



Australian
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Benefits and costs of post-cyclone emergency services in Cairns

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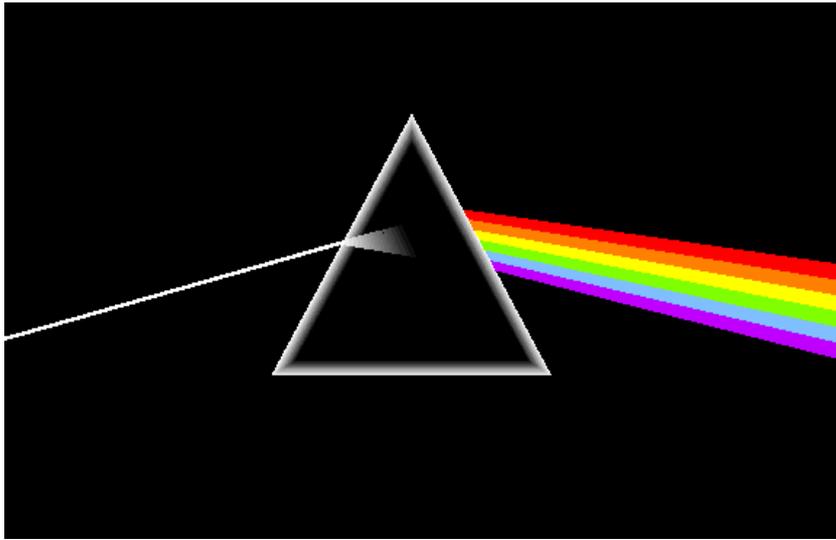
Crawford School of Public Policy

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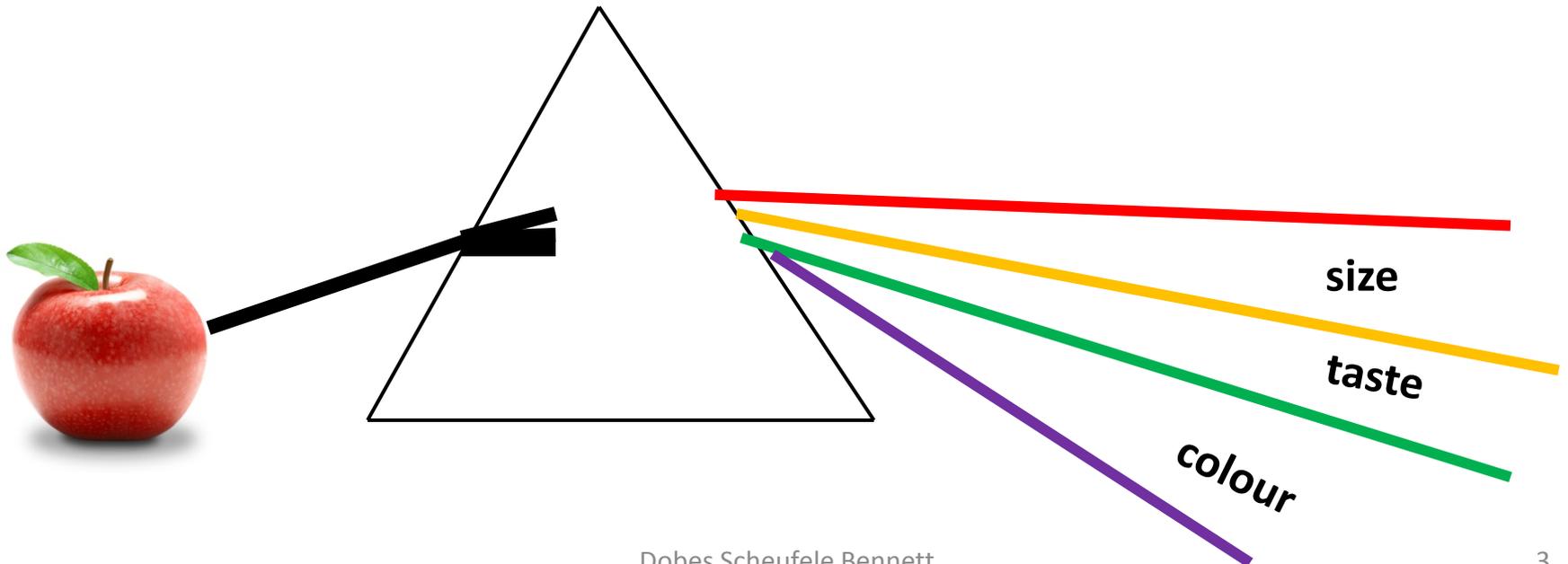
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background

- **2009 TC/low Charlotte**
- **Bruce Hwy cut at Mulgrave River bridge**
- **no fresh food in major retailers, Cairns CBD**
- **question: should public sector (EMQ) or private sector provide fresh food?**
- **but fresh food requires cooking facilities**
 - **so scope of analysis expanded**
- **focus group priorities: fresh food, sewerage, utilities, pets, police. Not inoculations etc**



**a good or service
can have a range
of intrinsic
qualities or
characteristics**



choice experiments

- **define and present good or service as a 'bundle' of attributes**
 - including price or cost
- **respondents choose between bundles**
 - they trade-off price and different attributes
- **use econometric methods to estimate probabilities of choosing different bundles**
- **provides implicit prices (WTP) for marginal change in each attribute**

This is the first of 6 questions: we ask you to choose the “**bundle**” of emergency services that your household would most prefer. The questions may look the same, but they are actually different.

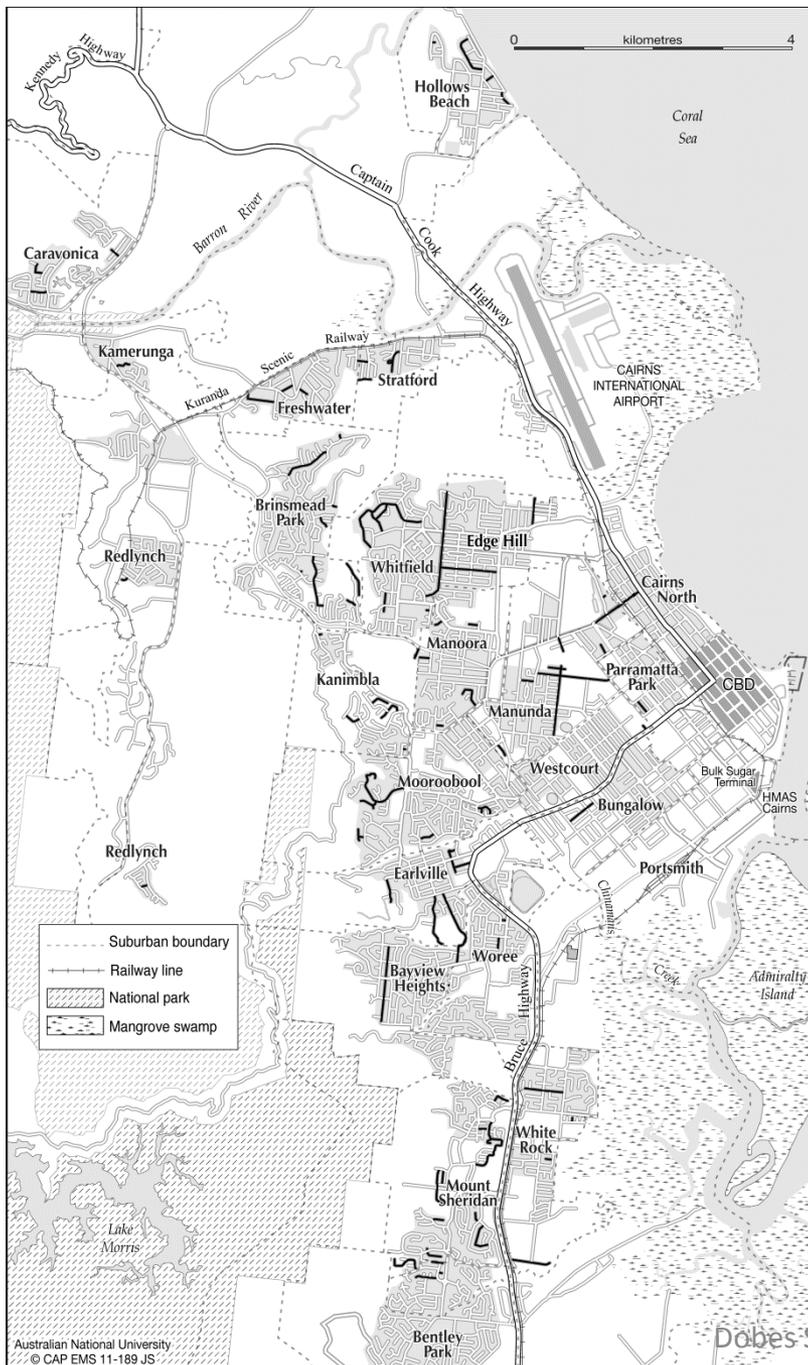
Bundle A does not involve any new or additional services, and no payment
Bundles B and C involve changes in emergency services and some payment
 Please tick the bundle (A, B or C) that your household would most prefer:

status quo bundle

alternative bundles of emergency services

	Bundle A (no new services)	Bundle B	Bundle C
Pets	Pets stay at home with owner or friend	Pets stay at home with owner or friend	Pets housed in shelter for 5 days after cyclone
Security	Minimal extra police	Patrols for 3 days after cyclone	Patrols for 3 days after cyclone
Fresh food	Delivered to shops 5-8 days after cyclone	Delivered to shops 3-4 days after cyclone	Delivered to shops 5-8 days after cyclone
Utilities	Gas, water, electricity, sewerage reconnected in 5-8 days	Gas, water, electricity, sewerage reconnected in 5-8 days	Gas, water, electricity, sewerage reconnected in 3-5 days
Cyclone levy	\$0 per year	\$ 300 a year (about \$ 1 a day)	\$ 1,000 a year (about \$ 3 a day)
My household's most preferred bundle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Now please go on to the next page. It is really important that you select your household's preferred bundle on each of the following pages as well.



provision of post-cyclone emergency services in Cairns : choice modelling survey in 2011: Dobes, Scheufele, Bennett

non-stratified random sample of households across Cairns based on UBD street directory

distribution and collection of hard copy survey by Cairns Lions Club to reduce cost and increase response rate



This survey is part of Australian National University (ANU) research about how the Cairns community values different aspects of emergency assistance before, during and after severe cyclones.

Your household has been selected randomly, and your answers will be absolutely anonymous. The ANU is not able to identify you from the form that you fill out.

The survey is voluntary – you do not have to fill it out.

However, by completing this survey you will be helping the Cairns community because the Lions Club will be paid for its help in distributing and collecting the questionnaires.

The Cairns Lions Club will receive extra money for all fully completed surveys that it collects. Please answer all the questions as best you can. It should only take about 20 minutes.

If you have any queries, please contact Dr Leo Dobes (Leo.Dobes@ANU.edu.au) or on (02) 6125 2557.

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This project operates under the research ethics protocols of the Australian National University, and any questions or complaints can be forwarded to:

Human Research Ethics Committee (Office of Research Integrity)
Innovations Building (124)
Corner Eggleston and Garran Roads
The Australian National University
Canberra ACT 0200
Tel: (02) 6125 3427 Fax: (02) 6125 4807
Email: Human.Ethics.Officer@anu.edu.au

Dobes Scheufele Bennett

**covering letter:
information and context
for respondents**

note: ethics caveat

Approximately how many years have you lived in Cairns?
(number)

Were you born in Australia?
(Please indicate with cross or tick) YES NO

How many children (under 15 years of age) live in your household? (number)

How many adults (15 years and over) live in your household? (number)

How many pets do you normally keep in your household?

Please enter number DOG(S) CAT(S) OTHER
(e.g. 0, 1, 2, 3, ...)

Do you think that your house or flat would suffer major damage during a Category 5 cyclone, close to the 'eye'? YES NO
MAYBE DON'T KNOW

Have you ever experienced a severe cyclone anywhere? YES NO

Were you in Cairns during Cyclone Yasi in February 2011? YES NO

Did you or any of your household members shelter in the Earlville Stocklands shopping centre during Cyclone Yasi? YES NO

Have you ever lived in a communal evacuation centre after a cyclone? YES NO

Has your house or flat ever been flooded, cut off by floodwaters, or lost gas, electricity, water or sewerage? YES NO

some introductory questions

**to obtain information :
provide objective information before main choice questions to avoid later bias**

The compulsory Cyclone Levy

- would be paid by all Cairns households.
- would be collected with the electricity bill
- money would be put into a Trust Fund, supervised by a special Ombudsman, so that it cannot be used for anything except helping those affected by a cyclone.

Remember that your available income is limited, and you will still need to meet your every day expenses as usual.

advice about payment vehicle

Current government assistance would not be affected:

- depending on your circumstances, the Centrelink Disaster Recovery payment is \$1,000 per eligible adult and \$400 per child. Eligibility includes injury, destruction of residence, isolation of 24 hours from (or in) residence, or loss of utilities for at least 48 hours. Your eligibility for the payment is not affected by your income or assets.
- you may also be eligible for government loans or income support after a cyclone

reminder about budget constraint

The “volunteer” approach to helping cyclone victims would continue

- Australians have traditionally helped disaster victims largely on a “volunteer” basis. It is not being suggested that this community-based approach should change. Payment would be required in the future to get extra resources if more services are provided.

more context

..... and your opinion definitely counts

- For new emergency services to be put in place, the support of a majority of Cairns residents would be necessary. And everyone living in Cairns would have to pay the levy.
- Your answers are important.

incentive compatibility

Please tick or cross any or all of the following that applies most to you

- I carefully read all the information and questions
- I read most of the information and questions
- I quickly browsed the information and questions
- I did not really read the information and questions

Do you think that Australia's weather patterns are changing?

YES NO MAYBE DON'T KNOW

Do you think that cyclones will become more damaging in Cairns in the future?

YES NO MAYBE DON'T KNOW

Do you think that cyclones will happen more often in Cairns in the future?

YES NO MAYBE DON'T KNOW

If you agree with any of the following, please tick one or more boxes:

- I don't care about emergency services after a cyclone
- People should be responsible for looking after themselves
- More services should be provided, but I don't have spare money to pay for them
- More services should be provided, but I already pay enough in taxes
- More services should be provided, but I don't think that I should be the one to pay
- More services should be provided, but the "bundles" used above don't make sense
- I found making a choice too confusing, so just ticked any box
- More services should be provided, but funds collected would not be used correctly

Some other reason (please specify):

**questions to
test reasons
for answers
and to check
on 'protest'
answers**

**found to be a significant
determinant of WTP**

Variable	CL		pECM	
	Coefficient ^a	Standard error	Coefficient ^a	Standard error
Pets	-0.07488** (0.0297)	0.03443	-0.06926** (0.0228)	0.03042
Security	-0.00078 (0.9209)	0.00786	0.01580* (0.0632)	0.00850
Food	0.07365** (0.0365)	0.03522	0.08712** (0.0170)	0.03649
Utilities	0.22005*** (<0.0001)	0.03667	0.24923*** (<0.0001)	0.03146
Levy	-0.00096*** (<0.0001)	0.7634D-04	-0.00140*** (<0.0001)	0.6646D-04
Con ^b	-0.55784*** (<0.0001)	0.11331	-1.00674*** (0.0090)	0.38536
Responsibility	-0.20100*** (<0.0001)	0.04590	-0.59887** (0.0344)	0.28305
Damage	0.38667*** (<0.0001)	0.04574	1.05218*** (0.0002)	0.28497
Insurance	-0.30318*** (<0.0001)	0.05370	-0.87661** (0.0163)	0.36500
Sigma ^c			4.62980*** (<0.0001)	0.43721
<i>Model statistics</i>				
n (observations)	2460		2460	
LL _{β(pECM)}			-1478.82623	
LL _{β(CL)}	-2110.39894			
χ^2_{1} compared to LL _{β(CL)}			p <0.0001	
McFadden pseudo ρ^2 adj.	0.22		0.45	
AIC ^d	1.72309		1.21043	
AIC ^d finite sample	1.72312		1.21046	
BIC ^d	1.74434		1.23404	
HQIC ^d	1.73081		1.21901	

modelling results

***=significant at 1% level, **=significant at 5% level, *=significant at 10% level;

^a p-values in parentheses

^b Generic constant term included in utility function of change options

^c Error component included in utility function of 'do nothing' option

^d Normalised by sample size

costs: pet care & accommodation

- **no estimate of cost of construction of pet shelter**
 - could assume ‘worst case’ scenario 320 dogs (1 per cent of 22,000 registered)
 - but RSPCA had only 6 requests after Yasi
- **daily operational cost of dog care = \$20 plus initial vaccination (\$25) and worming (\$10)**
- **5 days care ≈ \$43,000**

costs: longer police presence

- **assume 30 extra officers**
 - return air fare = \$500
 - accommodation + expenses = \$264 per day
 - no additional salary
- **4 days ≈ \$46,800**
- **11 days ≈ \$102,450**

costs: faster provision of fresh food

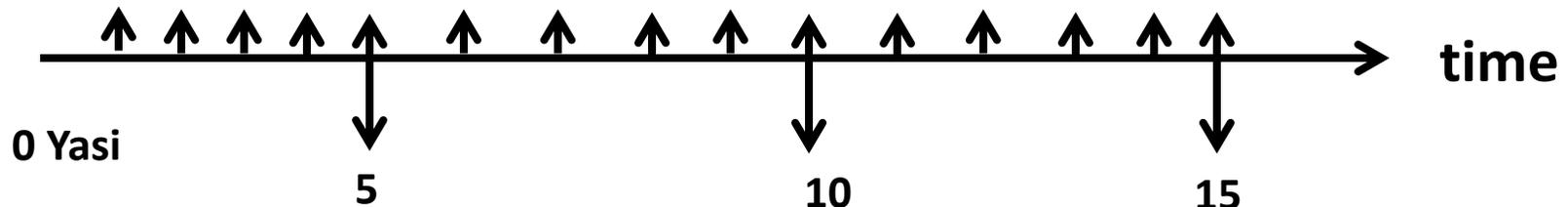
- **some options**
 - resupply by sea impractical
 - road and rail transport require total weather proofing Brisbane to Cairns – cost????
 - alternative roads west of Dividing Range impassable in rain
 - custom-built warehouse – exorbitant cost and impractical
- **air transport 4 days, 100 pallets per day**
 - Boeing 737 (10 pallets): \$60,000 per return trip
- **total cost 4 days \approx \$2.5m**

costs: faster reconnection of utilities

- **some options**
 - **maintain emergency cadre of trained personnel in Cairns at cost of \$20m p.a.**
 - **supply generator to all households: \$118m**
 - **separate sewerage pump reconnection during Yasi \$93,000 for 4 days (pumps from mining coys)**
- **Ergon Energy est. \$2m to \$3m per day to accelerate reconnection**

some assumptions

- Cairns experiences cat 4 or cat 5 tropical cyclone every 5 years
- discount rate 4 per cent (plus 2 and 6)
- estimated benefits are annual



costs and benefits

service	benefit (\$m)	cost (\$m)	net present value (\$m 2011)
pets sheltered 5 days	- 5.0	0.5	-59.6
police patrols (3 days)	1.7	0.05	19.7
police patrols (10 days)	5.7	0.1	66.2
fresh food delivered within 3-4 days	6.2	2.5	65.7
utilities reconnected within 3-5 days	17.8	10.1	181.0

Notes:

1 Amounts shown are order of magnitude only, and are expressed in \$2011.

2 Net Present Value of benefits minus costs over 15 years has been calculated using a discount rate of 4 per cent per annum.

findings

- **order of preference**
 - **pets (negative)**
 - **police patrols**
 - **fresh food**
 - **faster reconnection of utilities**
- **mistrust of govt and emergency services orgs**
- **possibly two ‘populations’**
 - **‘no change’, self-reliant, insured, etc**
 - **want more services**
- **positive benefits do not necessarily mean that services should be funded by governments**