

Refining CBA

Sensitivity Analysis
Distributional Impacts



Sensitivity Analysis [step 5]

- CBA often requires us to predict the future, which is uncertain
- Some costs and benefits are hard to value accurately, especially nonmarket values
- Uncertainty about some aspects of a CBA may alter the results of the analysis
- Because so many assumptions go into CBA, performing robustness checks on preferred management options is critical

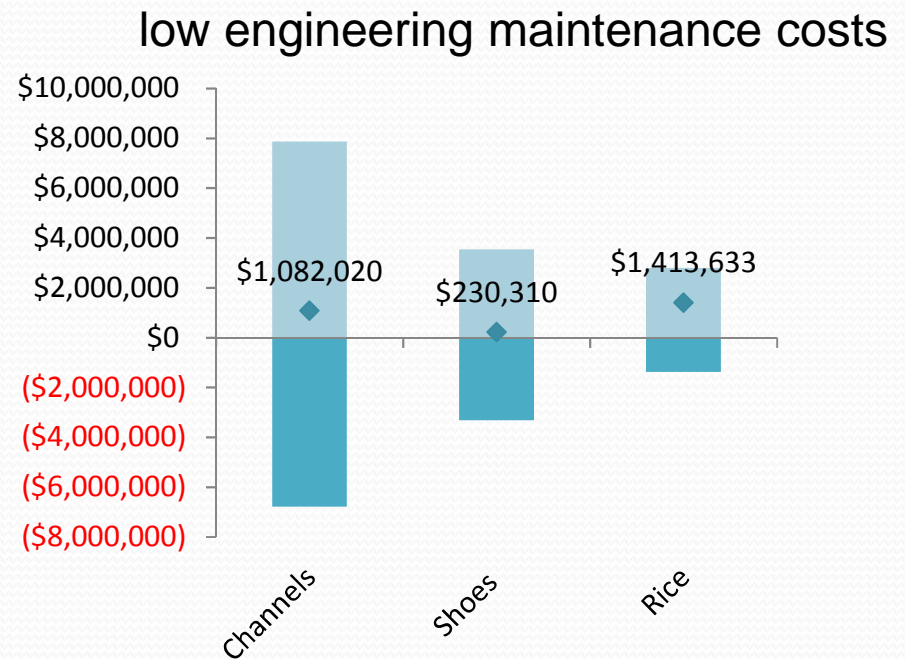
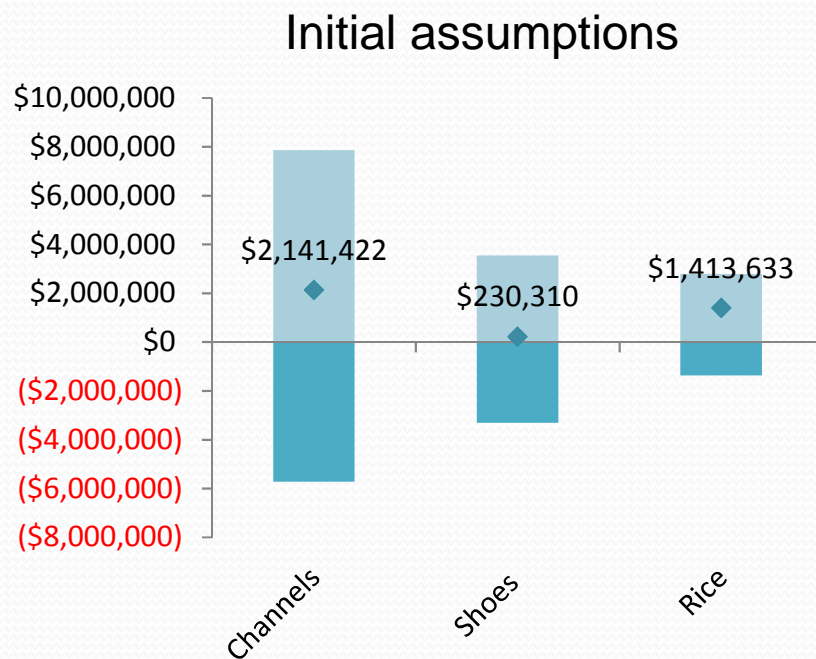


Sensitivity Analysis

- What happens if engineering costs run over? Or a new retailer floods the market with inexpensive shoes? Or rice prices rise unexpectedly?
- Steps in undertaking **sensitivity analysis**
 1. Identify key parameters that are uncertain
 2. Examine the impact that a change in each would have on the project's net present value
 3. Ask "Does this change the decision about the project?"

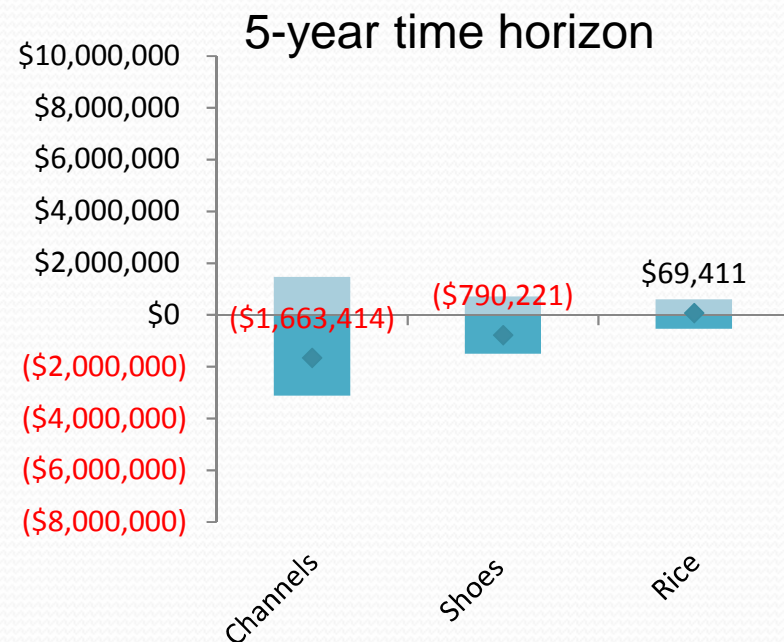
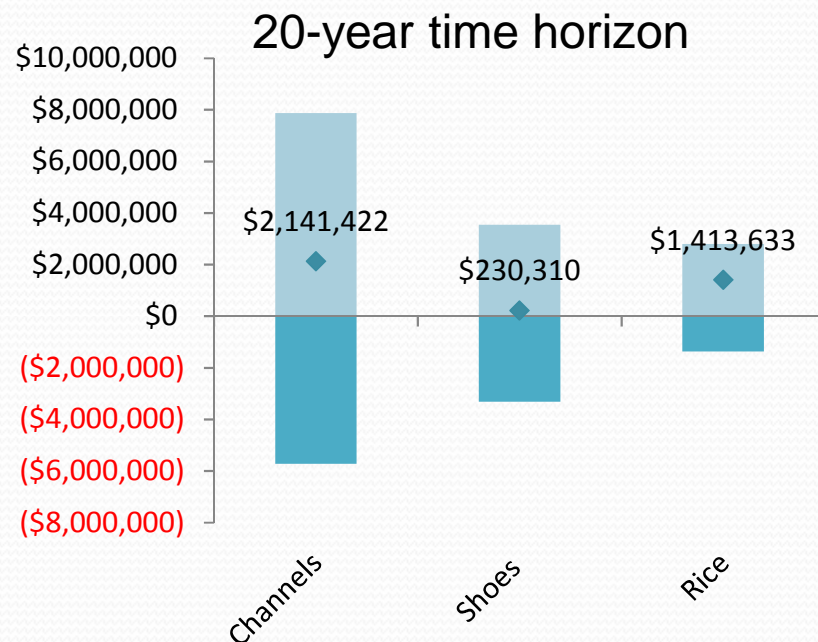
Sensitivity Analysis

- If engineering maintenance costs were 25% higher than you thought, you would recommend leaving rice outside your door over diversion channels!



Sensitivity Analysis

- The **project duration** may also impact results: Projects with disproportionately high costs at the beginning look more favourable with long time horizons





Sensitivity Analysis

- If the ranking of net benefits does not change when considering risk and sensitivity to assumptions, then our policy recommendations are **robust**
- Your report should state ranges for which policy recommendations hold
 - e.g., construct diversion channels unless engineering maintenance rise above \$470/ person day

Sensitivity Analysis

- When you report results, describe sensitivity tests and rank order your options

Cost/Benefit Category	Diversion channels	Leave shoes outside	Heaps of rice
NPV, Original	\$2,141,422	\$230,310	\$1,413,633
Rank	1	3	2
NPV, r=10%	\$1,012,300	-\$50,487	\$1,025,521
Rank	2	4*	1
NPV, r=15%	-\$110,593	-\$318,535	\$624,309
Rank	3*	4*	1

* Negative NPV indicates that less preferred than 'do nothing'

Sensitivity Analysis for Jumbees

- Complete worksheet
- Which policy do you recommend?



Consider distribution of costs and benefits [step 6]

- Think about a policy with the following benefits & costs

Stakeholder	Benefits	Costs	Net Benefits
Group 1	30	10	20
Group 2	10	20	-10
Group 3	25	10	15
Group 4	15	20	-5
Group 5	15	25	-10
Overall social impact	95	85	10

- Benefits exceed costs to society, yet society would not vote for this because while society as a whole gains, more people lose than win

Consider distribution of costs and benefits

- Think about a policy with the following benefits & costs

Stakeholder	Benefits	Costs	Net Benefits
Farmers	30	10	20
Fishermen	10	20	-10
Retailers	25	10	15
Environmentalists	15	20	-5
Children	15	25	-10
Overall social impact	95	85	10

- Benefits exceed costs to society, yet society would not vote for this because while society as a whole gains, more people lose than win
- Depending on who those people are, the policy may be infeasible, and an alternative policy may be preferred



Consider distribution of costs and benefits

- In general, our role is to note the distribution of costs and benefits in our reports
- Ultimate decision-making authority rests with others