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Nontraditional Variables in Health Care Risk Adjustment

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Note: This article is intended to introduce a recently concluded research project (Mehmud, 2013) with the same title. The research was funded by the Health Section of the Society of Actuaries. The report, in its entirety, is available at:nhttp://www.soa.org/Research/Research-Projects/Health/research-2013-nontrad-var-health-risk.aspx.

Recognizing the importance of fortifying risk adjustment programs against selection based on nontraditional variables, the Society of Actuaries' Health Section sponsored an in-depth study into the relationship of nontraditional variables with health costs. The results of this research demonstrate that it is important to adjust the traditional risk adjustment model in order to recognize nontraditional variables. While this article does not go into the detailed results of the study, it introduces the key concepts and provides the context and motivation for this research. I encourage you to read the full report, a Web link for which is provided on this page.

The Affordable Care Act (ACA) includes the mechanism of risk adjustment in commercial small group and individual markets in order to further the policy goals of premium stabilization, mitigating incentives for issuers of health care coverage policies (issuers) to avoid unhealthy members, and to remove any advantages or disadvantages for plans inside health care exchanges compared to plans outside of such exchanges. The importance of risk adjustment to these policy goals cannot be overemphasized, and details such as the variables that are included in the risk assessment formula affect the extent to which the program is successful in meeting these goals.

Risk adjustment models have included variables such as demographic (i.e., age and gender) and clinical markers based either on ICD-9 diagnosis codes and/or pharmacy codes such as the National Drug Codes (NDCs). Literature points to other variables such as geography, body mass index (BMI), education and income that also explain the variation in health care cost—but have hitherto not been included in risk adjustment programs mainly because such variables are not typically found in claim data, or that their use may or may not be permissible given legal or privacy-related concerns. If these nontraditional variables explain meaningful variation in cost beyond traditional risk adjustment models—then this may provide incentives for issuers to select certain members. If such incentives lead to selection that affects the financial performance of issuers—then the policy goals of the risk adjustment program may be undermined.

Issuers of health care policies will price their 2014 products assuming that the purchasers will be an "average risk." As the phrase implies, an average risk is an individual who is expected to cost the same as the average of all of the individuals in that age cohort in a market. Around June of 2015, an issuer will receive a payment if purchasers were actually higher than average risk, or have to make a payment if they were lower than an average risk. In this manner an issuer can price to an average risk year over year, which promotes premium stabilization, and not have to worry about who takes up coverage since revenue is adjusted after the benefit year. This process mitigates the incentive for risk selection.

Like most actuarial exercises, risk adjustment is not perfect. In this case, the imperfections, if not properly understood and addressed, may undermine the policy goals of the ACA risk adjustment program. What happens when a risk adjustment mechanism does not adequately remove the incentive for selection? Health actuaries are well aware of the so-called "death spiral" that may occur when an issuer experiences significant ongoing adverse selection. Can that happen even in a risk-adjusted market?

The way it can potentially happen is if the risk adjustment mechanism does not adequately compensate an issuer for the assumed risk. For example, consider the hypothetical case of a chronic disease such as diabetes. A risk adjustment model such as the Department of Health and Human Services' ACA condition category model (HHS model) assigns a risk weight to this condition. The

risk weight is about 1.3 for adults in a 2014 platinum plan. This implies that a person with diabetes is expected to cost about 1.3 times more than an average person without diabetes in the same demographic cohort and metallic plan. This is an average expectation, but in reality, individuals with a specific health care condition have costs that are typically distributed across a spectrum from low to high cost. There will be individuals with diabetes who will not cost much more than an average individual without the condition, and there will be those who will cost much more than 1.3 times the cost of an average individual without diabetes. If there were ways to identify these two different theoretical sub-groups of individuals, then a strong incentive for selection would persist even after the revenue is risk adjusted.

There are two distinct stakeholder perspectives on the issue, as follows.

1. **Issuer Perspective:** Understanding the impact of nontraditional variables is as much about avoiding losses as it is about creating gain. The ACA risk adjustment is intended to be a zero-sum exercise, but if incentives for selection via nontraditional variables persist and are utilized only by a few participants, then participants not using them will be at a disadvantage. Conversely, if the variables are used similarly across the marketplace, then the potential for adverse effect on a given issuer would be greatly mitigated.

2. **Policy Perspective:** It is important to understand the impact of nontraditional variables and to consider these in any update of a risk adjustment methodology so that policy goals are preserved.

The report tests the potential of nontraditional variables to explain claim cost variation above and beyond traditional risk adjustment. The nontraditional variables were grouped into one of five categories:

1. **Demographic:** While traditional models utilize age and gender, the report examines models that include ethnicity, years of education, smoking status, occupation or industry, and family size.

2. **Economic:** Income is an important variable considered in the research. Cost-sharing subsidies are based on income levels in health care reform, which in turn impacts the ACA risk models via an assumed induced utilization.

3. **Lifestyle:** Variables include whether the person was advised to restrict high fat/cholesterol foods, usually had a lot of energy, whether health had limited social activities, or was advised to exercise more.

4. **Psychological Outlook:** Variables such as whether a person considered their mental health status to be good, fair or poor; or felt calm or peaceful, etc.

5. **Physical Outlook:** Perception and attitudes toward personal health may drive medical cost, and variables such as whether perceived health status was poor, difficulty in walking three blocks, or whether the person feels that ills can be overcome without medical help are analyzed in the report.

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You may already be thinking (correctly I might add) that variables such as those described above are not typically found in claim data. Data from the Medical Expenditure Panel Survey (MEPS)[1] was used in the research. This data is collected through a survey-based approach, complemented to a limited extent by physician records and transactional claim data. There are important limitations of this data that are described in the report. For purposes of this research it was an ideal dataset that contained a plethora of person-level characteristics along with medical conditions, pharmaceutical utilization and cost variables. The dataset includes over 1,500 person-level variables that were winnowed down to 200 based on (a) whether a variable could be causally related to health care costs, and (b) whether the variable could conceivably be used to attract a certain membership (i.e., whether it could be actionable). This list was further cut down to around 33 variables based on the relative importance of these variables.

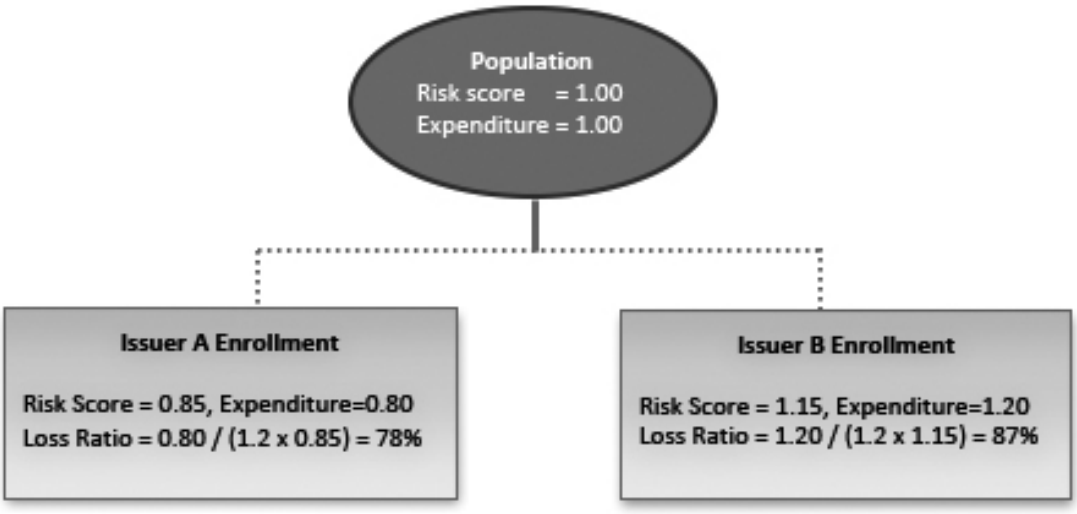
This brings us neatly to the crux of the research that describes how we determine the relative importance of nontraditional variables. While socioeconomic variables have received a lot of interest in terms of their relation to health care cost, we do not have a conceptual framework to measure their economic value to an entity such as a health plan, nor crucially do we have a framework to measure their economic value in a risk-adjusted environment.

The research report describes the development of a new conceptual framework that allows us to quantify the economic value of a nontraditional variable, and consistently compare this value across many other variables. The report develops a new measure (Loss Ratio Advantage or LRA) to help quantify the potential of a nontraditional variable to affect a risk adjustment program.

The LRA indicates the difference in loss ratios between an issuer (i.e., Issuer A) that is able to select the more profitable 50 percent of the market based on a nontraditional variable and another issuer (i.e., Issuer B) that enrolls the remaining 50 percent. In this manner the influence of a nontraditional variable can be directly linked to financial performance. This research shows that financial performance is the correct perspective with which to study the performance of nontraditional variables and not, for example, statistical performance.

Let me state that one more time, given the importance of the point and how much effort was involved in arriving at this conclusion! Accuracy is not the correct lens through which to value the contribution of socioeconomic variables. Bias in terms of risk-adjusted cost is the key that unlocks the door to understanding the potential incentives to use such information.

The graphic on page 19 illustrates (albeit in a simplified way) the core concept of the LRA measure. Issuer A is able to select 50 percent of the market that has the lowest *risk-adjusted expenditure* based on a nontraditional variable. Issuer B enrolls the remaining 50 percent. Assuming Issuer A's risk score is 0.85 and expenditures are actually 0.80 of average while Insurer B's risk score is 1.15 and expenditures are actually 1.20, then allowing 20 percent for administration and margin, the loss ratio may be calculated as the ratio of expenditure to risk-adjusted revenue. For example, for issuer A, this becomes [expenditure=0.80] / ([premium=1.2] x [risk score=0.85]) or 78% while loss ratio for insurer B is 1.20 / 1.2 x 1.15 = 87%. This calculation produces a difference in loss ratio of 9 percent between the two issuers. This is the LRA. In this case, it exceeds typical profit margins, and is therefore a very significant result from a business perspective.



The calculations in the graphic are simplified, and the calculations used in the research report more closely resemble the risk adjustment methodology under the ACA.

I invite you to read the report, which develops the framework in more detail, including addressing questions such as:

1) What is the relationship between a nontraditional variable and total health costs?
2) Is this relationship statistically significant?
3) Does the relationship persist after we risk adjust costs and is it still significant?
4) How do we quantify the potential and incentive for using such a variable in a risk-adjusted environment?
5) Lastly, how can we adjust the risk assessment methodologies to remove such an incentive and thus further the policy goals of a risk adjustment program?

The findings of the report are too lengthy to include here, but to provide a general flavor—variables such as geography and education are more important within the demographic category. Income also has a relatively high LRA measure, and so do a few lifestyle variables such as feeling energetic or attitudes toward having health care insurance or seeing a provider when sick. Issuer A (who within the LRA framework is assumed to be able to use a nontraditional variable to attract a more favorable mix of enrollees) prefers persons who are generally in good mental condition, even after risk adjustment is taken into account. A strong effect was measured for variables that described physical limitations due to pain or other health conditions, with issuer A attracting those who did not have such limitations.

The research report was written keeping in mind both the issuer and policy perspectives, and I hope that the information contained in it is constructive toward the goal of strengthening risk adjustment programs. The report is not to be interpreted as a "cookbook" in terms of how to strategize marketing activities or any other selection effort. Nor should the results be relied upon by policymakers to adjust risk adjustment programs without checking to see if the results hold when data for a specific application is considered. While this study used a specific data source and risk adjustment model, results for an issuer or policymaker will vary by the data, model and methodology that are used.

The most important outcome of this work is the conceptual framework and high-level conclusions rather than specific numbers. I hope that this work is extended by other researchers, and applied toward risk adjustment programs in order to improve them and mitigate selection incentives that may otherwise persist. Finally, I would love to hear any feedback, questions or comments regarding the report.

I would like to take a moment to thank the Society of Actuaries' Health Section for their funding and support of this important project and to the extremely capable actuaries and experts who volunteered their time to serve on the project oversight group through the course of this project.

END NOTES

[1] On the Web: *http://meps.ahrq.gov/mepsweb/index.jsp.*.