Actuary of the Future

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COVID-19: Actuarial Risk Management Approach to the Airline Industry

By Justin Serebro

The recent coronavirus pandemic has caused a surge in stock market volatility. Treasury yields are at some of the lowest levels ever, and in one month we have seen the U.S. government spend trillions of dollars to try to keep the U.S. economy afloat. Further, many states have imposed stay-at-home policies, which discourage travel. This has resulted in massive revenue losses to the airline industry. As a result, airlines have been considering massive layoffs. This article suggests that applying economic capital techniques used by actuaries could help mitigate the risk of insolvency that some airlines may now face due to COVID-19. To illustrate this point, I refer to how actuaries use economic capital to manage risk exposures created by insurance products and suggest how this technique could also be used in the airline industry to manage risk.

MODELING CAPITAL

The idea behind capital is to have enough assets to pay for your liabilities. When determining required capital, a company should take into account applicable regulation as well as apply a principles-based approach to assess future scenarios that could be detrimental to the business. Sensitivity testing, in combination with expert judgment, can be used to determine the risk drivers that should be focused on in the scenarios. Once risk drivers are determined, the approaches and techniques used to model the risk drivers should be made with consideration to industry practices and generally accepted statistical, economic, and mathematical theory.

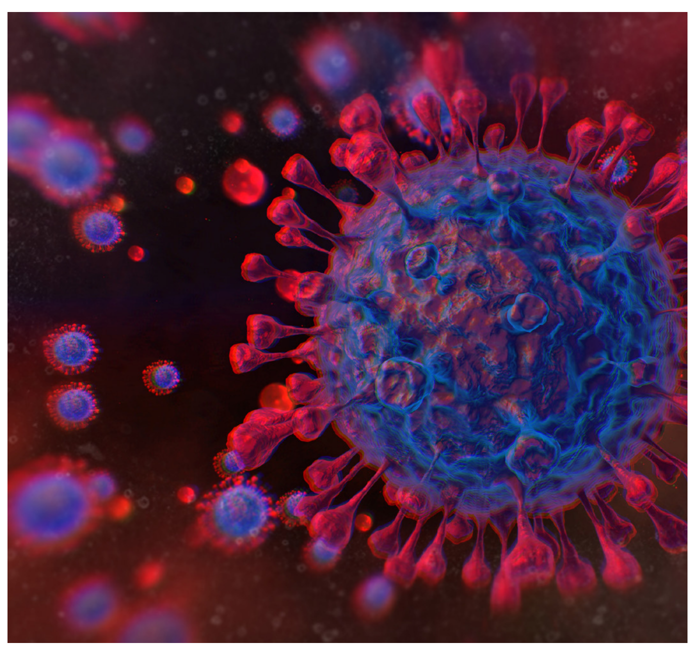
The particular branch of capital that would be most relevant in the current pandemic scenario is economic capital. Economic capital focuses on extreme events. Essentially, a company projects its assets and liabilities over a defined time horizon to determine the amount of assets needed to meet its projected liability cash flows with a specified level of confidence.

ACTUARIES IN INSURANCE

Actuaries working for insurance companies consider different risks based on the insurance products that their insurer sells. Depending on the insurance product, certain risks will be more or less material than others. For instance, a term life policy is more exposed to mortality risk than equity market risk, since the product pays off when a policyholder dies and the amount of death benefit paid does not depend on equity market movements. Actuaries quantifying economic capital for term life products would certainly want to include scenarios involving a catastrophic mortality scenario wherein excess mortality reaches or exceeds historical data.

OVERVIEW OF THE AIRLINE INDUSTRY

Airlines face the risk that there will not be enough ticket sales revenue to make adequate profit. They have fixed and variable expenses as well as other liabilities that they need to meet by receiving premiums from customers booking flights. Airlines are able to control the supply of flights and services. They can also adjust prices of flights. However, in the case of the COVID-19 pandemic, airlines cannot fill planes because of cancellations and a lack of demand for travel resulting from fear as well as travel



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restrictions. COVID-19 has been decreasing airlines' revenue to the point that some airlines may be considering massive layoffs to avoid insolvency.

APPLYING ECONOMIC CAPITAL TO AIRLINES

Relying on their experience managing risk for an insurance company, an actuary working for an airline might say, "What if there were a shock to demand? How much capital should we hold to be confident that we can meet our liabilities if flights are at X percent capacity for Y number of weeks?" There is no right answer for the values of X and Y. The choice for these variables depends on the company's risk appetite. Airlines can calibrate X and Y based on historical extreme cases (following 9/11, for example) and/or expert judgment. This kind of analysis is economic capital. Economic capital allows the airline to assess whether it has enough assets to pay for its liabilities. This could potentially save the jobs of hundreds of thousands of employees as well as provide other stakeholders confidence that the airline can survive a crisis like COVID-19.

CONCLUSION

The key goals of insurers and airlines are similar. They both want to maximize profit within their own risk tolerance. Currently, economic capital is a tool being used mainly by insurers and banks. However, it could also be used by airlines to help quantify the risk exposure in extreme scenarios like the current COVID-19 pandemic. One day, perhaps common risk management techniques such as economic capital could be used in other industries to manage risk exposures. ■

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