

GC Briefing

An update from the Life, Accident & Health Specialty Practice

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Push Pandemic out of Insurance Capital Markets Provide Necessary Depth

Life carriers struggle with the notion of hedging pandemic risk. The probability of an event occurring in any particular year is low. Even if an outbreak does occur, the process for estimating losses and determining reserves is unclear. Capital approaches do not consider probabilistic tail scenario risks. Quite simply, managing pandemic risk is an effort mired in doubt, though the potential for a devastating, multibillion dollar, worldwide outbreak is real. Traditional risk transfer tools have only limited utility in covering pandemic exposure. However, the depth and flexibility of capital markets may provide a robust alternative to traditional reinsurance.

Remote but Real

Exposure to pandemic mortality risk has been almost impossible for (re)insurers to manage. The likelihood of an insured loss is perpetually remote, but in the event of an outbreak, the losses could be tremendous. According to the RMS pandemic model, the chances of an outbreak for any one year are 1-in-30. Many scenarios entail early detection, effective vaccine production and low death rates, inherently mitigating the risk of insured losses. For a case similar to the 1957 influenza outbreak, RMS estimates a likelihood of 1-in-40. A pandemic of 1918's magnitude, with millions of deaths estimated, has a probability of 1-in-475.

***Risk of an outbreak in
any given year: 1-in-30***

***Risk of a 1957-caliber
outbreak: 1-in-40***

***Risk of a 1918-caliber
outbreak: 1-in-475***

Source: RMS pandemic model

Medical advances, many believe, have reduced the likelihood of a pandemic, but producing estimates is an exercise in uncertainty. Factors such as lethality, age, transmissibility, origin (geographically) and vaccine effectiveness usually sit outside the typical life insurance frame of reference. Complicating matters further, reference events are rare, impeding the utility of experience-based actuarial forecasting.

Statutes and regulatory agencies do not give capital credit for substantial pandemic cover, making effective risk management seem like a penalty for honesty. It would seem as though there is no short term benefit for effective risk management. But, real exposure is not limited to regulations. Carriers serious about solvency and protecting the interests of policyholders and shareholders should consider the impact of even a single pandemic incident.

To downplay the need for sufficient cover, carriers often believe that simply having more capital than peers is sufficient and that not being the first insurer to have its capital drained is sufficient protection. They reference “doomsday” scenarios that are not worth hedging. The reality, though, is considerably more nuanced. Three epidemics have occurred in the past century (in 1918, 1957 and 1968), and SARS was a near miss.

The management of pandemic risk has been hindered by the tools available. Traditional reinsurance is not equipped to cover the large potential losses that life carriers would face, making the cost of this form of risk transfer prohibitively high. Further, with reinsurance, the cedent remains exposed to the same risk it seeks to transfer through the credit exposure to a company (i.e., the covering reinsurer) with high concentrations in the original risk. Thus, an outbreak would still put the ceding carrier’s solvency in jeopardy. The only viable approach is to push the risk out of the (re)insurance market.

Extreme mortality bonds provide a way to secure pandemic cover without simply passing the risk to another (re)insurer. In 2007, USD59.7 trillion was traded in global capital markets, according to Private Equity Intelligence, Ltd. (Preqin). Risk-bearers could use extreme mortality bonds to tap into the extensive and risk-diverse capacity afforded by the investing public. There is still a role for reinsurers; they may bear part of the pandemic risk, with limited indemnity coverage and through the purchase of mortality catastrophe bonds from other (re)insurers – but they will not be required to assume more risk than they realistically can support. Capital markets provide the depth and liquidity to go beyond merely shuffling the risk between (re)insurers to make real pandemic risk management possible.

How Mortality Bonds Work

Extreme mortality bonds are a subset of the broader catastrophe bond (“cat bond”) asset class. Instead of being linked to catastrophe event triggers, though, the fundamental benchmark in a mortality bond is its “mortality index.” The mortality index may be based on an existing reference point, such as U.S. Centers for Disease Control (CDC) metrics, or carriers could opt for a custom mortality index using several data sources. Index data is weighted by age, sex and geography to create specific parameters for the cat bond to match the portfolio being protected. Using this method, the issuing carrier can reduce the basis risk between actual and index-driven modeled losses.

If the mortality index exceeds a certain rate (i.e., the attachment point), a payout occurs. The size of the payout depends on the value of the index, the attachment point and the exhaustion point (i.e., the mortality level at which the bond is fully paid). From the bond holder’s perspective, the attachment point is the maximum mortality rate at which the bond will not sustain a loss. Any mortality rate higher than the attachment point will cause a loss of bond principal. The exhaustion point is the mortality rate at which all principal will be lost.

***Risk-bearers
could use mortality
bonds to tap into the
USD59.7 trillion in
financial assets used
for investment in
tradable securities.***

$$R_n = (\text{Index}_{n+1} - \text{Attachment Level}) / (\text{Exhaustion Level} - \text{Attachment Level})$$

n: period of time (equals duration of the bond at issuance)

R_n: the amount by which principal will be reduced

Index_{n+1}: value of the underlying mortality index for the year in question (ending in the year n+1)

Attachment Level: mortality rate at which payments begin

Exhaustion Level: mortality rate at which principal is exhausted

Using this index-based approach to ascertaining attachment and exhaustion points, mortality bond sponsors must be prepared for the challenges of basis risk. A mismatch in coverage could occur if actual losses are greater than those anticipated by the index. To help address this issue, some industry players are working to develop new indices and reference tables with underlying populations more like insurance company clients. However, all transactions to date have been based on broad, country-specific data sources, such as the CDC mortality results for the United States.

Transparency is crucial for the longevity of the asset class if an insurable event occurs. Investors must understand the risks assumed and the events that could cause losses of interest and principal. The four near-outbreaks of the past century provide reminders, and emerging diseases pose significant threats of excess mortality and morbidity to portfolios of insureds. Pandemic risk usually comes in the early stages of a disease, when medical responses are limited. The greatest threats to life and health insurance are from diseases that have high prevalence in the young and middle-aged adult population. As a contemporary example, a virulent and currently untreatable strain of adenovirus 14 has recently emerged in the United States and bears ongoing scrutiny.

To ensure investors understand the risks being covered and the composition of the underlying mortality index, bond issuance and marketing documents contain these details as well as actuarial analysis and sensitivity tests around pandemic scenarios.

Short Track Record, but Potential Abounds

Mortality bonds may be increasing in popularity, but the market is still in its infancy. Six mortality bonds in 20 tranches have been issued over the past four and a half years. Currently, there is USD1.8 billion in total limits outstanding. One mortality bond (Vita III Ltd.) was sponsored in 2007, generating more than USD500 million of risk capital. While it is clear that the mortality bond market is still young, it does show considerable promise.

Issuer	Sponsor	Risk Principal (US\$ MM) ⁽¹⁾	Inception	Expected Maturity	Term (Years)	Rating (S&P)	Spread (in bps) ⁽²⁾	Expected Loss (in bps)	Wrapper
Un-wrapped Tranches									
Osiris B2	AXA	64	9-Nov-06	15-Jan-10	3.18	A-	120	7.3	
Osiris C	AXA	150	9-Nov-06	15-Jan-10	3.18	BBB	285	17.8	
Osiris D	AXA	100	9-Nov-06	15-Jan-10	3.18	BB+	500	37.4	
Tartan Class B	Scottish Re	80	4-May-06	7-Jan-09	2.68	BB+	300	18.0	
Vita II Class B	Swiss Re	62	13-Apr-05	1-Jan-10	4.72	A	90	0.7	
Vita II Class C	Swiss Re	200	13-Apr-05	1-Jan-10	4.72	A-	140	4.0	
Vita II Class D	Swiss Re	100	13-Apr-05	1-Jan-10	4.72	BBB	190	14.0	
Vita III Class A-VII	Swiss Re	129	11-Jan-07	1-Jan-12	4.97	AA-	80	3.1	
Vita III Class B-I	Swiss Re	90	27-Dec-06	1-Jan-11	4.01	A	110	3.9	
Vita III Class B-II	Swiss Re	50	27-Dec-06	1-Jan-12	5.01	A	112	3.7	
Vita III Class B-III	Swiss Re	39	27-Dec-06	1-Jan-11	4.01	A	110	3.9	
Nathan Re	Munich Re	100	19-Feb-08	15-Jan-13	4.91	BBB+	135	4.7	
Wrapped Tranches									
Osiris B1	AXA	128	9-Nov-06	15-Jan-10	3.18	AAA	20	7.3	CIFG wrapped
Tartan Class A	Scottish Re	75	4-May-06	7-Jan-09	2.68	AAA	19	5.0	FGIC wrapped
Vita III Class A-IV	Swiss Re	100	11-Jan-07	1-Jan-11	3.97	AAA	21	3.2	MBIA wrapped
Vita III Class A-V	Swiss Re	100	11-Jan-07	1-Jan-12	4.97	AAA	20	3.1	FSA wrapped
Vita III Class A-VI	Swiss Re	71	11-Jan-07	1-Jan-11	3.97	AAA	21	3.2	CIFG wrapped
Vita III Class B-V	Swiss Re	50	11-Jan-07	1-Jan-12	4.97	AAA	21	3.7	FSA wrapped
Vita III Class B-VI	Swiss Re	71	11-Jan-07	1-Jan-11	3.97	AAA	22	3.9	CIFG wrapped

Total Outstanding 1,660 -->as of 06/06/2008

Notes

(1) Transactions issued in non-USD are converted as of the prevailing exchange rate on their respective inception date

(2) Spread over benchmark rate (typically three month US LIBOR or, for Euro-denominated transactions, Euribor)

Source: Guy Carpenter & Company, LLC

Proponents of mortality bonds – and the broader class of insurance-linked securities (ILS) – have held that these instruments are non-cyclical with the broader market. After all, their risk is driven by mortality rates rather than interest rates and other economic factors. This position may be correct from a triggering perspective, but 2007 showed that a turn in credit markets can have ancillary effects on mortality bonds.

The principal concern surrounding mortality bonds, though, is that they have not been tested. Thankfully, no pandemic has occurred to date that would have triggered a payout from an extreme mortality bond, so a pandemic-related payout has yet to occur. Even as investors and issuers become more comfortable with these instruments, the entire process will contain a certain amount of doubt. A track record without a loss history is necessarily incomplete. Nevertheless, the bonds are closely related both in structure and utility to catastrophe bonds, which are developing a performance history.

Aside from the absence of a triggering event in the modern era, the concerns associated with mortality bonds are manageable. Issuers can mitigate basis risk through careful index development and thorough modeling. We expect novelty premiums to shrink as the market matures. Even the lack of a loss history is likely to be tolerated by investors. Thus, there is at last an efficient way to transfer extreme mortality risk.

Conclusion

There is nothing easy about hedging pandemic risk. The likelihood of extremely high insured losses from a disease outbreak is remote, and transferring risk provides little regulatory or rating agency benefit. But, effective risk management for life carriers requires a solution. Extreme mortality bonds offer a way to move pandemic risk out of the reinsurance industry. After all, traditional reinsurance provides little protection, as the carrier remains exposed even after securing cover. Capital markets are sufficiently large to absorb and distribute pandemic risk effectively, insulating a life carrier from threats to solvency and financial performance.

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