

Casualty Actuarial and Statistical (C) Task Force

Price Optimization White Paper

I. Introduction

1. Ratemaking is the process of establishing rates used in insurance or other risk transfer mechanisms. This process may involve a number of considerations, including estimates of future claims costs and expenses, profit and contingencies, marketing goals, competition, and legal restrictions. Actuaries have a key role in the ratemaking process and are generally responsible for determining the estimated costs of risk transfer. The advent of more sophisticated data mining tools and modeling techniques have allowed the use of more objective and detailed quantitative information about the judgmental aspects of the rate-setting process instead of reliance primarily on anecdotal evidence. The process of using sophisticated tools and models to quantify other business considerations such as marketing goals, profitability or policyholder retention is referred to as “price optimization” in this paper.
2. Making adjustments to actuarially indicated rates is not a new concept; it has often been described as “judgment.” Insurers often considered how close they could get to the indicated need for premium without negatively affecting policyholder retention and how a given rate would affect the insurer’s premium volume and expense ratio. Before the introduction of data-driven quantitative techniques, the answers to these questions were largely subjective. Historically, when judgment was applied, the changes were made on a broad level (e.g., an entire rating territory) and were often selections lower than indications.
3. In recent years, some insurer rating plans have begun to address risk at a more granular level. Insurers have started using big data, data mining of non-insurance databases of personal consumer information and advanced statistical modeling to select rates that differ from indicated rates at a very detailed or granular level through a process or technique called “price optimization.” Thus, adjustments to rates are significantly more formalized and mechanized. They can be made for many risk classifications and, ultimately, perhaps even by individual insureds.
4. Critics object to insurers’ use of price optimization. Price optimization can use a variety of non-insurance databases to gather personal consumer information and detailed information about competitors pricing to model consumer demand and predict the response of consumers to price changes. Some argue that price optimization has been developed to increase insurers’ profits by raising premiums on individuals who are less likely to shop around for a better price. It is asserted that many of these people are low-income consumers. Some argue that price optimization introduces a systematic component to rate setting unrelated to expected losses or expenses. The

Consumer Federation of America (CFA) has called price optimization unfairly discriminatory, claiming that it can result in drivers with the same risk profile being charged different rates.¹

5. While accepting some deviations from indicated rates and rating factors, regulators are concerned that use of sophisticated methods of price optimization could extend beyond acceptable levels of adjustment to cost-based pricing and could result in rates that vary unfairly by policyholder.
6. In late 2013, the Auto Insurance (C/D) Study Group (Study Group) began to study the use of price optimization in auto insurance. Because the topic of price optimization goes beyond auto insurance and requires a great deal of actuarial or statistical expertise, the Study Group asked the Casualty Actuarial and Statistical (C) Task Force (Task Force) to perform any additional research necessary on the use of price optimization, including studying regulatory implications, and respond to the Study Group with a report or white paper documenting the relevant issues.

II. Scope

7. In this paper, the Task Force provides background research on price optimization, identifies potential benefits and drawbacks of price optimization, and presents options for state regulatory responses. The Task Force is not expressing an opinion on the policy decisions made by each state concerning rating practices that may incorporate price optimization.
8. The primary focus of the paper is on personal lines. Some of the concepts and principles may have application to other lines of business.

III. Background: State Rating Law, Actuarial Principles and Definitions

9. The basis for all rate regulation is established by the state law—both statutory and case law. The statutory rate standards that rates not be excessive, inadequate or unfairly discriminatory are common to most state rating laws applicable to P/C insurance. These common statutory rate standards have traditionally been defined in terms of expected losses and expenses. Most casualty insurance rate laws also include a section that lists the considerations that are permitted in the establishment of rates.
10. Additionally, the actuarial profession utilizes ratemaking principles. The following are the four principles in the Casualty Actuarial Society's (CAS) Statement of Principles Regarding Property and Casualty Insurance Ratemaking:
 - a. Principle 1: A rate is an estimate of the expected value of future costs.
 - b. Principle 2: A rate provides for all costs associated with the transfer of risk.

1. Consumer Federation of America, 2014. "Insurance Commissioners Should Bar Industry Practice of Raising Rates on Customers Based on Shopping Habits," accessed at <http://consumerfed.org/news/766-insurance-commissioners-should-bar-industry-practice-of-raising-rates-on-customers-based-on-shopping-habits>.

- c. Principle 3: A rate provides for the costs associated with an individual risk transfer.
- d. Principle 4: A rate is reasonable and not excessive, inadequate or unfairly discriminatory if it is an actuarially sound estimate of the expected value of all future costs associated with an individual risk transfer.²

11. The following terms are used in this paper:

- a. “Actuarial judgment” is used in many of the actuarial methodologies in the rate-setting process (e.g., selection of loss development factors, trends, etc.). Actuarial Standard of Practice (ASOP) No. 1, *Introductory Actuarial Standard of Practice*, states that “the ASOPs frequently call upon actuaries to apply both training and experience to their professional assignments, recognizing that reasonable differences may arise when actuaries project the effect of uncertain events.”³ According to the CAS, “[i]nformed actuarial judgments can be used effectively in ratemaking.”⁴ Judgments are made throughout the ratemaking (as well as risk classification) process, including assumptions on the inputs as well as assessing the accuracy of the results. Price optimization does not replace actuarial judgment in ratemaking, and actuarial judgment remains a separate and distinct exercise that is fully consistent with and permitted by sound actuarial standards. Actuarial judgment is also used in other areas of the ratemaking and risk classification process such as loss development, trend, credibility and assumptions in class plan models.
- b. “Ratemaking” is “the process of establishing rates used in insurance or other risk transfer mechanisms. This process involves a number of considerations, including marketing goals, competition and legal restrictions, to the extent they affect the estimation of future costs associated with the transfer of risk.”⁵
- c. The “price” is defined as an actuarial estimate of all future costs associated with an individual risk transfer. The price is the result of management decisions after taking into account other considerations such as underwriting, marketing, competition, law and claims, in addition to the estimate of the rate.
- d. The “actuarial indication” is the best estimate of the cost to transfer risk from an individual to the insurer. It is determined by the data at hand and the analytical techniques used but might not always provide the best estimate of costs going forward. There can be a variety of reasons why the actuarial indication could have limitations, such as low volume of data/credibility, a problem with data quality or biases in the analytical technique(s) used. Additionally, there could be changes that are not fully reflected in the data, such as internal company changes or changes in the external environment.
- e. “Price elasticity of demand” (commonly known as just price elasticity) measures the rate of response of quantity demanded due to a price change. Price elasticity “is used to see how

2. Casualty Actuarial Society, 1988. *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*, accessed at www.casact.org/professionalism/standards/princip/sppcrate.pdf.

3. Actuarial Standards Board, 2013. *Actuarial Standard of Practice No. 1, Introductory Actuarial Standard of Practice*.

4. Casualty Actuarial Society, 1988. *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*, accessed at www.casact.org/professionalism/standards/princip/sppcrate.pdf.

5. Casualty Actuarial Society, 1988. *Statement of Principles Regarding Property and Casualty Insurance Ratemaking*.

sensitive the demand for a good is to a price change. The higher the price elasticity, the more sensitive consumers are to price changes. A very high price elasticity suggests that when the price of a good goes up, consumers will buy a great deal less of it, and when the price of that good goes down, consumers will buy a great deal more. A very low price elasticity implies just the opposite, that changes in price have little influence on demand.”⁶

- f. A “class plan” is a structure of elements used to determine the rate to be charged a specific risk. The elements include a set of rules, rating variables (e.g., classifications and sub-classifications), factors, discounts, surcharges and fees applied to a base rate that determines the rate to be charged a consumer to transfer risk to the insurer. Generally, a “class plan” is embodied in a document called a rating manual.⁷
- g. A “rating variable” can be defined in a narrow or broader sense. The narrow version used historically is that variables are only those explicitly stated in the insurer’s class plan. Price elasticity would not then be considered a rating variable as it is not an explicit element in a filed class plan. The broader use of the term is that any piece of quantified data that went into the selection of the filed class plan factors is a rating variable.

IV. Price Optimization Background

- 12. Price optimization is a complex process based on predictive modeling intended to assist insurance companies in setting prices. It is an additional component of the pricing process in which the insurer transitions from actuarial rates to final prices. According to Earnix,⁸ price optimization utilizes a variety of applied mathematical techniques (linear, nonlinear, integer programming) in the ratemaking process to analyze more granular data.
- 13. There are several different types of price optimization, and price optimization can be performed at different levels of aggregation. According to Towers Watson,⁹ there are three main types of optimization used in ratemaking:
 - a. Ratebook Optimization – using mathematical algorithms informed by cost and demand models to adjust factors in an existing structure.
 - b. Individual Price Optimization – a non-parametric rate engine that builds a price based on the cost and demand for the product.

6. Moffatt, M. Economics expert, Economics.about.com.

7. Paraphrased from the Casualty Actuarial Society’s [Foundations of Casualty Actuarial Science](#).

8. Earnix Ltd. provides integrated pricing and customer analytics software that allows financial services companies to predict customer risk and demand and its impact on business performance. Its software platform allows insurance companies to harness customer data and optimize business performance across auto, home, commercial and other product lines (www.bloomberg.com/research/stocks/private/snapshot.asp?privcapId=1745902).

9. Towers Watson & Company manages employee benefit programs; develops attraction, retention and reward strategies; advises pension plan sponsors on investment strategies; provides strategic and financial advice to insurance and financial services companies; and offers actuarial consulting (www.bloomberg.com/profiles/companies/TW:US-towers-watson-&-co).

- c. Hybrid Optimization – create a new rate factor based on the demand model that overlays the cost-based rate algorithm.¹⁰
14. With rate book optimization, the model can guide the adjustment of rating factors in the existing rating plan to achieve an insurer’s business goals. These models generally determine selections at the classification level to optimize the insurer’s program.
 15. With individual price optimization, prices are determined at the individual policy level based on cost and demand. The output is often on a nonparametric basis, generating prices that are often not related to an insurer’s rating plan. This type of price optimization is believed to be more common with retail or personal service companies in the U.S. and in insurance pricing in other countries.
 16. With hybrid optimization, an additional factor is added to an insurer’s existing rating plan to incorporate other aspects from a demand model such as expected retention, profitability, premium volume or expense. The new rating factor would be designed to modify the existing rating plan to achieve an insurer’s business goals; the rating factor may or may not be correlated with expected costs.
 17. Some distinguish between “constrained” versus “unconstrained” optimization. Generally, constrained optimization refers to an insurer setting maximum and minimum limits on the model’s output. For example, in price optimization, a price could be constrained by the current price and the fully loss-based indicated price.
 18. There is no single or widely accepted definition of price optimization. In economics, price optimization is “(f)inding an alternative with the most cost-effective or highest achievable performance under the given constraints, by maximizing desired factors and minimizing undesired ones.”¹¹
 19. Definitions or descriptions of price optimization as used in insurance, offered by various stakeholders, include the following:
 - a. The CAS¹² defines price optimization as “the supplementation of traditional actuarial loss cost models to include quantitative customer demand models for use in determining customer prices. The end result is a set of proposed adjustments to the cost models by customer segment for actuarial risk classes.”¹³
 - b. The American Academy of Actuaries (Academy) defines price optimization as “a sophisticated technique based on predictive modeling results and business objectives and

10. Guven, S., 2015. FCAS, MAAA, Towers Watson & Company. Presentation, Casualty Actuarial Society’s RPM Seminar.

11. BusinessDictionary.com, www.businessdictionary.com/definition/optimization.html#ixzz3VJDlmfkl.

12. Casualty Actuarial Society Price Optimization Working Party of the Committee on Ratemaking.

13. Casualty Actuarial Society Committee on Ratemaking Price Optimization Working Party, 2014. “Price Optimization Overview.”

- constraints that are intended to assist insurance companies in setting prices. It is an additional component of the pricing process in which the business manager goes from cost-based rates to final prices by integrating expected costs with expected consumer demand behavior, subject to target business objective(s). The target business objective(s) may be to improve profit, increase volume, increase or maintain retention, or some combination thereof. These targeted business objectives represent the insurer's pricing strategy. Price optimization is a technique used to achieve that pricing strategy."
- c. Towers Watson defines price optimization as "a systematic process for suggesting adjustments to theoretical cost-based prices that better achieve business objectives, subject to known constraints."¹⁴
 - d. Earnix defines price optimization as a "systematic and statistical technique to help an insurer determine a rate plan that better fits the competitive environment, within actuarial and regulatory standards." Earnix adds that price optimization helps inform an insurer's judgment when setting rates by producing suggested competitive adjustments that balance and help the insurer achieve certain business goals, including loss ratios, customer retention and new business.¹⁵ Earnix describes price optimization as an application of prescriptive analytics as opposed to predictive analytics. Prescriptive analytics use predictive models and business goals as inputs to recommend decisions to achieve the optimal results.
 - e. The Ohio Department of Insurance (DOI) describes price optimization as varying premiums based upon factors that are unrelated to risk of loss in order to charge each insured the highest price that the market will bear.¹⁶
 - f. The Consumer Federation of America (CFA) describes price optimization as a practice where premiums are set based on the maximum amount a consumer is willing to pay, rather than the traditionally accepted methods of calculating premiums based on projected costs, such as claims, overhead and profit.¹⁷
20. Vendors, such as Towers Watson and Earnix, have developed commercially available software for carriers that perform price optimization. The use of the software varies from insurer to insurer, as each insurer specifies its own objectives and constraints. According to Towers Watson, its software provides: 1) an environment for a carrier to integrate its own models (e.g., loss cost models, expense assumptions, policyholder demand models) on customer data; and 2) mathematical algorithms that search the universe of rating structure parameters (i.e., relativities) to identify the set(s) that most closely meet the carrier's corporate objectives, subject to its constraints. Thus, each optimization

14. Towers Watson, Nov. 3, 2014. Letter to Joseph G. Murphy, accessed at

www.naic.org/documents/committees_c_d_auto_insurance_study_group_related_141103_towers_watson.pdf.

15. Earnix. "Introduction to Price Optimization," accessed at

www.naic.org/documents/committees_c_catf_related_price_optimization_docs_referred_in_memo_to_castf.pdf.

16. Ohio DOI, Bulletin 2015-01.

17. Consumer Federation of America, 2013. Letter to state insurance commissioners.

exercise is unique to the insurer and relies on the insurer's data, assumptions, input models, targets and constraints. Some insurers develop their own price optimization software.

21. In the traditional rate-setting process, actuaries determine expected losses, expenses and profit loading; adjustments may be made to reflect business considerations such as marketing/sales, underwriting and competitive conditions. Depending on the situation, regulators may permit insurers to reflect judgment and the competitive environment in rates. However, the rate filer (insurer) must ensure that filed rates are not excessive, inadequate or unfairly discriminatory. This table provides a high-level comparison of these approaches:

	<u>Traditional Approach</u>	<u>Price Optimization Approach</u>
General approach is ...	Base rate (loss cost) x adjustment factor	Base rate (loss cost) x adjustment factor
Adjustment factors (for auto insurance) are based on ...	Age, gender, territory, make and model year, and many other rating variables	Age, gender, territory, make and model year, and many other rating variables
Adjustment to rates based on market, regulatory and other considerations are based on ...	Qualitative assessment	Qualitative and quantitative assessments informed by price optimization
Basis for adjustments to rates is ...	Judgment	Automatic, systematic analysis (modeling)

22. Price optimization is based on quantitative modeling and can result in a departure from traditional cost-based ratemaking. It adds a quantitative step to the insurance ratemaking process by using additional, and sometimes more complex, models to quantify the effects of rate changes and improve profitability or other measures (e.g., policy counts). The key difference is that with price optimization: 1) market demand and customer behavior are quantified instead of being subjectively determined; and 2) the effect of the rate deviation from the loss cost on business metrics is mathematically measured. Both approaches make adjustments to the indicated risk classification factors, but with price optimization, these adjustments are made to rating factors with more clearly defined insurer goals.
23. Price optimization provides additional data analysis that can be used to make adjustments and forecast the outcome of a rate revision. Towers Watson says price optimization incorporates models that generate a much larger number of rate scenarios to run through the price assessment environment and to identify which scenarios better achieve business objectives.
24. One of the most controversial ways that insurers are using price optimization is to analyze patterns of policyholder demand behavior. According to the CAS, until recently, companies had limited ability to quantitatively reflect individual consumer demand in pricing. Price optimization relies on the concept of "price elasticity of demand of customers"—an economic measure to show response to

demand for goods or services in relationship to price changes. By measuring and using price elasticity of demand, an insurer can “optimize” prices and individual consumer rates to charge the greatest price without causing the consumer to shop for another insurer. It is this use of elasticity of demand that has led to criticisms that price optimization penalizes customers (or groups of customers) who are more likely to renew their policies or less likely to shop for other insurance.

25. Towers Watson notes that “elasticity of demand is a key ingredient” in the price optimization process. Towers Watson also notes that the input models in its optimization software include policyholder demand models, which “do not describe which customers shop more or less but rather how likely a customer is to renew a policy or accept an insurer’s quote.” Policyholder demand models, according to Towers Watson, are generally fit to recent, customer-level, historical data that contains information about the customer, as well as what purchase decision the customer made (e.g., did the customer renew – yes/no, did she or he accept this quote – yes/no).



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26. Price optimization has been used for years in other industries, including retail and travel. However, the use of model-driven price optimization in the insurance industry is relatively new. A 2013 Earnix survey of 78 major insurers found that 45% of large insurance companies (with gross written premiums over \$1 billion) in North America currently use some form of price optimization, with an additional 29% of all companies reporting they plan to do so in the future. State regulators report receipt of few rate filings specifically identifying the use of price optimization.

V. Identify Potential Benefits and Drawbacks of Price Optimization

27. Price optimization often affects the selected rates or rating factors rather than the indicated ones, and historically selections were often based, in part, on judgment. Therefore, regulators are challenged with reviewing an insurer’s selected rates or rating factors without, in certain cases, knowing how price optimization influenced the insurer’s selections. General guidelines some regulators may use to review rates include the relationship between the current, indicated and selected rates or factors, how far the selected rates or factors vary from the indications, or the relationship between factors for a class plan variable. Distilling the voluminous information connected with price optimization makes determining the extent and effect of a program much

18. Marin, A. and T. Bayley, 2010. “Price Optimization for New Business Profit and Growth,” accessed at <http://www.towerswatson.com/en/Insights/Newsletters/Global/Emphasis/2010/iEmphasisi-20101>.

more difficult for regulators. In addition, regulators must rely upon insurers to present accurate and complete information on indicated rates and the adjustments to arrive at selected rates. Regulators do not currently have the data necessary for an independent evaluation of most of the insurer modeling and calculations.

28. According to the CAS,¹⁹ price optimization may improve rate stability and lower an insurer's long-term cost for providing coverage and limit policyholder disruption. This may be viewed as indirectly favorable for consumers who do not want to shop for insurance on a regular basis. An alternative view is that price optimization should not be used to provide rate stability; actuarial credibility theory is intended to resolve data fluctuation and rate stability problems as part of the calculation of the actuarial rate change indication.²⁰
29. Consumer advocates assert that deviation from cost-based pricing through price optimization will disfavor those consumers with fewer market options, less market power and less propensity to shop around—in particular, low-income and minority consumers.²¹
30. Consumer advocates state that price optimization raises prices above the cost-based estimate of some policyholders who are known to be less likely to change insurers when faced with a price increase below a certain threshold (targeting loyal customers or policyholders who would not shop around in the face of an increase). Consumer groups have cited the Brookings Institution²² study to assert that low-income customers tend to shop around less frequently than relatively wealthy consumers, potentially a result of having fewer market options available. Some disagree with applicability of the study to insurance, stating that the study was based on shopping for major credit and borrowing purchases and not about insurance. Based on an Insurance Information Institute (III) poll, lower-income customers (under \$35,000 annual income) are more likely to shop for insurance than more affluent individuals (above \$100,000 annual income), who might shop less.²³
31. State insurance regulators are concerned with the shift from “loss-based ratemaking principles to principles that encompass subjective market driven ratemaking”²⁴ and question how price optimization “would not conflict with state rating laws that require rates not to be excessive, inadequate and unfairly discriminatory.”²⁵

19. Casualty Actuarial Society, 2014. Letter to the Casualty Actuarial and Statistical Task Force.

20. Miller, M.J., 2015. EPIC Consulting, LLC. April 6, 2015, letter to the Casualty Actuarial and Statistical (C) Task Force.

21. Comments of the Consumer Federation of America; Center for Economic Justice; Americans for Insurance Reform; United Policyholders; Center for Insurance Research; and Peter Kochenburger, NAIC Consumer Representative; on the March 24, 2015, Draft Casualty Actuarial and Statistical (C) Task Force Price Optimization White Paper, April 20, 2015.

22. Brookings Institution, 2006. “From Poverty, Opportunity: Putting the Market to Work for Lower Income Families,” accessed at <http://www.brookings.edu/research/reports/2006/07/poverty-fellowes>.

23. Scism, L., 2015. “N.Y. Regulator Studying How Car, Other Insurance Rates Are Set,” *Wall Street Journal*, accessed at www.wsj.com/articles/n-y-regulator-studying-how-car-other-insurance-rates-are-set-1426793439?tesla=y.

24. Piazza, Richard, Casualty Actuarial and Statistical (C) Task Force letter to Gary R. Josephson, CAS President, regarding the CAS "Discussion Draft of Statement of Principles Regarding Property and Casualty Insurance Ratemaking," May 22, 2013.

25. Ibid.

32. Insurers argue price optimization is a technological improvement over current practices, and criticisms are aimed at “unconstrained” price optimization, not the “constrained” form of price optimization used in setting rates.
33. Insurers also contend that price optimization is allowed under the current actuarial standards of practice. Notably, there is no current actuarial standard of practice focused on ratemaking. The Actuarial Standards Board (ASB) released an exposure draft of such an actuarial standard in September 2014; a final standard has not yet been adopted.
34. Robert Hartwig, president of the III, claims the price optimization process does not (unfairly) discriminate and does not abandon the core principle of risk-based pricing. He said it simply provides “more precision in the process associated with pricing, and it allows insurers in an analytical way to deal with what-if scenarios.”²⁶
35. Dr. Hartwig also says that the “assertion that low-income consumers are particularly vulnerable because they do not shop is ... entirely unsubstantiated.” A poll conducted by the III “found that 68% of people with annual income under \$35,000 compared prices when most recently buying auto insurance, a higher percentage than any other income group. [61%] of respondents with income above \$100,000 said they had shopped around.”²⁷

VI. Regulatory Responses to Price Optimized Rating Schemes

36. State law requires that rates not be excessive, inadequate or unfairly discriminatory. Regulators should consider whether these requirements can be met when price optimized rating schemes are used. Even if the requirements can be met, some constraints on the optimization might be needed. Constraints should not be so great that a company cannot earn profit consistent with its cost of capital.
37. Regulators have a number of potential responses regarding price optimization. California, Maryland and Ohio defined price optimization and issued bulletins prohibiting the defined practice. New York issued letters to insurers to further study price optimization.
 - a. Maryland, the first state to take explicit action against price optimization in rate setting, released Bulletin B 14-23 on Oct. 31, 2014. The Maryland Insurance Administration announced it determined that price optimization is a practice in which an insurer varies rates based on factors other than the risk of loss, such as the willingness of some policyholders to pay higher premiums than other policyholders, resulting in rates that are unfairly discriminatory in violation of state law. Insurers using price optimization techniques

26. Weisbaum, H., 2014. “Data Mining Is Now Used to Set Insurance Rates; Critics Cry Foul,” accessed at www.cnbc.com/id/101586404.

27. Scism, L., 2015. “Loyalty to Your Car Insurer May Cost You,” accessed at <http://blogs.wsj.com/moneybeat/2015/02/20/loyalty-to-your-car-insurer-may-cost-you>.

in Maryland were required to end such practices and resubmit rates compliant with the bulletin no later than Jan. 1, 2015.

- b. In February 2015, the Ohio DOI issued Bulletin 2015-01, noting that “price optimization involves gathering and analyzing data related to numerous characteristics specific to a particular policyholder that are unrelated to risk of loss or expense.”²⁸ The Bulletin says that insurer usage of the price elasticity of demand, or how much of a premium increase a particular policyholder will tolerate before switching insurers, is unrelated to risk of loss or expense. The Ohio DOI said that by its nature, price optimization can result in two insureds with similar risk profiles being charged different premiums. Insurance companies that use these price optimization techniques in Ohio were required to end the practice and resubmit rates compliant with the bulletin no later than June 30, 2015.
 - c. The California DOI issued a “Notice Regarding Unfair Discrimination in Rating Price Optimization” on Feb. 18, 2015, and generally defined price optimization as setting rates based on a willingness of an individual or group to pay more than another individual or group with the same risk profile.²⁹ The bulletin states that any insurer currently using price optimization to adjust rates in California must cease doing so. “Any insurer that has employed price optimization to adjust its rates in the ratemaking/pricing process shall remove the effect of any such adjustments from any filing to be submitted subsequent to the date of the Notice. And any insurer that has a factor or factors based on price optimization in its rating plan shall remove the factor or factors in its next filing.”
 - d. On March 18, 2015, the New York Department of Financial Services (NYDFS) sent a letter to P/C insurers and defined price optimization as the practice of varying rates based on factors other than those directly related to risk of loss—for example, setting rates or factors based on an insured’s likelihood to renew a policy or on an individual’s or class of individuals’ perceived willingness to pay a higher premium relative to other individuals or classes. The New York DOI declared such practices as inconsistent with traditional cost-based rating approaches and said such practices could violate its law prohibiting rates to be unfairly discriminatory. The DOI is seeking to determine whether insurers use price optimization in New York and has required insurers to answer its specific rating questions by April 15, 2015.³⁰
38. Some state regulators believe that existing state laws are sufficient to deal with price optimization and that no bulletin or other public statement is necessary. Many states have not received a filing that stated price optimization was incorporated into the rating process. Many states are looking

28. <https://insurance.ohio.gov/Legal/Bulletins/Documents/2015-01.pdf>.

29. <http://www.insurance.ca.gov/0250-insurers/0300-insurers/0200-bulletins/bulletin-notices-commiss-opinion/upload/PriceOptimization.pdf>.

30. *Insurance Journal*, 2015. “New York DFS Opens Inquiry Into Price Optimization,” accessed at www.insurancejournal.com/news/east/2015/03/20/361413.htm.

more closely at the issue or are waiting for the issue to be more thoroughly discussed and reported upon by the NAIC.

39. Regulators have broad authority to ensure rating practices are consistent with state rating laws. Specific options for regulatory responses as identified by the Task Force include the following, and may need to be adapted depending on state law (e.g., file and use; prior approval) and line of business (e.g., personal lines versus commercial lines):
- a. Define price optimization and determine which components of price optimization, if any, are allowed in a particular state.
 - i. Determine whether ratebook price optimization is allowed.
 - ii. Determine whether individual price optimization is allowed.
 - b. Define any constraints on the price optimization process and outcomes.
 - i. A constraint might limit the pricing adjustment to be between the current rates and the cost-based indicated rate and always in the direction of the indicated rate.
 - ii. A constraint might require selected rating factors to be between the current and cost-based factors, within a confidence interval around the current/indicated factors, or directionally consistent with the current factors.
 - iii. A constraint might limit the variables that can be used in defining a risk class, such as a categorical or numerical measure of retention.
 - iv. A constraint might be that price optimization can only be applied to specific class sizes, not class sizes so small that price optimization could be applied at the individual insured level or to small groups of insureds.
 - v. A constraint could be that price optimization adjustment factors for different classes must be relationally logical.
 - c. Develop regulatory guidance on the meaning of statutory rate requirements so that rates are not be excessive, inadequate or unfairly discriminatory.
 - i. Provide clear examples of what is unacceptable.
 - ii. Identify principles under which the legal requirements for rates are met.
 - d. Create filing requirements using a specific definition of “indication” or “best estimate” of needed rates and rating factors.
 - i. Consider whether the best estimate is a point estimate or any selected value within a confidence interval around the point estimate.
 - ii. Consider whether an “indication” should purely reflect expected costs of risk transfer.
 - iii. Consider whether to require actuarial certification that the indications presented in the rate filing are based solely on cost considerations and are not otherwise adjusted.

- iv. Consider requiring disclosure of any adjustments to rates that are not based on cost-related items.
 - v. Consider not allowing any non-cost-related adjustments to rates.
- e. Require specific explanation or reasoning to support any proposed or selected rate or rating factor that deviates from the indication.
- f. Change filing requirements to require the following transparency:
 - i. Disclose whether price optimization, including any customer demand considerations, is used.
 - ii. Describe any specific use of price optimization and explain why the statutory rate requirements are met.
 - iii. Disclose differences in proposed prices for the insurer's existing and new customers.
 - iv. File a report showing the distribution of expected loss ratios under the current prices and under the proposed prices (e.g., a histogram with two series). If the distribution under proposed prices is wider compared to the distribution under current rates, then there are additional subsidies in the proposed rates.
- g. Ensure that the regulatory system does the following:
 - i. Requires all rating factors be filed and all adjustments to indicated rates be disclosed.
 - ii. Maintains adequate resources for reviewing complex rate filings, including price optimization.
 - iii. Establishes regulatory practice with more in-depth review of price optimization models used in ratemaking.
 - 1. States and/or the NAIC should obtain expertise with models.
 - 2. Modeling experts should review how a particular model works and the accuracy and appropriateness of input data in order to make an informed determination regarding the statutory rate requirements.

VII. Recommendations and Next Steps

...to be developed

after Section VI. (Regulatory Responses to Price Optimized Rating Schemes) is finalized.