Policy Optimization

Policy optimization

Consumers always want more for less. Ideally, many people would like to be able to drive a Rolls Royce, travel in executive class, or have a mansion. All things are possible until you consider actually having to pay for these luxuries. This is not how the real world operates; most make the best purchases they can subject to their level of income or available capital. They choose priorities. They trade off the features that they like against those they do not like (such as higher prices) and eventually come to a decision that fulfills a need as best they can under the circumstances. By understanding the relative importance consumers place on different product/service characteristics, successful providers, be they public or private, balance the product features desired by consumers against the price they are prepared to pay for these products.

Designing a public policy for optimization of outcomes for citizen benefit from a government perspective could be a similar process of finding the right balance of features and priority choices against cost implications. Rather than satisfying consumers, government needs to satisfy citizens, constituents, users, and taxpayers, and not necessarily in that order. Collectively, we will call this group "users". Users of pubic goods and services, like consumers of private good and services, constantly want more for less. They want excellent roads, infrastructure, superior education for their children, excellent and accessible health care when and where needed, a clean environment, safe streets and communities, but would rather not be burdened with paying for it through higher taxes, or even by taxes at all.

Not unlike private companies, governments want to balance their offerings to ensure that the benefits and costs are in balance and give value for the money spent in the form of appropriate and desirable policy/program outcomes. Like successful private sector companies, knowing the relative importance of different policy features to that collective group of "user" is crucial to successful outcomes.

This paper illustrates how the modeling of consumer or user preferences can be applied to public policy optimization, and is based on a case study jointly commissioned by North Country Research Inc., Charlebois Consulting Ltd., and Cambridge Strategies Inc..

Why not ask people what they want?

Traditional polling fails to provide insightful guidance for either companies or Government in optimizing their product or service offering. This is because products or

services are examined in isolation, and therefore, once a complete package (product or service) is put together, the ends may not result in the best outcome. When people are asked what they want, the normal response is everything, with the caveat they want it to "cost" as little as possible. Clearly, a fresh approach is needed to reflect some form of practical reality.

Our approach – Model their policy preferences

Our approach is fresh in that it models the tradeoffs that users make between competing or alternative policy offerings. This information not only identifies the relative importance of different policy options, but allows government to optimize its product or service delivery across key strategic segments. This paper introduces a case study that was created specifically to illustrate this technique. It is for illustrative purposes only. It is not intended to be conclusive as to a policy option recommendation. All the techniques used are those characteristic of Discrete Choice Modeling. The results are not represented as scientifically based because the sample was not large enough nor was it scientifically random. However, the outcomes are representative of what this technology can provide for policy design and program optimization.

Revenue optimization

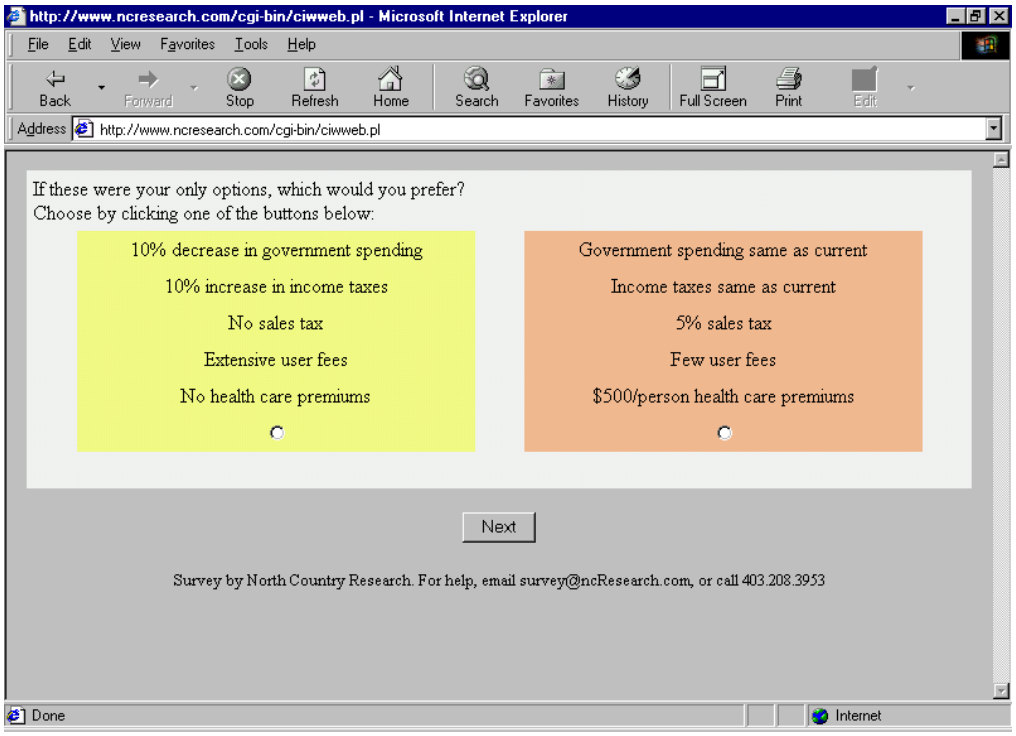
There are numerous ways for government to increase revenue. The more common applications include simply spending less, raising income taxes, charging a sales tax, imposing user fees, or in the case of some jurisdictions, charging extra for services such as health care. However, users do not prefer (and sometimes dislike) all or some of these different elements. What may be accepted in some areas (user fees for instance) may be rejected completely by others groups of users or they may find acceptance in certain geographic areas. This study examines the relative importance of these different revenue tools available to Government from some 400 Albertans responding to a web based survey in October 2002. The specific elements included in this trade off include:

Policy variable	Specific policy levels
Government spending	Decrease 10% Same as current Increase 10%
Income taxes	Decrease 10% Same as current Increase 10%
Sales taxes	No sales tax 5% sales tax
User fees	Few user fees Extensive user fees
Health care premiums	No health care premiums $500/person health care premiums $1000/person health care premiums

The model created is for illustrative purposes only. We could easily have included additional policy variables (business taxes, for instance), or additional policy levels (10% sales tax, for example) as would suit a client's specific needs.

Discrete choice modeling

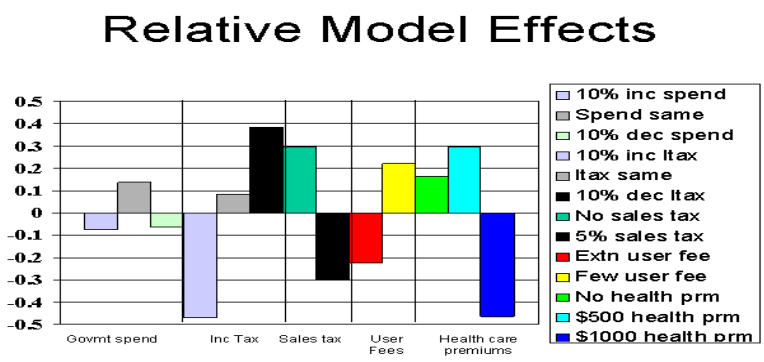
To understand user preferences, we place respondents in a series of controlled hypothetical choice situations and ask them to make a choice. By examining their tradeoffs, we are able to identify the key drivers of their behaviour and preferences. One example of such a trade-off is illustrated below:



In this instance, we collected responses from 391 Albertans. While sufficient to provide top line directional information, this case study is limited by a small sample size. This survey was available online.

Results

The results of a discrete choice modeling experiment identify the relative importance of each of the different policy variables (and policy levels) included in the experiment. These are summarized in the graph below:



This suggests that users reject income tax increases about the same as they reject $1000 health care premiums. Both of these elements are disliked more than a 5% sales tax or extensive user fees.

Policy simulator – An interface to the data

The assist in understanding the importance of the model data, we have created an easy to use computer simulator that acts as an interface to the data. An example is illustrated below, that compares and existing policy against a proposed alterative to understand which is preferred by consumers.

North Country Research

File Segment Help

Segment: Aggregate

	Existing policy	Proposed policy
Government spending	Spending same as current	Spending same as current
Income tax	Same as current	10% increase
Sales tax	No sales tax	No sales tax
User fees	Extensive user fees	Few user fees
Health care premiums	$500/person health care premiums	No health care premiums
Share of Preference	**56.06%**	**43.94%**
Base Case	56.06%	43.94%
Change	0.00%	0.00%

This simulator can be used by government to design the optimal policy, and to identify the relative importance of different policy features. Acting as an interface to the data, this tool helps illustrates how a "proposed policy" (the right column) compares to an existing policy; users prefer the policy with the highest share of preference. In most instances, the "existing policy" should be matched as closely to the policy of the day, and any changes should be made to the "proposed policy".

To illustrate how this can be used, several examples will be discussed.

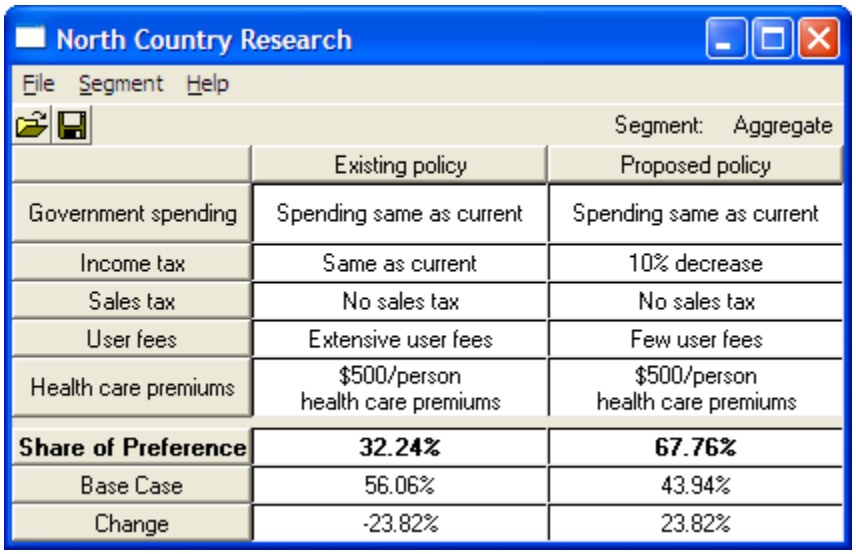
Background

The Minister of Finance wants to maximize revenues through some policy changes but further spending cuts are not practical. What is the "best" (meaning most politically acceptable) set of options open to the Minister, considering at the end of the day the government needs revenue, but just as important (if not more so), the Minister and government caucus want to be re-elected, and therefore need to develop policy that is supported by the electorate. Recognizing that certain items are beyond the control of the government (for instance, the value of the dollar, or the price of oil), the goal is to design an optimal policy that is favoured by citizens.

Case study 1: Policy Optimization

Objective:
Determine the optimal revenue policy for taxpayers in Alberta, irrespective of its influence on total government revenue.

Solution:
The simulator was used to identify the most important policy variables to survey respondents. The proposed policy was changed, and gathered a preference of 67.76% compared to 32.24% for the existing policy. This solution is illustrated below:



	Existing policy	Proposed policy
Government spending	Spending same as current	Spending same as current
Income tax	Same as current	10% decrease
Sales tax	No sales tax	No sales tax
User fees	Extensive user fees	Few user fees
Health care premiums	$500/person health care premiums	$500/person health care premiums
Share of Preference	**32.24%**	**67.76%**
Base Case	56.06%	43.94%
Change	-23.82%	23.82%

This suggests that respondent's desire:

- Government spending at existing levels (no increase and no decrease)
- A ten per cent decrease in income taxes
- No sales tax
- Few user fees
- $500/person health care fees.

Health care premiums are an interesting element of the revenue optimization mix. While it may seem intuitive that respondents desire no health care premiums, this is not the case. When health care premiums are set to "none", the share of preference for the existing policy is 64.80% (and 35.20% for the same existing policy). This suggests that users prefer $500/person health care premiums to none, perhaps because the people surveyed had this benefit paid by their employer, or that they realize the strains being placed on the health care system today, and realize the importance of charging premiums.

While interesting, this example is hardly practical, since it ignores the revenue implications such an optimization strategy will have on Government operations. Let us turn our attention to a more realistic situation; maximizing revenues.

Conclusion

This case study illustrated how discrete choice modeling can be successfully applied to public policy, and demonstrated how Government can design effective policy through carefully understanding user preferences. While intended only as a case study, this tool can be expanded to include numerous other policy attributes or policy attribute levels. Further, these results could be examined separately across different segments of users.

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A copy of this simulator is available by contacting Tim.Glowa@ncResearch.com. An extended version of this paper with additional case study examples is available and can be obtained by contacting any of the authors.