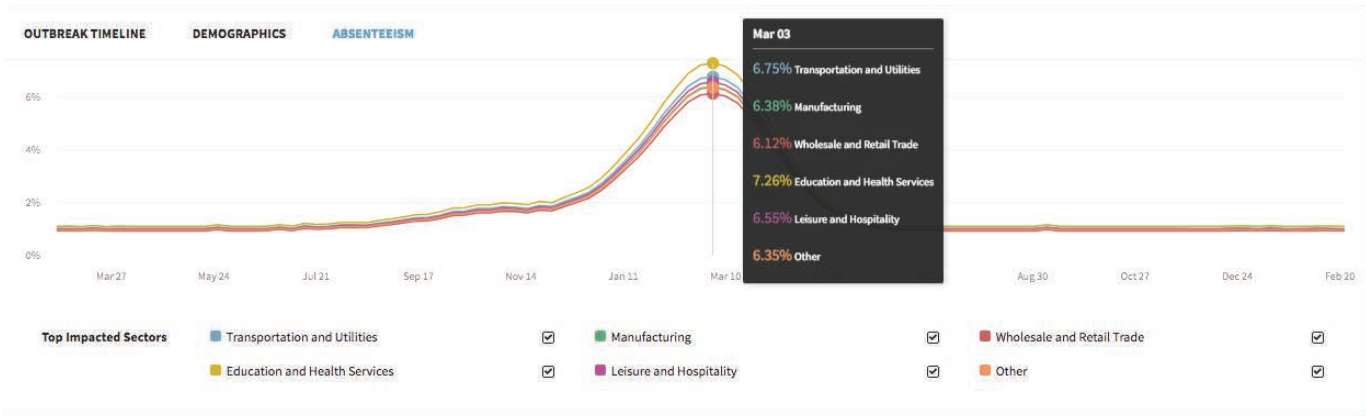


Figure 4
Case Study: Peak Absenteeism Rates



Note: Weekly Absenteeism rate = (number of people missing work as a fraction of the total workforce)

The platform enables (re)insurance companies to monitor their own exposure to infectious disease risk and thereby gauge their potential mortality shock from epidemic diseases of various types and sizes based on their own accumulation footprint and profiles. In Figure 4, we model the peak absenteeism rates for the 1957 influenza pandemic. This analysis enables the determination of the synergistic effects of multi-part triggers for business interruption resulting from employees not being present at work during an outbreak or epidemic event.

CONCLUDING THOUGHTS

Zoonotic diseases are not new phenomena; nor are pandemics. However, technological and social advances which have led to rapid increases in the international movement of people and goods have as a consequence that zoonotic diseases and pandemics are growing, even alarming threats to human

well-being. We will need to devote a great deal more attention and resources to monitoring animal diseases and their potential spread to human populations in order to have a chance of minimising this threat. ■



Petra Wildemann, SAV, DAV, IFoA, is director of Business Development EMEA at Metabiota. She can be reached at pwildemann@metabiota.com.



Patrick Ayscue, PhD, is director of Epidemiology, Product Development at Metabiota. He can be reached at payscue@metabiota.com.

General Insurance Actuarial Risk Assessment Overview

By Syed Danish Ali

This article holistically places ratemaking into its proper context and connects the diverse operations that have impact on ratemaking as well. Broadly, the risk that a business line faces can be segregated into accident risk and expense risk.

Accident Risk

- The likelihood of actual claims being higher than expected is a major risk to general insurance, which will be referred as “accident risk” in this article.
- Generally, the company price for taking on this risk by assuming a certain loss ratio with a margin for contingencies. If actual claims are lower than expected, the profit emerges.
- In order to mitigate this risk, proper underwriting as well as reinsurance arrangements is made.
- The fluctuation in actual loss ratio from year to year is a major risk which leads to fluctuations in shareholders’ return.

Expense Risk

- This risk can be defined as the likelihood of actual expenses being higher than the expected. If the difference (expected vs. actual) is positive, the company makes money.

Risk management is about thinking creatively of scenarios, not just following the output of a model as risk management is ultimately about sustainability and survival and not profits and losses.

GENERAL ERRORS DURING RATEMAKING PROCESS

Process Error

Process uncertainty originates from general claims uncertainty (including frequency, severity, timing, change in demand, and claims settlement process, etc.), internal sources of uncertainty (including planned or unplanned business mix changes, reserves booked other than recommended, expenses uncertainty, etc.). Uncertainty in economic, legal and operating environment and the stages of the insurance cycle are also contributing factors of process uncertainties in the results and recommendations.

Parameter Error

Our results and conclusions are derived from the parameter estimates used in our actuarial and statistical models. These parameters inherit uncertainties relating to data quality, large and exceptional claims, change in reserving process and philosophy, assumptions including inflation, claim cost trend and others (including IBNR).

Our parameter estimates are deduced from past experience, our expectations of future and reasonable actuarial judgment. Since historical estimates contain distortions and random movements, past experience is not necessarily a reasonable guide to the future. Therefore, our results and recommendations inherit uncertainty due to parameters’ estimates used.

Model Error

Our results and conclusions are derived from the adopted actuarial and statistical models. These statistical models are simplified versions of very complex (and unknown) underlying systems, processes and assumptions. This leads to inherent bias in our results and recommendations.

The choice of the model used can also contribute to the model uncertainty. For example, the triangulation methods used to estimate the incurred-but-not-reported claims can produce different results under a paid claims pattern as compared to incurred claims pattern.

RISK MANAGEMENT IN RATEMAKING

Based on the pricing assumptions, the company’s management should understand the insurance business as the specificity of the insurance-related-reverse production cycle (collecting premiums first, paying out claims later and accumulating assets to cover future payouts) and the requirement to control and mitigate operational risks that are generated everywhere in the insurance value chain.

Risk management is about thinking creatively of scenarios, not just following the output of a model as risk management is ultimately about sustainability and survival and not profits and losses.

For instance, different sub-products within motor line can have different features and claim trends. Regarding claim trends, bodily injury has no maximum liability limit and so can be a major source of potential loss. The company controls this risk by an excess of loss (XOL) reinsurance treaty without any limit for bodily injury cases. For comprehensive products, the sum insured are determined and known beforehand, and it is carefully monitored that changes in underwriting or depreciation policies do not unduly lead to decreases in sum insured as this will directly lead to decreases in premium being charged as premium on comprehensive is charged as percentage of sum insured.

Giving another example, different sub-products within medical insurance can have different features and claim trends. Regarding claim trends, grievous surgeries and chronic pre-existing conditions as well as critical illnesses can be a major source of potential loss. The company can control this risk by an XOL reinsurance treaties.

In order to calculate a final set of rates for an existing product, the company performs the following actions:

- Select an overall average premium target for the future policy period
- Finalize the structure of the rating algorithm
- Derive the base rate necessary to achieve the overall average premium target
- Select the final rate differentials for each of the rating variables based on the policy characteristics, coverage type and claim history
- Calculate proposed fixed & variable expenses
- Make projections based on the appropriate (or realistic) set of claims and expense assumptions

Proposed rates and rate changes should be viewed as a quantitative diagnostic tool for determining expected costs. If the company does not know its true rate needs, then it cannot know if the rates dictated by the market are sufficient to produce its planned or target returns. Once future expectations are determined, informed discussions can take place as to how to respond to those expectations. If the market dictated prices are too low, the company must know what other actions (e.g., changes in underwriting rules, marketing emphasis or claims handling) are necessary in order to produce the planned results. Implementing all or part of the rate changes is just one alternative for management to consider.

The “Loss Ratio” approach is very useful when there is a lack of credible claim experience. This is because this methodology is based on the idea of observing the impact on underwriting

results by varying the claims cost, and the claims cost is estimated based on the available or current rates. Furthermore, when determining rates for writing new business, where no internal historical data exists, the actuary¹ can still determine the indicated rate by estimating the expected pure premium and expense provisions and selecting a target profit provision (possibly based on industry statistics).

The rate variation for different risk characteristics occurs by modifying the base rate. An insurer that fails to charge the right rate for individual risks (when other insurers are doing so), is subject to adverse selection (and thus, potentially deteriorating financial results). An insurer that differentiates risks using a valid risk characteristic (when others are not) may achieve favorable selection and gain a competitive advantage.

When a company identifies a characteristic that differentiates risk that other companies are not using, the company has two options for making use of this information:

1. Implement a new rating variable.
2. Use the characteristic for purpose outside of rate-making (e.g., for risk selection, marketing, agency management).

If the company implements a new rating variable and prices it appropriately:

- Its new rates will be more equitable.
- It may write a segment of risks that were previously considered uninsurable.
- It will attract more lower-risk insured at a profit.
- Some of the higher-risk insured will remain and will be written at a profit.

Over the long run, the company will be better positioned to profitably write a broader range of risks.

We need to take into account of the adequacy of risk factors that are considered for pricing purposes. The key objective is statistical parsimony here, as seeing too many risk factors in pricing tools means collinearity/multicollinearity problems, but too few risk considerations means that an optimum pricing structure has not been embarked upon.

What we often ignore is that market considerations play a larger role than risk considerations in setting of the prices of general insurance products. Pricing is inescapably linked with underwriting. We need to see different underwriting markets (soft is where prices are low and profits are low and hard is where prices are high and profits are higher). Another is underwriting itself. If we are underwriting high risks unduly then no amount

of good pricing will be adequate. For instance, having a third party insurance as the majority of the motor portfolio will mean higher loss ratios relative to a balanced portfolio no matter how high the prices are charged for third party insurance. Such situations demand increasing comprehensive motor into the portfolio rather than increasing prices for the third-party insurance.

Apart from underwriting strategy, pricing is linked with business and product strategy as well. Generally, if the objective is revenue enhancement of market share in a soft underwriting cycle, then pricing will tend to be low and underwriting less strict (higher GPW growth but higher loss ratios) and vice versa.

The company emphasizes data capturing and management as pricing requires holistic data and not segregated in silos. IT capturing is important, too, especially for risk parameters. Management Information System (MIS) platform is suited for this purpose.

One possible adjustment in deciding the “permissible loss ratio” is to offset it by the “investment return.” Investment gains sometimes, but not always, offset underwriting losses. And certain forces significantly affect the underwriting results—inflation, regulation, competition, and investment results. When the major components of loss costs are increasing rapidly because of inflation, rates tend to increase more slowly because of competition among insurers. Competition also affects underwriting results. During periods of seemingly favorable results, insurers might try to increase their premium volume, writing business at less-than-adequate rates. Sometimes, based on a belief, it is possible to write more commercial insurance at an underwriting loss, for which they can compensate with superior investment results. Although this practice can be effective in the short term when investment conditions are favorable, it can result in adverse operating losses.

That is why it is suggested that underwriting decisions should be kept independent and distinct from investment decisions by the company.

Feasibility analysis for critical distribution channels like agents, brokers and bancassurance should be undertaken by the company to see how adverse market conditions can likely change the quantity and quality of business brought by these distribution channels for premium revenue.

Innovations should be adopted but cautiously. Complex forms medical and motor insurance products and add-ons, complex derivatives and investment instruments should be generally avoided as it is difficult to realize their precise consequences until it is usually too late. Pricing should be continuously improved and enhanced but products should remain legible to all the stakeholders involved.

Lastly, I would like to highlight that insurance companies do not become insolvent due to having vulnerable balance sheets. As insurance is the business of risk taking, there are always vulnerabilities that have the potential to cascade and develop into a larger crisis. This vulnerability is kept in balance by risk management and market confidence. Ensuring that adequate premiums are charged for the commensurate risk is a part of this overall risk management. ■



Syed Danish Ali is deputy manager, Actuarial at Allianz Efu Health Insurance Company. He can be reached at sd.ali90@gmail.com.

ENDNOTE

- 1 Or technical individuals involved.

Universal Life with Secondary Guarantees Survey Summary

Through its Policyholder Behavior in the Tail workgroup, the Society of Actuaries has published a new report¹ summarizing the results of its most recent assumption survey for Universal Life Insurance with Secondary Guarantees. Highlights are as follows:

- 25 companies participated in the survey up from 20 last time, covering \$740 billion of insurance inforce.
- Capital requirements are highly dependent on assumptions for lapse rates and investment returns.

- A wide range of assumptions is evident across companies, particularly for “tail” scenarios and elderly insureds, only some of which is explained by product design differences.

This is the latest in a series of surveys² covering Universal Life Insurance with Secondary Guarantees and Variable Annuities, respectively, started in 2007. The motivation for these surveys is the high degree of sensitivity that these products have to elective policyholder behavior, and the emergence and changes in these behaviors in recent years. The reports from these surveys should be of interest to actuaries in product development, pricing, inforce management, and valuation roles, and should aid in the development of prudent policyholder behavior assumptions for these important product lines.

Anyone interested in more information or learning about how to participate in future surveys should contact Barbara Scott at bscott@soa.org. ■

ENDNOTES

- 1 <https://www.soa.org/research-reports/2017/2017-ul-second-guarantee-survey/>
- 2 <https://www.soa.org/research/topics/risk-mgmt-res-report-list/>

Recent Publications in Risk Management

As an ongoing feature in Risk Management, we will provide recent publications we find noteworthy to our readers. Please send suggestions for other publications you find worth reading to dschraub@soa.org or cheryl.by.liu@FWD.com.

Use of internal models in ICS 2.0

The CRO Forum

https://www.thecroforum.org/wp-content/uploads/2017/07/CROF_ComFrame_Paper-v20170718publication.pdf

Global insurance markets - Current status and outlook up to 2027

Allianz Research

https://www.allianz.com/v_1499237486000/media/economic_research/publications/working_papers/en/Global_insurance_markets_05072017.pdf

2017 Universal Life with Secondary Guarantees Survey Summary

SOA

<https://www.soa.org/Files/Research/Projects/2017-ul-second-guarantee-survey.pdf>

Influencing Risk and Risk Culture

KPMG

<https://assets.kpmg.com/content/dam/kpmg/sg/pdf/2017/06/Influencing-risk-and-risk-culture.pdf>

IAA RISK BOOK

IAA

<http://www.actuaries.org/index.cfm?lang=EN&DSP=PUBLICATIONS&ACT=RISKBOOK>

2017 ERM Symposium Award Papers on Enterprise Risk Management

2017 ERM Symposium

<http://www.ermssymposium.org/2017/call-for-papers.php>

Risk Assessment Database

CAS

<http://www.casact.org/research/rad/>

Society of Actuaries in Ireland ERM Resource Database

<https://web.actuaries.ie/press/erm-resource-database>

Climate Change: Information on Potential Economic Effects Could Help Guide Federal Efforts to Reduce Fiscal Exposure

United States Government Accountability Office

<https://www.gao.gov/assets/690/687466.pdf>

The Global Risks Report 2017

World Economic Forum

<https://www.weforum.org/reports/the-global-risks-report-2017>

JRMS e-Library Update

By Frank Reynolds

The Joint Risk Management Section has developed a library of over 100 books on Risk Management and related topics.

This year four books chosen from the Canadian Skills and Knowledge Index for ERM (basically what one should know to practice in the ERM field) have been added these titles are:

- Corporate Value of Enterprise Risk Management
- Market Consistency
- Counterparty Credit Risk and Credit Value Adjustment
- Enterprise Risk Management

To access the JRMS e-library, visit the section webpage (soa.org/jrm) and click on the “resources” tab at the top, then click the link for “EBSCO e-books.” You will need to login using your SOA user information.

The books can be download and used for a period of two weeks.

Good reading! ■



475 N. Martingale Road, Suite 600
Schaumburg, Illinois 60173
p: 847.706.3500 f: 847.706.3599
w: www.soa.org

NONPROFIT
ORGANIZATION
U.S. POSTAGE
PAID
SAINT JOSEPH, MI
PERMIT NO. 263

