NCCI Research
Applied Research

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If you have followed NCCI's workers compensation research over the years, you have read about key issues such as the aging of the workforce, the impact of the recession on temporary total benefit duration, and the effectiveness of workers compensation fee schedules. You may know that NCCI offers its research papers free of charge on ncci.com for everyone to view.

What you may not know is that most of NCCI's research effort goes toward Applied Research. This research focuses on improvements in NCCI's class ratemaking, experience rating, and legislative reform pricing—all of which directly support our core mission of fostering a healthy workers compensation system. While these endeavors are well known in the actuarial community, they are less known to other segments of the industry. With that in mind, we thought we would share some of the improvements NCCI has implemented in the last 10 to 15 years.

Extreme Events

Twenty-five years ago, the insurance industry underappreciated the potential impact of extreme events. The property casualty industry thought it understood hurricanes until Hurricane Andrew in 1992. While the industry demonstrated an understanding of earthquake risk in workers compensation, the events of September 11 underscored how much more research was needed to understand the potentially catastrophic terrorism exposures facing our industry.

NCCI initially filed a provision for terrorism losses in early 2002. However, as the provision was based primarily on judgment and not science, we were unsuccessful in getting regulatory approval. Given the importance of the issue, NCCI partnered with leading catastrophe modeling firms to develop terrorism provisions based on newly created models for workers compensation insurance. NCCI made a second filing, based on these models, which was approved in all jurisdictions in 2003. But we did not stop there. In 2004, we filed a provision for industrial mega-accidents in all jurisdictions and earthquakes in those with significant exposure.

One of the features of extreme events is that decades or even centuries can go by without one in a given state. This is also true of very large individual losses—any given five-year period may be free of such claims. It is usually easy to temper the impact when they occur—but what about rate adequacy when the experience is free of large claims? NCCI converted its ratemaking to a limited loss basis, ensuring that a large claim or two would not unduly distort the overall rate level indication. More importantly, we built in a long-term provision for these large losses so that the absence of such occurrences in any individual year would not affect rate adequacy.

Initially this provision was built into the general loss costs statewide. NCCI's large loss research

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continued—by expanding the number of hazard groups (which group together risks based on large loss potential) from four to seven in 2007. This enabled us to more effectively incorporate the potential of large losses at the class loss costs level. Additional research resulted in major changes to the methodology for determining excess loss factors. This methodology further enhanced the accuracy of class loss costs and was implemented in late 2014.

The Continuing Quest for Improved Loss Costs

While part of NCCI's mission is to maintain adequate loss costs overall, another goal is to have loss costs that reflect the unique exposures that vary by job classification. At the same time that we were reflecting the differences in large loss potential by class, we were busy researching other key distinctions between classes.

One of the main developments was a reevaluation of which types of claims tend to develop adversely and which types of claims resolved as expected by the claim adjuster. Adverse development on losses is one of the more challenging aspects of maintaining loss cost adequacy. We know that on top of claim adjuster estimates of losses, an additional loss provision is needed (called IBNR for Incurred but Not Reported) to provide a complete evaluation of a claim's overall value.

Previously, NCCI added more IBNR to large claims than to small claims (relative to the claim adjuster's estimate). However, our research showed that the IBNR need was not the same for all claims of a given size. Acute injuries, such as broken limbs, tended to resolve as the claim adjuster expected, while back claims often saw a series of reserve increases by the adjuster over time. While these findings may not be surprising, the implications on loss estimates by class were.

In 2009, by extending this research to all types of injuries, we were able to classify them into those claims that were likely to adversely develop and those that were not. Surprisingly enough, contractors had severe claims but many of them were not likely to develop adversely. On the other hand, clerical risks tended to have less severe claims overall but were more dominated by back injuries. So a larger IBNR factor was needed on clerical risks than on contractor risks.

Generally, this resulted in relatively lower estimates of ultimate losses on contractor claims and relatively higher estimates on clerical claims. Overall, loss costs were stable, as the lower IBNR for contractors was generally offset by a higher provision for certain other large losses. The reassessment of historical loss results by class gave insurance carriers more accurate information to determine how different segments of the workers compensation marketplace performed.

A discussion of equitable loss costs would be incomplete without discussing the Experience Rating Plan. NCCI's Experience Rating Plan is custom-tailored to our classification plan. Some classifications are broadly defined out of necessity—there just is not enough volume to warrant further subdividing the class to increase homogeneity. The Experience Rating Plan calibrates the manual premium to reflect the loss experience of individual risks. This is important in many ways—the most important of which is providing a safety incentive for all insureds and reflecting a risk's relative exposure within its class.

NCCI monitors the performance of the Experience Rating Plan regularly. For many years, the performance was excellent and no refinements were indicated. A few years ago, NCCI began observing that, while most risks were being assessed appropriately, the best risks were not getting enough of an experience rating credit. In addition, the worst risks were not getting enough of a debit. By making a modification to the experience rating formula in 2013 (technically known as increasing the split point), we increased the weight given to an individual risk's experience. We were able to improve the pricing equity among risks while maintaining an understandable and transparent Experience Rating Plan—two critical elements toward ensuring the safety incentive that the experience rating modification provides.

Addressing Emerging Medical Issues

One of the most distinctive features of workers compensation in this century, as compared to the late 20th century, is the dominance of medical costs. While medical costs were only 43% of total benefits in 1981, they were 58% in 2015. The key reforms of the 1990s were focused on indemnity costs. In the last decade or so, the focus has been on medical.

Last century, our data plans were appropriately focused on supporting our pricing of indemnity reforms. However, we had very little medical cost detail. It became apparent that a significant upgrade in our data collection would be needed to meet the new challenges. In partnership with NCCI affiliates, we established the Medical Data Call, and used it in legislative pricings starting in 2012. Now with more than 400 million records, it provides an incredibly rich database for pricing drug formularies, medical fee schedule changes, as well as some of our more important general research.

Current Areas of Focus

For large insureds, loss-sensitive plans, such as those used in retrospective rating, are common. These loss-sensitive plans usually have limits on the degree to which a large claim can impact the policy's premium, as well as a cap on the total premium that would be charged regardless of the magnitude of the overall aggregate loss. We knew there was an interaction between the per-claim limits and the aggregate loss limits (called the "overlap"). It is much more difficult to pierce an aggregate cap of $1M if each loss is limited to $25K. Due to the complex mathematics involved, an approximation has been used for many years. With recent advances in computing power, NCCI is now able to precisely quantify the interaction between per-claim and aggregate limits.

Beyond the complex mathematics, the sheer number of combinations was beyond 20th century technology. Even if every risk was only in a single state and a single hazard group, there would need to be more than 200 million values to cover them all—well beyond paper solutions. NCCI is currently developing a new tool that, in the coming years, will address these 200 million-plus combinations and also allow for multistate and multihazard group risks, all on-demand in real time. NCCI is very excited about this, as it will be a breakthrough both mathematically and in information delivery.

Another major applied research project underway is focused on enhancing the stability of class loss rates for small classes without any loss of accuracy. When the data is sparse, developing a prospective estimate of expected losses is a real challenge. In addition to traditional approaches, NCCI is looking at alternative techniques (such as cluster analysis) to gain insight into reducing the loss cost volatility of small classes.

Closing

This article addresses some of the major applied research efforts at NCCI in the last 10 to 15 years. Other topics, such as employer's liability, the cost of capital for workers compensation insurers, monitoring our estimates of legislative pricing, and many others have driven intensive research efforts.

If you would like to keep current with NCCI's ongoing research efforts, it's easy to receive updates through our regular Notifications, or you can check out our complete list of research under the **Industry Information** tab on **ncci.com**. For help getting started, contact us at 800-622-4123.

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