AN APPLICATION OF THE DELPHI METHOD TO BENEFIT-COST ANALYSIS IN CÔTE D’IVOIRE

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* The views expressed in this presentation are those of the authors only and do not represent the views of MCC, CNPC, the US Government or the Government of Côte d’Ivoire
TODAY’S PRESENTATION

• Context: Benefit-cost analysis in international development
• Project background
• The Delphi Method
• Applying the Delphi Method in Côte d’Ivoire
• Lessons learned
• Data is scarce
  • Data collection in many countries is irregular or unsystematic
  • Databases in many countries are not maintained or updated
• Time and resources are scarce
  • Project teams may collect their own data, albeit with long lead times and high costs
  • Project design may change quickly or alternative solutions may present themselves, and data collection may not be able to adapt
• Analysts often must rely on methods of approximating data
  • Benefit transfer methods are common
  • Often looking for ways to improve data and methods in ways that are not costly in time or money
In December 2015, the Republic of Côte d’Ivoire was selected to develop a five-year compact with the Millennium Challenge Corporation. GOCI and MCC teams worked together to develop projects throughout 2016 and 2017. Compact signed in November 2017.

One of the proposed projects focused on transport to improve the movement of goods and people in and around Abidjan. The zone around the Port of Abidjan is one of the major chokepoints in the city.

MCC conducts benefit-cost analysis and requires projects to achieve an economic rate of return (ERR) of 10%.
THE ABIDJAN PORT ZONE
PROPOSED SOLUTION

• Two new bridges
  • Short bridge to improve circulation within the port zone
  • Long bridge to provide a bypass around the port zone

• Transport consultants reviewed the proposals
  • Assessed the likely costs and traffic on each bridge
  • Costs likely to be high and benefits (mainly vehicle operating costs and time savings) comparatively low on the long bridge
  • Unlikely to meet MCC’s cost-benefit threshold
ALTERNATIVE SOLUTION

• Fill 74 hectares in Ebrié Lagoon
  • Includes two short bridges
  • Total cost is similar
  • Provides similar road connections as the original solution
  • Lagoon is polluted, so filling does not produce large environmental damage

• Produces additional economic benefits
  • Still reduces congestion in the port area
  • Also creates new land for productive purposes within the port area

• The value of the newly created land would influence whether the project met the cost-benefit threshold
WHAT IS THE VALUE OF THE LAND?

• Most land in the port zone is controlled by the Port Autonome d’Abidjan (PAA) and leased to private firm
  • Current rental prices set by government and charged by PAA are 3500 to 6000 CFA/m²/year ($5.66 - $9.71 m²/year)
  • However, this is a mandated price, not a market price

• We heard anecdotally:
  • Nearby firms may be offering land for 11000 – 12000 CFA/m²/year ($17.80 - $19.42 m²/year)
  • Some firms sublease their PAA land to others for several times the price mandated by PAA

• We needed to estimate the true market rental price to plug into our model

• Unfortunately, we had less than three weeks to obtain the data and little budget to do it
THE DELPHI METHOD

• An iterative, consensus-building approach that uses expert opinions to “crowd source” information
  • Developed by RAND in the 1950s
  • Iterative process of private rankings and group debate driving toward consensus around a number of variables
  • Relies on the opinion of multiple experts, rather than a single expert or report

• Particularly well suited to uncertain or unmeasurable questions or data about the future
  • Projecting the effects of a new product or technology
  • Where historical data is not available
  • Estimating probabilistic variables
THE DELPHI METHOD

• Participants estimate the values individually

• The individual estimates are used to obtain an average

• Average is shown to the group and debate ensues between those who think it should be higher and those lower (individual scores are anonymous to the group)

• After some debate, participants will be asked to produce another set of individual estimates, and the entire process repeats

• The goal is not complete consensus, but each iteration should yield:
  • Maybe a different estimate of the average expected value for each parameter
  • Understanding of the “fixed points” of opinion
THE ABIDJAN DELPHI WORKSHOP

• Three hours on the morning of April 7, 2017

• Gathered 17 stakeholders with experience in the port zone

• The audience was chosen to try to elicit a range of opinions to spur debate
THE ABIDJAN DELPHI WORKSHOP

- Participants were given:
  - An introduction to the problem
  - An explanation of the Delphi Method
  - A worksheet with six questions

- Each iteration included:
  - 10 minutes for individual estimates, coffee and time to tabulate results
  - 30 minutes for discussion

- Three iterations were completed

<table>
<thead>
<tr>
<th>Question</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What would be a fair rental price for this parcel of land?</td>
<td>CFA/m²/year</td>
</tr>
<tr>
<td>2a. If the annual rental price was not fixed and the port rented it to</td>
<td>CFA/m²/year</td>
</tr>
<tr>
<td>the highest bidder, how much do you think businesses would be willing</td>
<td></td>
</tr>
<tr>
<td>to pay rent this land?</td>
<td></td>
</tr>
<tr>
<td>2b. If you were a business owner, how much would you be willing to pay</td>
<td>CFA/m²/year</td>
</tr>
<tr>
<td>to rent this land?</td>
<td></td>
</tr>
<tr>
<td>3a. If a business had already obtained a lease for this land and</td>
<td>CFA/m²/year</td>
</tr>
<tr>
<td>decided to sublease it, what price do you think they would be able</td>
<td></td>
</tr>
<tr>
<td>to get?</td>
<td></td>
</tr>
<tr>
<td>3b. If you were a business owner with a lease for this land, what price</td>
<td>CFA/m²/year</td>
</tr>
<tr>
<td>would you ask for a sublease?</td>
<td></td>
</tr>
<tr>
<td>4. What types of businesses do you think would be the best use of this</td>
<td></td>
</tr>
<tr>
<td>land?</td>
<td></td>
</tr>
</tbody>
</table>
“GROUND RULES” FOR THE WORKSHOP

• We are not looking for “the right answers,” we are looking for everyone’s best estimates

• Each person will have the chance to discuss and change his or her mind, so please fill out a number for every variable

• Individual estimates will be confidential and discussion should follow “Vegas rules” of non-attribution

• Everyone speaks from their own expertise, not as a representative of their organization

• Everyone should speak! This process is about discussion, so we’re depending on everyone to be opinionated*

*(Though opinionated doesn’t mean your mind can’t be changed…)
SUMMARY OF THE DISCUSSION

• There was good discussion after each iteration
  • Participants mostly adhered to the ground rules
  • Everyone in the room spoke at least once
  • There was a good diversity of opinion

• It took some time to cultivate the trust of the participants
  • Discussion became more detailed and heated
  • Despite our reassurances that the information would be used only for research, some participants were hesitant in their responses

• After the first two rounds, we got the sense that some participants were not giving their personal opinions
  • We reminded everyone their responses would be anonymous
  • We also reminded them their responses would be used to inform our analysis, not actually for setting prices
## RESULTS

<table>
<thead>
<tr>
<th>Question</th>
<th>2b. If you were a business owner, how much would you be willing to pay for this land?</th>
<th>3b. If you were a business owner with a lease for this land, what price would you ask for a sublease?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1st</td>
<td>2nd</td>
</tr>
<tr>
<td>Round</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>16</td>
<td>15</td>
</tr>
<tr>
<td>Minimum (CFA/m²)</td>
<td>2,500</td>
<td>1,500</td>
</tr>
<tr>
<td>Maximum (CFA/m²)</td>
<td>50,000</td>
<td>50,000</td>
</tr>
<tr>
<td>Standard deviation (CFA/m²)</td>
<td>11,275</td>
<td>11,696</td>
</tr>
<tr>
<td>Mean (CFA/m²)</td>
<td>8,388</td>
<td>8,817</td>
</tr>
<tr>
<td>Mean w/o min &amp; max (CFA/m²)</td>
<td>5,836</td>
<td>6,212</td>
</tr>
<tr>
<td>Median (CFA/m²)</td>
<td>5,100</td>
<td>5,500</td>
</tr>
</tbody>
</table>

* According to xe.com, the market exchange rate on April 7, 2017 was 618 CFA francs per dollar
IMPLICATIONS

• The workshop produced a realistic point estimate that could be plugged into the cost-benefit model, along with a range to be used for sensitivity analysis
  • Produced a range of ERRs from 13-16%, above the 10% hurdle

• Advantages
  • Thanks to the efforts of our CNPC colleagues, the workshop was organized in a week
  • Only financial costs were conference room rental and coffee service
  • Low time commitment for participants (3 hours)

• Disadvantages
  • Not as comprehensive or precise as a formal survey
  • Findings could be biased if non-responses were correlated or we accidentally omitted any key experts with divergent views

• Despite the analysis, GOCI and MCC ultimately agreed to not to include the investment as part of the compact
LESSONS LEARNED

• Keep the questions focused and continually remind of the workshop objectives
  • More data points means less time for discussion of each one; if needed, separate focus groups could be organized to have relevant discussions and realistic convergence
  • Be careful when wording questions to avoid influencing the results

• Pay attention to status and seniority when selecting participants
  • The presence of superiors could inhibit participants from giving honest responses

• Continually seek to cultivate trust
  • Early rounds were more influenced by participants’ institutional interests instead of their objective opinions
THANK YOU

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