VALUING
METEOROLOGICAL
PRODUCTS AND SERVICES

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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.
• 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.