VALUING METEOROLOGICAL PRODUCTS AND SERVICES

Douglas A. Smith
Professor of Economics
Carleton University

August 2006

INTRODUCTION

- Purpose of framework.
- Focus on meteorological products and services.
- Background to Doppler weather radar case study.
- General approach: Value of information.

ECONOMIC VALUE

- Utility and well-being: approach to value.
- Attaching monetary values-benefits.
- WTP shows value if traded in markets.
- Some weather information is transacted--most is not.
- Valuing non-market benefits.
- Growing area of specialization among economists.

USES OF WEATHER INFORMATION

- Initial step of all valuation studies: impacts.
- Better weather information>>>better decisions>>>better outcomes.
- Benefits are the change in the value of outcomes.
- Weather information impacts are everywhere.
- Use of information determines WTP

VALUE OF INFORMATION

- **No Value if:**
  - Very strong priors.
  - -No cost of bad decision.
  - -Locked in behaviour.

  Big Value if:

  -Weak Priors.

  -High costs of bad decision.

  -Many reactive options.

  Source Macauley (RFF) and others.

PERSPECTIVES ON VALUATION

- All methods reflect Willingness to Pay (WTP). Observed or inferred.
- Demand-based approaches directly elicit WTP from users who could be firms or individuals.
- Revealed preference vs. stated preference issues.

VALUATION: II

- Contingent valuation method (CVM).
- Direct questioning in clearly specified CVM framework.
- Exxon Valdez: Is some number better than no number at all?
- CVM and the budget constraint.
- Limitations but will be used when no alternatives are available.

EXAMPLE-SNOW REMOVAL

- Snowfall and accident rates.
- Large impact of snow removal and road maintenance, de-icing.
- Better information reduces accidents and allows greater snow removal/management efficiency.
- Annual snow management conferences focus on planning related to better weather information.

EXAMPLE: AIRPORTS

- Value of weather information obvious.
- Current planning models incorporate uncertainty of weather forecasts.
- Better “uncertainty” information also provides benefits.
- Max. flight utility s.t. all delay costs.
- Greater forecast certainty allows fewer delay costs.

CANADA'S NATIONAL RADAR PROJECT

- PDV of costs over ten years is $88 million.
- Doppler radar offers important enhancements.
- Motion of weather systems provides more information.
- Weather is predicted more quickly and accurately.
- Many potential beneficiaries-Ubiquitous.

COST-BENEFIT ANALYSIS

- Compares policy achievements with costs.
- Converts all impacts into dollar magnitudes.
- Provides a consistent analytical framework.
- From decision-maker perspective, costs are direct and benefits dispersed.
- Underscores importance of having direct benefit estimates to compare with known costs.

ESTIMATING BENEFITS

- WTP directly from survey of representative sample of 1,000 Canadian households.
- Used CVM protocols to value Doppler.
- Information provided separately for different regions reflecting weather event differences.
- Responses provide a PDV of better weather information over 10 years of $433M

BENEFITS: II

- Benefit transfer: Major risk categories.
- Vehicle trips, hail damage, winter roads, trucking. Regional differences.
- Combined survey responses with damage data for accidents and hail damage.
- Total PDV of these benefits is $203M.
- Subset of overall WTP.

NET BENEFITS

- Discounted benefits ($203-$433M) exceed costs ($88M).
- Many subsets of benefits exceed Doppler radar costs.
- Improved weather information appears to be a good social investment.
- Provides example of valuation that can be extended to other elements of weather information.

SUMMARY

- Estimated Doppler benefits and costs.
- Newer valuation approaches advance on older production based methods-wider range.
- Weather-sensitive decisions: everywhere.
- Possible to establish an overall benefit valuation model for Canada.
- Doppler radar benefits greatly exceed costs.