Diary of a Traveling Actuary

By Dirk Nieder and Jing Lang

Dirk Nieder is an actuary responsible for Gen Re's Life and Health business in Japan, South Korea and Taiwan. Based in Cologne, Germany, Dirk visits the local teams six to seven times a year. This is his diary.

FIRST STOP: TOKYO

On Jan. 26, 2020, on my first business trip of the year I arrived in Tokyo. Out of curiosity, I entered a drug store and looked for face masks. Having never worn a face mask in my life, I studied the explanations on the wrappings carefully. Meanwhile, a lady arrived at the shelf. I watched her putting **all** the face masks from the shelf into her shopping basket and disappearing to the cashier. Surprised, I held onto the three packages of face masks in my hands and decided to purchase them. It turned out to be a wise decision, as face masks were not available in Tokyo in the coming days.

What had happened? On Dec. 31, 2019, Wuhan Municipal Health Commission—a city in the Hubei province of China—announced they have identified a cluster of pneumonia patients,[1] all suspected to have been to a (now closed) local seafood market that also sold live animals. One week later, on Jan. 7, Chinese authorities confirmed they had identified a novel (new) coronavirus as the cause of the pneumonia. Coronaviruses are a large family of viruses, some of which can infect people. Some strains of coronaviruses cause temporary discomfort—such as common colds, while others cause severe or even fatal disease—such as Middle East respiratory syndrome (MERS) and severe acute respiratory syndrome (SARS).

By the time I arrived in Tokyo, the number of infections in China had risen to 2,000 and the first confirmed cases of the virus outside mainland China were reported in Japan, South Korea, Thailand and the United States. Chinese authority has put Wuhan, a city of more than 11 million, on quarantine. That means halting all public transportation, including city buses, trains and ferries. No buses or trains are allowed coming into or leaving the city, and all planes at the Wuhan airport were grounded. Lunar New Year had just begun.

SECOND STOP: TAIPEI

The next stop of the business trip was Taipei. The number of infections had risen to 30,000 and the number of deaths exceeded 600 when I arrived on Feb. 6.

Based on what we know, coronavirus have two ways of transmission: environment-to-human and human-to-human. The original transmission of this particular coronavirus outbreak was suspected to have been from an animal source to humans, called a "spillover." The human-to-human transmission is from a sick person to others through coughing, sneezing or talking. The infected individual can remain asymptomatic for up to two weeks.

Video footage had just appeared in China that showed a 56-year-old male standing beside a now believed to be a 61-year-old female carrier for 15 seconds in a grocery market on Jan. 23. The male was diagnosed with the coronavirus 12 days later. Neither of them was wearing a face mask. The video was widely circulat-

ed, and since then it is believed that human-to-human transmission can happen in as little as 15 seconds.

What a change! Before visiting a client in Taipei to give a presentation, I had to confirm that I had not visited China, Hong Kong and Macao in the last weeks. One morning, I arrived without wearing a face mask at a client's office building. I was only allowed entry into the office building after a temperature check, having washed my hands with alcohol-based sanitizers and putting on a mask that was provided. The picture (pg. 1) shows me in the office building, with all the employees in the background undergoing the same procedure. Even just entering a restaurant in Taipei was only possible after a temperature check.

THIRD STOP: SEOUL

The last stop of my business trip was Seoul. The number of infections had crossed the 45,000 mark and more than 1,100 deaths from the infections had been counted when I arrived on Feb. 11. At check-in for my flight to Seoul, I was again asked if I had visited China. Only one out of three seats was occupied on the flight.

I was running out of the face masks that I had purchased in Tokyo. I had in the meantime become accustomed to wearing a face mask. Luckily, my Seoul office made further masks available. All dinner events in Seoul had been canceled in the meantime, and even the internal celebration of a successful business year had been postponed. The level of alertness to the impact of the virus continued to be high. The virus was a popular topic in all client and private conversations.

> Many Asian countries see the outbreak of this virus as one of the most serious public health crises.

Also, on Feb. 11, the World Health Organization (WHO) officially named the virus "COVID-19," which stands for coronavirus disease discovered in 2019. The official name reflects the agreed-upon guideline between WHO, the World Organisation for Animal Health and the Food and Agriculture Organization of the United Nations in 2015—to not refer to a geographical location, an animal or group of people to avoid stigmatization. Place names such as Ebola and Zika—where those diseases were first identified and which are now inevitably linked to them in the public mind. More general names such as "Middle East respiratory syndrome" or "Spanish flu" are also now avoided as they can stigmatize entire regions or ethnic groups.

BACK TO GERMANY

The day of my return to Germany approached. 70,000 infections and 1,800 deaths had been reported as of Feb. 15.

I felt like I was entering a different world after boarding the return flight to Germany at Incheon airport. The stewardesses did not wear face masks during the entire flight. Face masks were hardly visible on arrival in Frankfurt. Since leaving the baggage claim area at the Frankfurt airport, I have not seen a single face mask in Germany. I sheepishly took off my face mask since I didn't want to draw attention.

It may be too simple to consider the use of face masks as an indicator for the alertness of a country. But after this business trip I am puzzled about these contrasts: Many Asian countries see the outbreak of this virus as one of the most serious public health crises. In Western countries, the new virus is considered a strong flu, which infects 5 percent to 15 percent of the population every winter season anyway and which does not require specific measures. In fact, figures of influenza were frequently referenced as context: there are three to five million cases of severe influenza that occur worldwide each year, and between 291,000 and 646,000 people die every year from influenza and seasonal illness.

TODAY

85,000 infections and 2,900 deaths have been reported as of Feb. 29. It's notable that during the two weeks that I am back in Germany, the number of infections has moderately increased (70,000 to 85,000), but the number of deaths has significantly increased (1,800 to 2,900).

Based on a report[2] by the Chinese Center for Disease Control and Prevention on all COVID-19 cases diagnosed as of Feb. 11, we find:

- The age group 60+ accounts for 30 percent of the infections but 80 percent of death.
- The fatality rate in the age group 60+ is 10 times higher than the fatality rate of younger people.
- The fatality rate of people with co-morbidities is seven to 12 times higher than the fatality rate of people without a co-morbidity, with the highest fatality rate for people suffering from cardiovascular diseases.

Clusters of infections have been identified in South Korea, Italy and Iran. Iran now has the highest COVID-19 fatality outside of China. On Feb. 27, the first suspected U.S. case of a patient getting the new coronavirus through "community spread"—with no history of travel to affected areas or exposure to someone known to have the COVID-19 illness has been identified in California. The U.S. stock market has also taken a nosedive, wiping

out all the gains for the past 12 months, in response to growing fear of a pandemic.

REACTION FROM INSURANCE COMPANIES AND GOVERNMENT

The reactions from governments, insurance associations and insurance companies in Asia to the spread of COVID-19 has been swift. For example, the governments in China, Hong Kong and Singapore announced that they would pay for all medical expenses related to COVID-19 at public hospitals. Insurance associations in Singapore issued statements that coverage for hospitalization expenses related to COVID-19 would be covered under the insurance policies of their members. These steps were seen to be important to ensure that people, who do not feel well, promptly seek medical attention.

Life insurance companies reacted by waiving waiting periods and deductibles under medical reimbursement products and providing cover also for hospitals that are "out of network." Existing policyholders and employees, including immediate family members, would benefit from a temporary extension of their benefits at no charge. The additional coverage would comprise the payment of a diagnosis benefit, quarantine benefit, hospital cash benefit and death benefit due to COVID-19. The coverage of Critical Illness or Accidental Death Benefits was extended to cover COVID-19.

China's Banking and Insurance Regulatory Commission (CBIRC) prohibited companies in China to develop stand-alone COVID-19 products due to the lack of a pricing basis. It also prohibited companies in China to conduct marketing campaigns using the COVID-19 virus to promote the sales of insurance products. Outside of China, new products emerged that provided diagnosis benefits, hospitalization benefits and death benefits due to COVID-19, provided an adequate waiting period had passed.

Insurance companies furthermore donated money and medical supplies, and provided free diagnosis and death coverage due to COVID-19 to frontline medical personnel. Grace periods for premium payments were extended. Free online medical consultations were provided for people restricted from visiting hospitals during the special lockdown period.

Major online companies partnered with insurance companies to offer protection for its user base: Users of WeChat, a messaging and social media app, could register for free coverage in case of diagnosis with severe-condition COVID-19 and resulting death. Grab, a leading superapp in Southeast Asia that provides ride-hailing, food delivery and payment services, provided a COVID-19 diagnosis benefit to Grab drivers and delivery-partners.

Also, enterprises, which had been affected by the lockdown of cities and closed businesses, receive assistance from governments and insurance providers. For example, a consortium of 12 insurers in China provides temporary cover for business losses, wages of employees placed in quarantine and other expenses caused by suspension of operations due to COVID-19. It has been reported that the provincial government committed to subsidize 70 percent of the premium of 100 businesses. Insurance companies also allow the temporary deferment of premium payments of commercial clients to ensure that there is no disruption to employees' coverage.

So, what can you do to stay safe and prevent the disease from spreading? Start with handwashing. Scrub your hands for at least 20 seconds, which is about the length of time to hum the "Happy Birthday" song from beginning to end twice.

My next trip back to Asia is mid-March. Stay tuned for more stories in the May newsletter. ■

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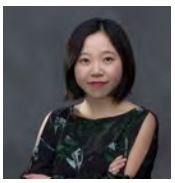

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ENDNOTES

1 *http://wjw.wuhan.gov.cn/front/web/showDetail/2019123108989*

2 The Epidemiological Characteristics of an Outbreak of 2019 Novel Coronavirus Diseases (COVID-19)—China, 2020, retrieved Feb. 29, 2020.

U.S. Mortality Improvement Trend Deep Dive

By Nikolai Serykh and Alex Yang

In January 2019, the Society of Actuaries (SOA) published "U.S. Population Mortality Observations—Updated with 2017 Experience,"[1] which highlighted a slowdown in the U.S. population's mortality improvement over the past several years. The following discussion aims to address a key question:

How can actuaries use population mortality trends to set future mortality improvement (FMI) assumptions for an individual life insurance portfolio?

In this paper, we will discuss two key dimensions often analyzed by insurance practitioners when using population mortality data:

- causes of death (COD)
- socio-economic status (SES)

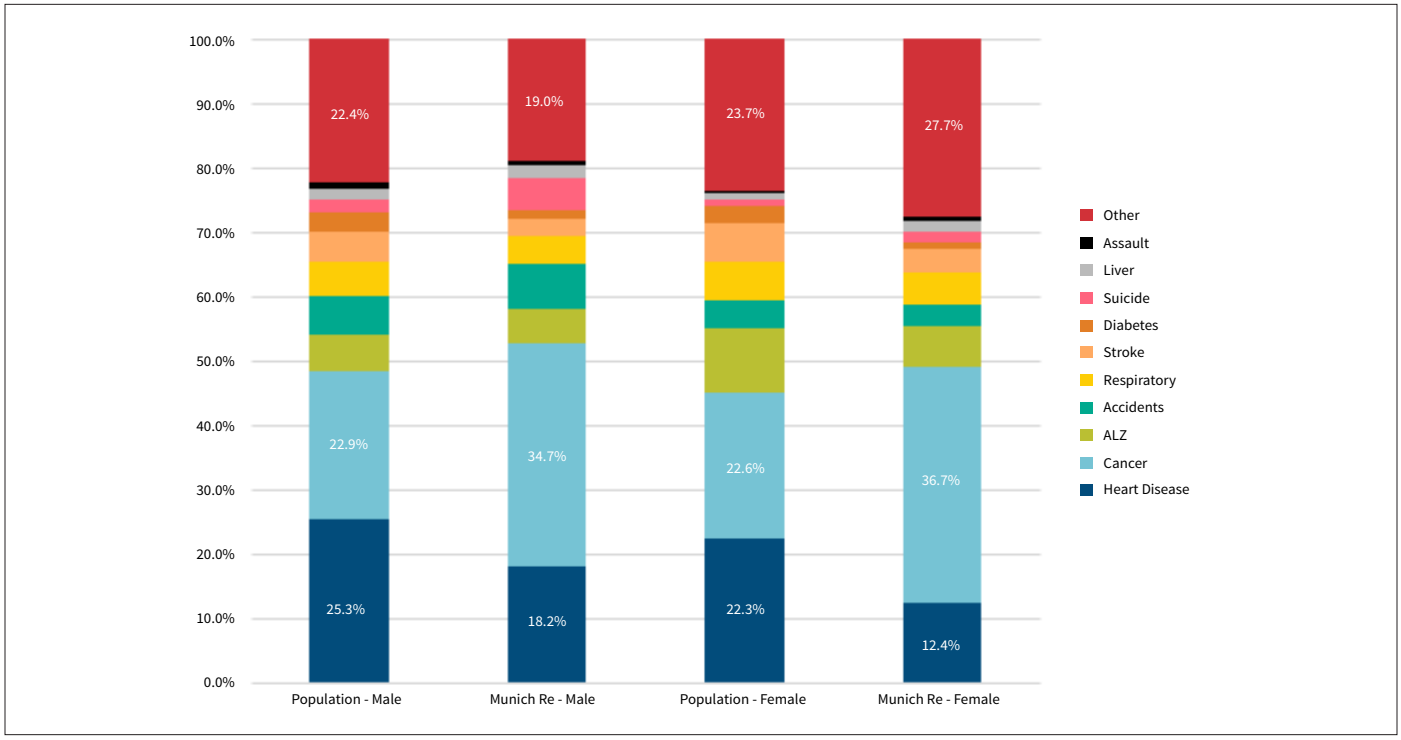
CAUSES OF DEATH

As highlighted by the SOA report, mortality trend is not homogenous across different CODs. In order to understand the difference in mortality trend between general population and insurance population, we need to identify the prevalence of each COD within the two populations.

Chart 1 compares the COD distribution between general population and Munich Re US Life's individual life portfolio claims by count from 2007–2017. The Munich Re experience is filtered for durations 1–20, single life, fully underwritten, automatically reinsured, excluding substandard and term conversions.

We observed that the Munich Re insurance portfolio deaths have a significant skewness towards more cancer and less heart disease compared to general population. One possible explanation for this

Chart 1
U.S. 2007–2017 COD Distribution—Population vs. Munich Re



skewness is that life insurance underwriting is more effective at filtering out potential cardiovascular disease than cancer. Traditional underwriting methods such blood test and family history can be highly effective in determining the risk of heart disease, thereby excluding high risk individuals from the insurance pool. In comparison, cancer is less predictable through current underwriting methods.

When actuaries are looking to review mortality experience and set FMI assumptions, it is important to take the underwriting impact and the resulting COD prevalence into consideration. As underwriting methodology evolves, many companies are starting to remove fluid tests and introduce accelerated underwriting tools. It is important to understand the selective features of these underwriting tools, beyond measuring the protective value using a traditional A/E analysis. For example, even if a new underwriting method can fully offset the mortality A/E impact from removing fluid tests, it may still have a secondary impact on mortality improvement trends, because it may be identifying a different portfolio of individuals compared to the traditional fluid test.

For our full COD analysis, which includes a deeper dive into the face amount and gender impact on COD distribution, please go to: *https://www.munichre.com/us-life/en/perspectives/mortality-studies/analyzing-ind-life-ins-mortality-trends-cause-of-death.html*

SOCIO-ECONOMIC STATUS

Another dimension that differentiates insurance population from general population is the SES. When analyzing U.S. population data for mortality trends, it is important to account for the fact that insurance population is heavily skewed towards the more affluent population.

The challenge with segmenting mortality experience by SES is that key indicators such as income, net worth, and education attainment are not always available or accurate. In this paper, we will discuss two approximation methods.

The first method is to segment the population mortality data by county using county-level income. Under this approach, we ranked all U.S. counties by historical per-capita income, and analyzed mortality data from CDC WONDER by percentile of county-level income. The main limitation of this approach is that counties do not have a uniform distribution of income within their population; in fact, some counties in the U.S. could have extreme wealth disparity that leads to 20–30 years[2] of life expectancy difference. Categorizing by county-level income can misclassify lives that have a different income profile than the rest of the county.

The second method is to proxy SES using education attainment levels. Education has been included as an element of death certificates in most U.S. states since 1989. Additionally, the total population estimates (i.e., the exposure) by education attainment can be retrieved from the U.S. Census Bureau. Combining these two sources allows us to conduct mortality studies for the U.S. population by different education attainment levels.

Using these methods, we segmented population data into four subgroups:

- By county income: Top 15 percent vs. bottom 15 percent
- By education: Bachelor's or higher (BA+) vs. less than Bachelor's (BA-).

We compared the mortality rate of the four population segments in Charts 2 and 3 on page 6.

Chart 2
Male 2013–2017 q'x as a Percentage of all CDC Male Population

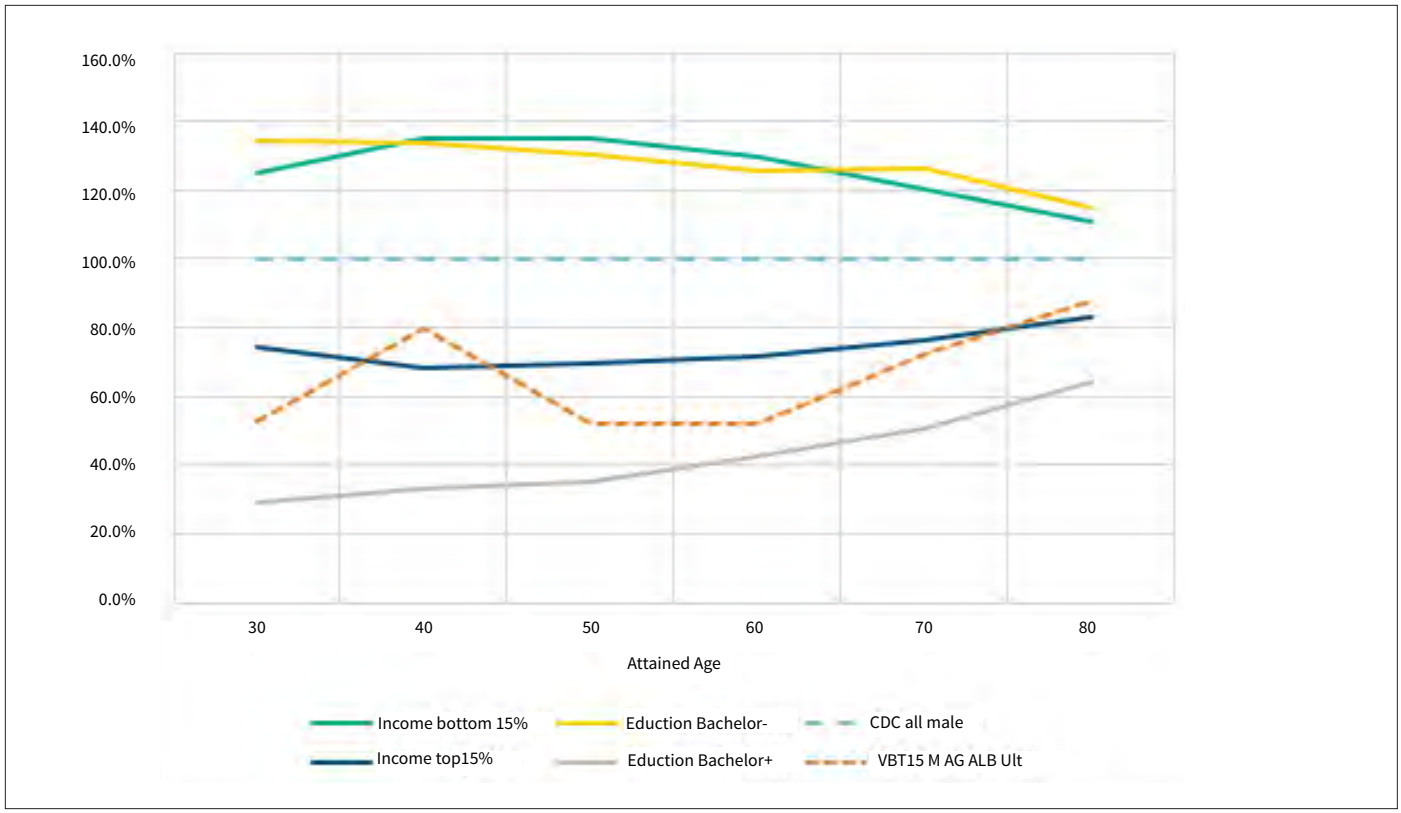
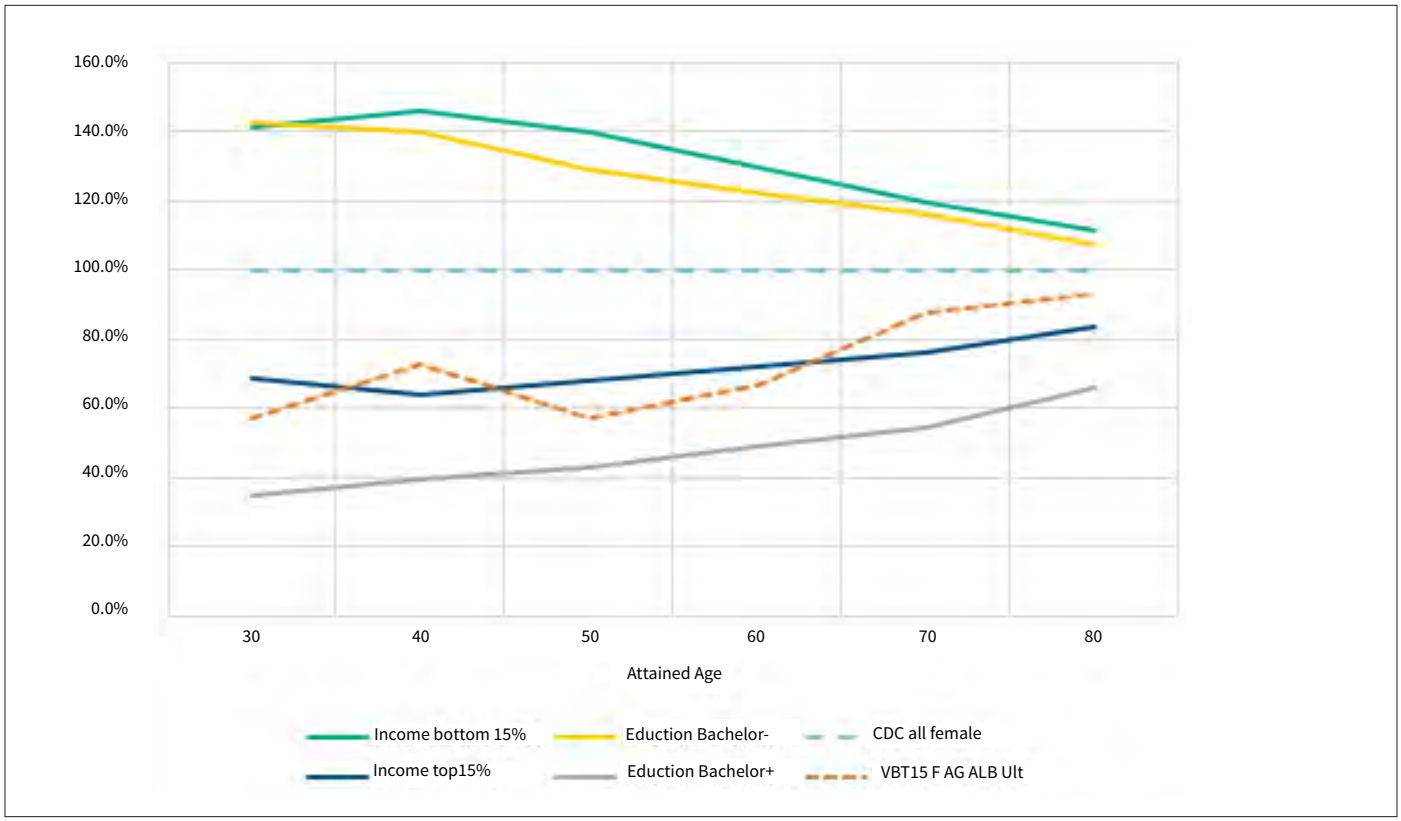


Chart 3
Female 2013–2017 q'x as a Percentage of all CDC Female Population



The following observations were made:

- **Both county income and education attainment can distinctly segment U.S. population's mortality.**
- **The mortality gap is wider at younger ages** with one exception that under the county income approach, the gap appears more narrow at age 30 than age 40.
- **Education attainment provides a stronger segmentation than county income.**
- **Higher SES is a good proxy for life insurance population.** For most attained ages between 30–70, the insured population's mortality (proxied by VBT15) is between or close to the "Top 15 Percent Income" and "Education BA+" mortality.

In charts 4, 5 and 6 (pg. 8), we then compared the observed MI rates for each subgroup, over the short-term (2011–2016) and long-term (2000–2016).

Chart 4
M&F Average MI By County Income

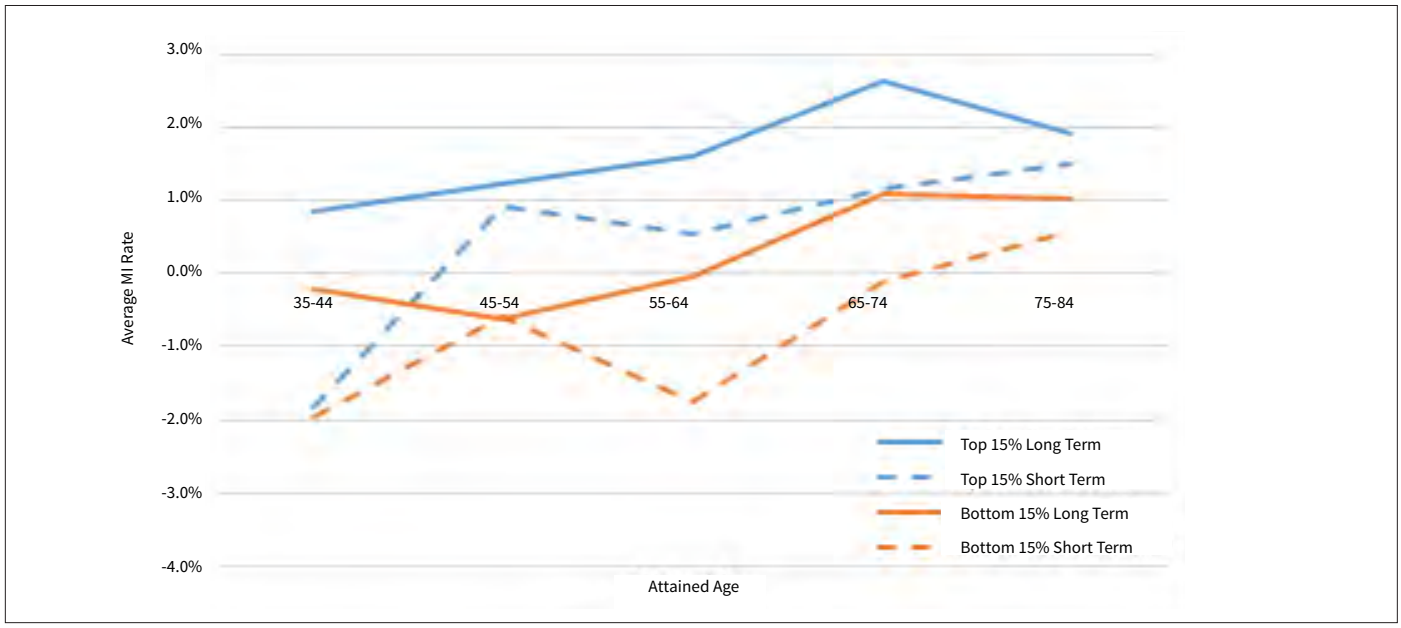


Chart 5
Male Average MI By Education

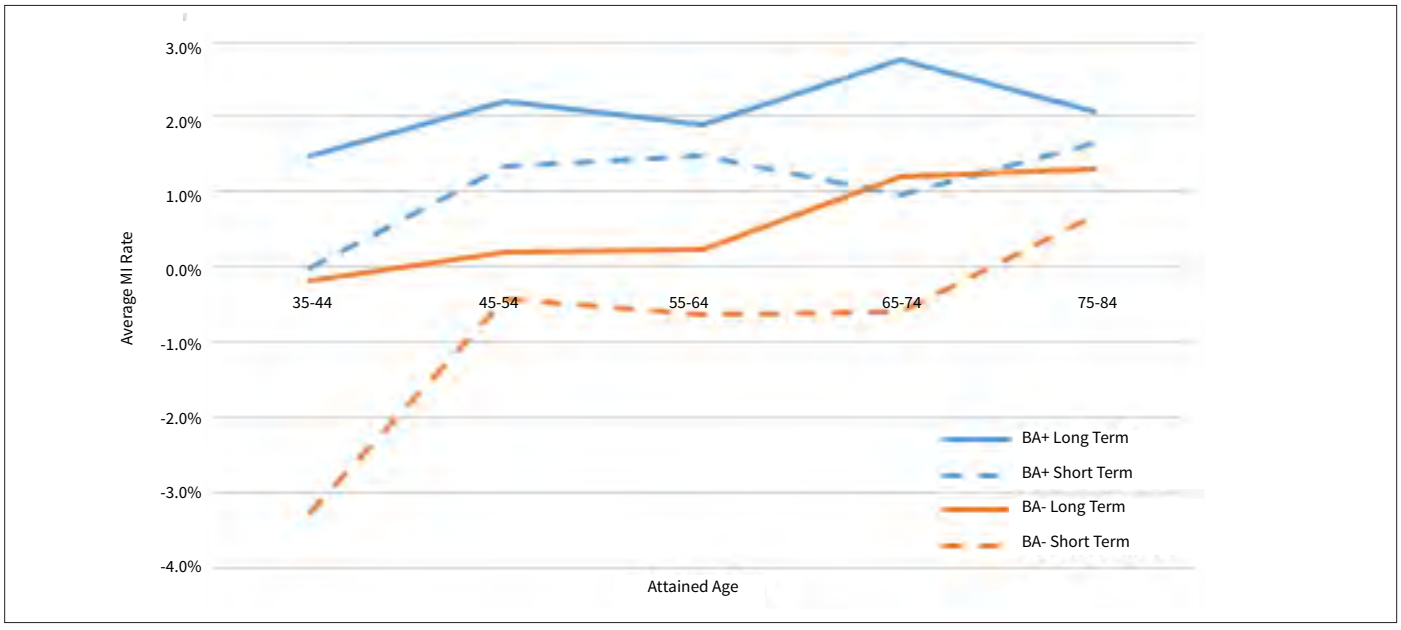
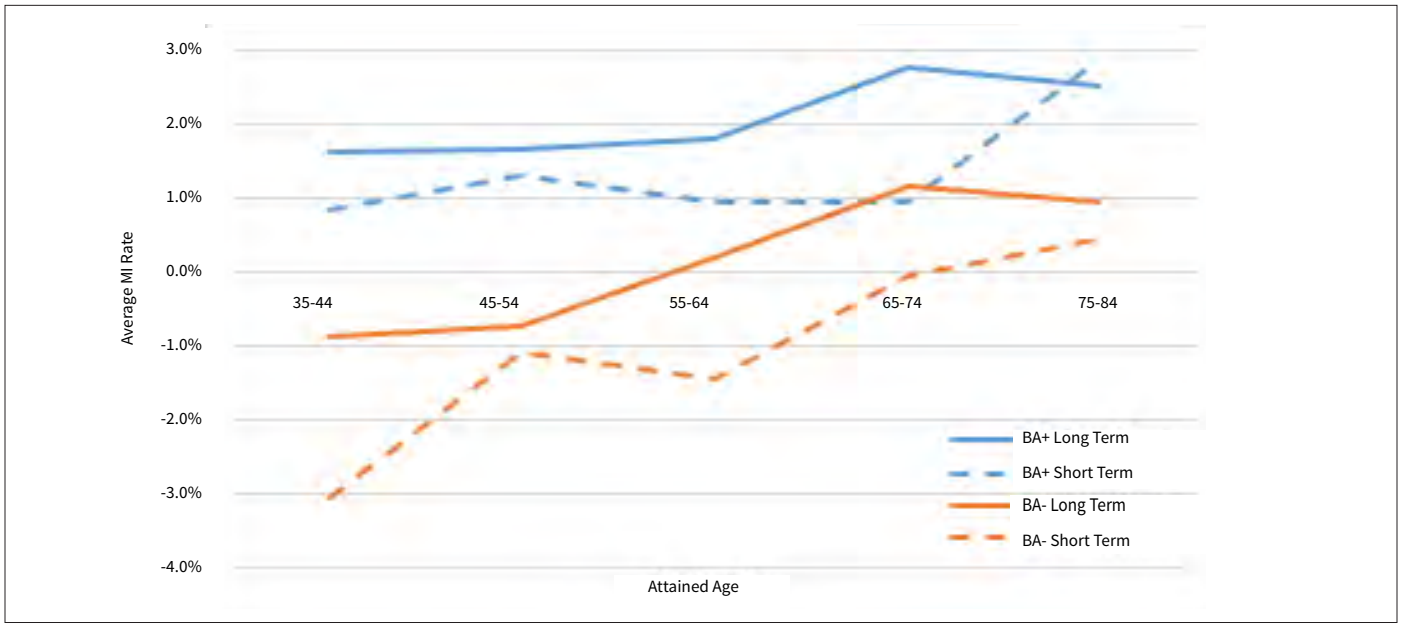


Chart 6
Female Average MI By Education



The following observations were made:

- **Mortality improvement is faster for higher SESs**, over both long-term and short-term.
- **Difference in mortality improvement between SESs is across all ages.**
- **Bachelor's or higher educated population has similar or better mortality improvement than those from top 15 percent income counties**, this is reasonable since we previously concluded that BA+ provides a stronger segmentation than Top 15 percent.
- **MI has slowed down in the short term, but materially positive MI can still be observed for the higher SESs.**

For more details on our mortality analysis by SES, please refer to the full whitepaper at the link below: *https://www.munichre.com/us-life/en/perspectives/mortality-studies/analyzing-individual-life-insurance-mortality-trends-socioeconomic-status-impact-report.html*

KEY TAKEAWAYS

Over the past few years, speed of mortality improvement has slowed amongst the general population. When actuaries develop long-term MI assumptions for life insurance using the population data, it is important to understand the difference between the general population and the population of an insurance portfolio. The two methods demonstrated in this article provide ways for actuaries to take these differences into consideration. ■

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2 Large Life Expectancy Gaps in U.S. Cities Linked to Racial & Ethnic Segregation by Neighborhood, https://www.cityhealthdashboard.com/story/1092

Reinsurance Underwriting:
Delineating the Core Differences of Various Lines of Business

By Michael Adams

As described by a colleague teaching new interns about the nature of our business at a reinsurance company: "If any underwriter here tells you they're not gambling, they're lying through their teeth."

Reinsurers are, by the definition of their industry function, gambling. Risk exists in every insurance transaction and insurance companies must draw a line in the sand between their tolerated risk-level and that which they must cede in order to maintain order on their balance sheet. That ceded risk can be highly volatile and someone, somewhere, must make a judgment call about how it will turn out, put a price on it, and place their balance sheet at risk.

But proper assessment of different lines of business requires different skill sets to produce the optimal outcome of profitability. In order to delineate these differences, we can attempt to plot various lines of business on two correlated, but unmarried, axes: quantifiability and volatility.

QUANTIFIABILITY

The high end of this spectrum is dominated by actuaries. Risks at the top of this spectrum are highly measurable, and often driven primarily by modeling with sold rates deviating only minimally from those determined by the model. Data is readily available that can be used to hone in on appropriate parameters. Resources are poured into analytics as profitability is directly correlated to robustness of modeling. This is evident by the high ratio of actuaries at reinsurers that specialize in life and health reinsurance transactions, which are relatively high on the quantifiability scale.

In contrast, major property and casualty writers often opt to more heavily utilize talent of the MBA-type. As these risks can be less quantifiable, confidence in profitability relies more on relationships and sage assessment of qualitative risks. Reinsurers prosper when their underwriters can produce business, negotiate well on behalf of the company, and draw on nontechnical indicators of good business.

VOLATILITY

More intuitive than the quantifiability scale, the volatility scale ranges from low to high. On the very low end, we see quota share deals on first-dollar insurance business. Under these arrangements, the reinsurer is on the hook for some percentage of all claims paid, while receiving their proportional share of premiums, net of an allowance for the direct writer's expenses. Volatility is about as low as it gets in the industry, matching the risk profile of the underlying insurance block of business. When the block performs well, the reinsurer sees profits. If all goes as planned the reinsurer will earn low, but steady profits year over

year. Commonly these transactions are driven more by capital needs than risk management needs.

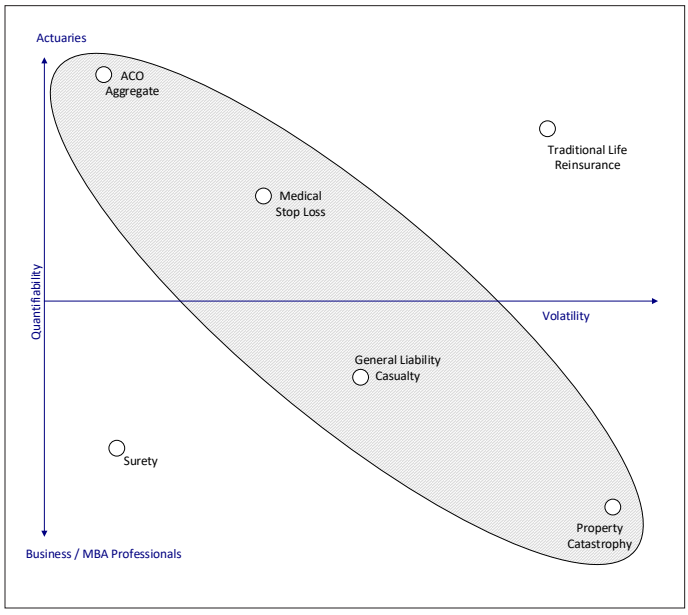
Higher volatility transactions typically deal with catastrophe claims: those only supposed to occur once every 10, 20 or 100 years. As opposed to the low and steady profits that are expected in a working layer as described previously, these transactions are designed to yield a moderate profit to the reinsurer in years where a claim does not occur, then dig deep into the red when it does, drawing from the reinsurer's vast capital base.

As it can take several years—or even decades—to determine if a reinsurer's premium rate for these high-volatility covers is adequate, market and capital-availability forces come into play much more heavily in these marketplaces. Rates and resulting profitability are much more sensitive to hard and soft markets, describing temporary market climates where insurance capital is scarce and abundant, respectively. It's not uncommon for management to issue directives to their front-line underwriters to "hold firm" with their rates and not cave to competitive pressure in an attempt to effect a hard market. Logically, if only one or a few market participants exercise this discipline, it can result in reduced market share for those participants.

As previously noted, there is a correlation between quantifiability and volatility. Lower volatility risks tend to be more quantifiable and vice versa. Thus, we see reinsurance lines of business tending to lie somewhere in the shaded range of Figure 1.

We'll walk through six examples and discuss where they lie on the two spectrums and why, based on their unique characteristics.

Figure 1
Correlation of Quantifiability and Volatility



Note that while the tendency is for a given line of business to fall in the shaded area, there are notable outliers due to the unique qualities of the underlying business or reinsurance coverage structure.

ACCOUNTABLE CARE ORGANIZATION (ACO) AGGREGATE COVERS

Quantifiability: High
Volatility: Low

Plotted at the top-left of the chart we have ACO aggregate covers. With the recent introduction of ACOs to the medical insurance industry and their ability to take two-sided risk, a need has arisen for reinsurance coverage that limits the potential losses that an ACO could sustain should the cost of care for their attributed membership increase.

Prominent underwriting methodology for this line of business involves a deep analysis into the performance and operational readiness of the ACO to (1) determine the adequacy of the benchmark expenditures with respect to the expected medical costs and utilization, and (2) ensuring that the organization has the right competencies to be successful under a risk-bearing contact, which includes governance structure, investment in data analytics, and strategic partnerships. Understanding the inherent volatility of these expected claims and gaps in competencies is paramount as minor miscalculations in claims or missing competencies can translate to large losses for the ACO and ultimately the reinsurer.

An actuary is best-suited for this job as they are the de facto authority on measuring claims volatility, assessing cost containment measures, and projecting insurance performance. This relationship is symbiotic in that the ACO not only gains downside protection, but also actuarial insight into the performance of their organization in containing costs.

MEDICAL STOP LOSS

Quantifiability: Moderate to high
Volatility: Low to moderate

Sitting farther down the spectrum is medical stop loss. This line of reinsurance cover pays when an exceptionally large health insurance claim occurs. A notoriously expensive medical claim is that for a hemophiliac, which can climb as high as $5–10M throughout the year. A medical stop loss cover may cover claims, for example, for any covered member that exceeds $1M in claims in a treaty year. While this is unlikely to occur on a case-by-case basis, the volume of health care claims and ubiquity of health coverage provides for the risk to be fairly quantifiable. Typically, a ceding insurer will have at least a few of these high claims in their experience. If not, there are reliable industry benchmark-

ing models based on broader datasets upon which underwriters can rely.

The major risk component reinsured here is process risk, as opposed to parameter risk. While some predictable claims occur, such as those for hemophilia, others are unforeseeable and seemingly random, like premature births. For the latter type, prevalence of large claims seems to follow a random selection process from a cost curve probability density function. As these cost curve PDFs are widely available in the market from vendors and re/insurers' own internal records, and a ceding insurer will typically have some of these high claims in their experience, there is opportunity for actuaries to measure expected costs with a reasonable degree of certainty over the course of a few treaty years.

GENERAL LIABILITY CASUALTY

Quantifiability: Low to moderate
Volatility: Moderate to high

There is a great degree of variability within the casualty line of business, and uncertainty emerges partly due to the wide variety of potential underlying risks. In contrast to those for the medical stop-loss line of business, underlying risks from program to program are often unrelated, ranging from high-end automobile accidents, to faulty breast implants, to class-action lawsuits. As a result, pertinent and reliable experience for a given type of risk is not so ubiquitous, which limits the actuary's effectiveness in assessing and projecting claims costs.

Needed expertise ranges by type of product and the nuances of each program. It would be unrealistic for a reinsurer to have the full extent of all of this expertise available on-hand, so casualty underwriters are often a jack of all trades, reasonably understanding the various associated risks and making a gamble. These gambles, also called "picks," can be substantiated or unsubstantiated by the picks from reinsurers competing to be on the same program.

This market interplay lends to decision-making based on competitive and market conditions. The underwriter can use an actuarially-derived pick as a grounding, while understanding that said pick is moderately uncertain, and inferring more information from how the rest of the market responds.

PROPERTY CATASTROPHE

Quantifiability: Low
Volatility: High

Perhaps the pinnacle of volatility in mainstream reinsurance, property catastrophe covers are on the bottom-right of the chart. These covers pay out to the insurer when an extraordinary event occurs that impacts a property writer's book in a substantial way. A straight-forward example is if a hurricane hits Florida and inflicts billions of dollars in damage to residential and commercial properties. If the towers of risk held by reinsurers is breached, a syndicate of reinsurers will pay out at their respective shares.

Ultimately, the same competitive and market pressures prevail as various reinsurers compete for share of these risks, necessitating the need in an underwriter for good relationships with brokers and strong negotiation skills.

These losses have historically occurred about once every 10 years. There are vendors in the industry that use sophisticated methods to model the potential damages sustained by any given property insurer in the event of a catastrophe, but the frequency of these occurrences is heavily debated, especially in the light of global warming. Some reinsurers will have the mindset that frequency is increasing due to effects of climate change, while others dismiss it as pseudo-science, sometimes at the highest level within a reinsurance company. The possibility of a real increase in catastrophic events further muddies a reinsurer's ability to be confident in their picks.

Ultimately, the same competitive and market pressures prevail as various reinsurers compete for share of these risks, necessitating the need in an underwriter for good relationships with brokers and strong negotiation skills. Reinsurers will strategically opt out of programs that they feel confident are underpriced and try to capitalize on those they think are well-priced with a larger share of participation. They will make modest profits each year that they can avoid a major loss—but when one does occur, the underwriters will be glued to the TV watching their profit-tied bonuses diminish as events unfold.

TRADITIONAL LIFE REINSURANCE

Quantifiability: High
Volatility: High

As exception number one, long-term mortality covers fall outside of our shaded area because they are highly quantifiable with respect to data availability and are best-assessed by actuaries with a deep knowledge of life insurance pricing, but ultimately not without notable risks, particularly parameter risk. In the case of traditional life reinsurance, which can span 10, 20 or 30+ years, process risk diminishes and parameter risk is magnified as coverage duration increases. A model parameter that is off by a

small margin could cause a long stream of unexpected losses or gains.

Unlike in prior examples, profitability can sometimes resemble an upward or downward slope, as priced parameters deviate from actual and project into the future. This long-term gamble requires the scrutiny and projection prowess of actuaries but also some business analysis from MBAs and the like to assess a company's strategic initiatives and block management techniques.

SURETY

Quantifiability: Low
Volatility: Low

The underwriting of surety bonds is notably distinct from the aforementioned lines of business in that a significant share of the underlying risk is that of creditworthiness, although the ability to analyze and evaluate a contractor's ability to perform the bonded work is also very important. Traditional surety bonds are paid out if, for example, a contractor becomes insolvent and does not fulfill their obligation to a customer.

Simplistically, underwriting entails assessment of the ceding company's ability to appropriately identify risky insureds, whether it be due to their less-than-stellar financial shape, perceived inability to execute the work they have taken on, or both. Fraud, in its manifold forms, is often a cause of surety loss as well, and is notoriously difficult to underwrite by nature.

With proper expertise and underwriting the volatility of the block should be relatively low, especially considering the reinsurer's ability to opt in and out of programs according to their assessment. Generally speaking, underwriters will seek not to bond contractors they do not believe will perform, or those with which they are not comfortable from the perspective of credit, character or capacity. Because of the unique ability in surety to recover losses by pulling from the insured's remaining capital, the target loss ratio is, in theory, 0 percent. ■

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