The choice of hunting and trading bushmeat in Tanzania: Choice experiments with actors in the Kilombero Valley bushmeat market

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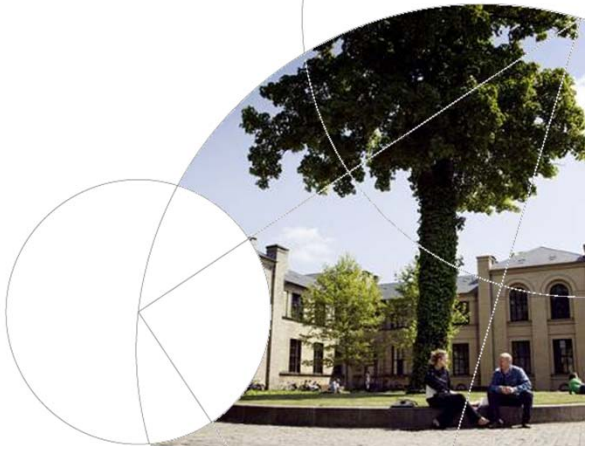

Bushmeat hunting and the bushmeat trade

Managing the bushmeat trade

Location background

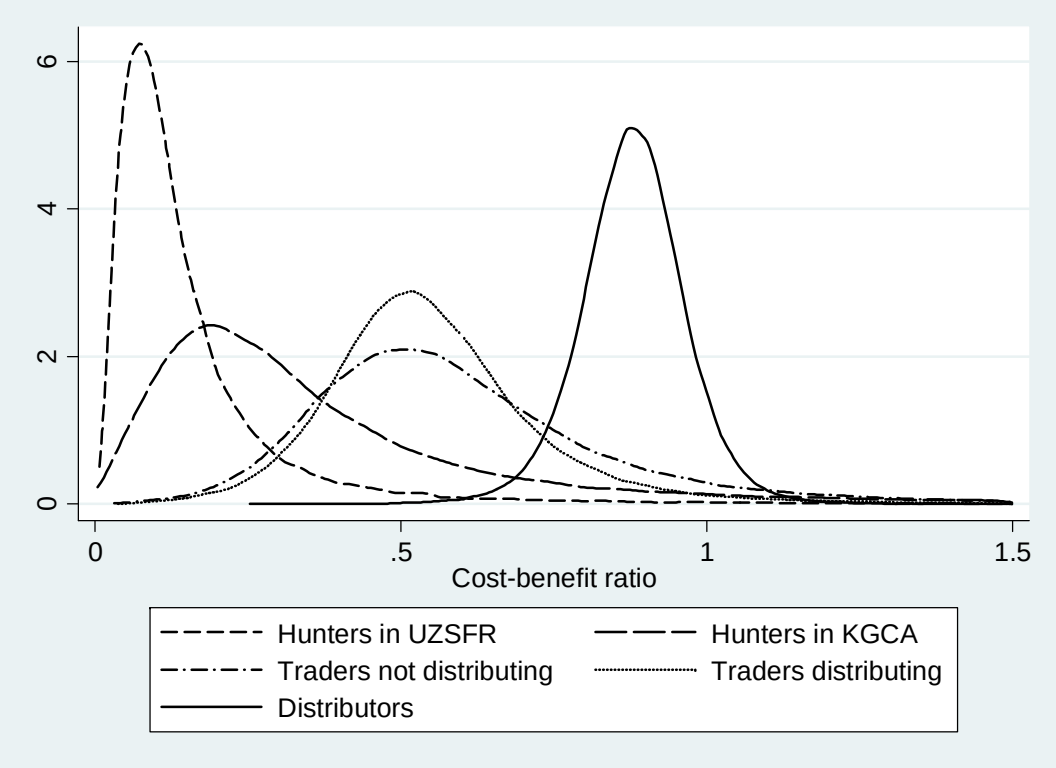

Figure 1. Density plot of the simulated distribution of cost-benefit ratios for the various actors in the local commodity chain.

Methods

		Hunt and trade bushmeat	Salary work
	Price per kg domestic animal meat	6,000 TSH	6,000 TSH
	Number of cows donated	4	4
	Salary per day		7,000 TSH
	Patrolling frequency	Once every year	
	Fine if caught	300,000 TSH	
	Preferred option		

Would you prefer to hunt and trade bushmeat or do salary work if the conditions were as described here?

		A	B	C
	Number of cows donated	1	5	2
	Salary per day	4,000 TSH	8,000 TSH	4,000 TSH
	Patrolling frequency	Once every month	Once every month	Once every week
	Fine if caught	100,000 TSH	50,000 TSH	30,000 TSH
	Hunting trips per month	0	3	5
				

Which of the three scenarios is best for your livelihood?
Which of the three scenarios is worst for your livelihood?

Methods

Attribute	Levels	Hypothesis
Cows donated	0 and 4	Higher number of domestic animals reduces the inclination to choose to hunt/trade bushmeat illegally because it supplies meat and products for own use and income generation
Price of domestic animal meat in general	1.000, 3.000, 4.000 and 6.000 (TSH/kg)	Higher price provide incentives to hunt/trade bushmeat in order to cover own protein needs and to supply increased demand for cheaper bushmeat
Daily salary in an alternative occupation of similar strenuousness and risk	1.000, 2.000, 3.000, 4.000, 5.000 and 7.000 (TSH/day)	Higher wages reduce the propensity to choose the hunting/trading bushmeat option.
Patrolling frequency by law enforcement staff	Once per year, twice per year, once every month and once every week	Higher frequency reduce the utility form hunting through higher likelihood of apprehension and punishment
Magnitude of the fine	30.000, 50.000, 100.000 and 300.000 (TSH/arrest)	Higher fines reduce the utility from hunting through higher reduction in profit margins if arrested

Results

Table 1. Random effect binary logistical regression on the choice to hunt/trade bushmeat or do salary work (base group) for the combined sample and for each of the three main actor groups.

	Combined	Hunters	Traders	Distributors
Donated cows	-0.94474 (0.16881)***	-0.55134 (0.30602)*	-1.05922 (0.30769)***	-1.34095 (0.46539)***
Price of domestic animal meat (1,000 TSH/kg)	0.12150 (0.03401)***	0.16265 (0.06934)**	0.14011 (0.05924)**	0.07816 (0.06537)
Salary (1,000 TSH/day)	-1.15293 (0.03900)***	-0.93769 (0.07159)***	-1.34725 (0.06527)***	-1.20809 (0.14523)***
Interaction between fine and patrol frequency (10,000)	-0.00045 (0.00018)**	-0.00033 (0.00050)	-0.00021 (0.00026)	-0.00097 (0.00035)***
Household assets value (1,000,000 TSH/AEU)	2.83627 (1.45153)*	1.80482 (2.41431)	6.27732 (5.28409)	3.67145 (6.57082)
Land cultivated (Acre/AEU)	-0.39948 (0.16221)**	-0.42817 (0.36376)	-0.78229 (0.35716)**	0.07890 (0.40964)
Total income (1,000,000 year/AEU)	1.22790 (0.34971)***	2.13095 (0.75335)	1.62584 (0.62189)***	-0.25028 (0.93520)
Constant	3.58091 (0.28996)***	2.65474 (0.50995)***	3.78952 (0.46687)***	4.58246 (0.90410)***
Sigma	2.40894 (0.14065)***	2.12691 (0.26580)***	2.77216 (0.22543)***	1.95267 (0.46500)***
Model properties				
Observations	2593	640	1350	603
Groups (i.e. individuals)	325	80	169	76
Log-likelihood	-942.81755	-263.54683	-479.02174	-178.82217
McFadden's pseudo r^2	0.5590	0. 6043	0.5498	0.4853
AIC/n	0.734	0.852	0.723	0.623

*, ** and *** signify statistical significance at 0.1, 0.05 and 0.01 levels, respectively.

Results

Table 2. Partial effects for logistic probability function averaged over observations.

	Combined	Hunters	Traders	Distributors
Donated cows	-0.09168 (0.01542)***	-0.06520 (0.03524)	-0.09677 (0.02685)***	-0.09690 (0.02431)***
Price of domestic animal meat (1,000 TSH/kg)	0.01179 (0.00316)***	0.01920 (0.00746)**	0.01267 (0.00514)**	0.00565 (0.00436)
Salary (1,000 TSH/day)	-0.11188 (0.00189)***	-0.11068 (0.00390)***	-0.12180 (0.00377)***	-0.08730 (0.00423)***
Interaction between fine and patrol frequency (10,000)	-0.00004 (0.00002)***	-0.00004 (0.00006)	-0.00002 (0.00002)	-0.00007 (0.00003)***
Household assets value (1,000,000 TSH/AEU)	0.27524 (0.14008)*	0.21303 (0.28172)	0.56749 (0.48235)**	0.26531 (0.47427)
Land cultivated (Acre/AEU)	-0.03877 (0.01571)***	-0.05054 (0.04313)	-0.07072 (0.03275)**	0.00570 (0.02954)
Total income (1,000,000 year/AEU)	0.11916 (0.03354)***	0.25152 (0.08536)***	0.14698 (0.05450)***	-0.01809 (0.06732)

*, ** and *** signify statistical significance at 0.1, 0.05 and 0.01 levels, respectively.

Results

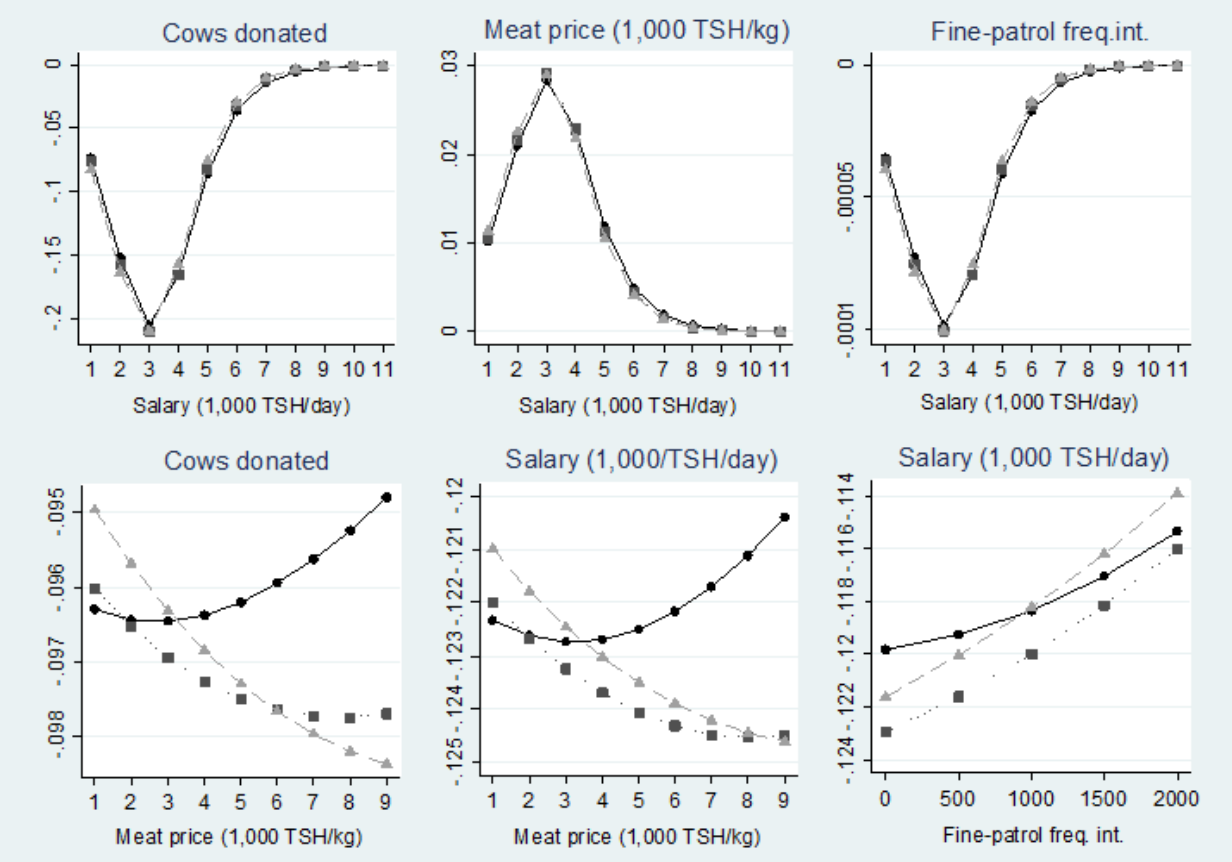

Figure 2. Average marginal effects, in terms of likelihood of choosing hunting/trading bushmeat, of one unit change in cows donated, price of domestic animal meat and the fine-patrol frequency interaction at each level of another attribute.

Results

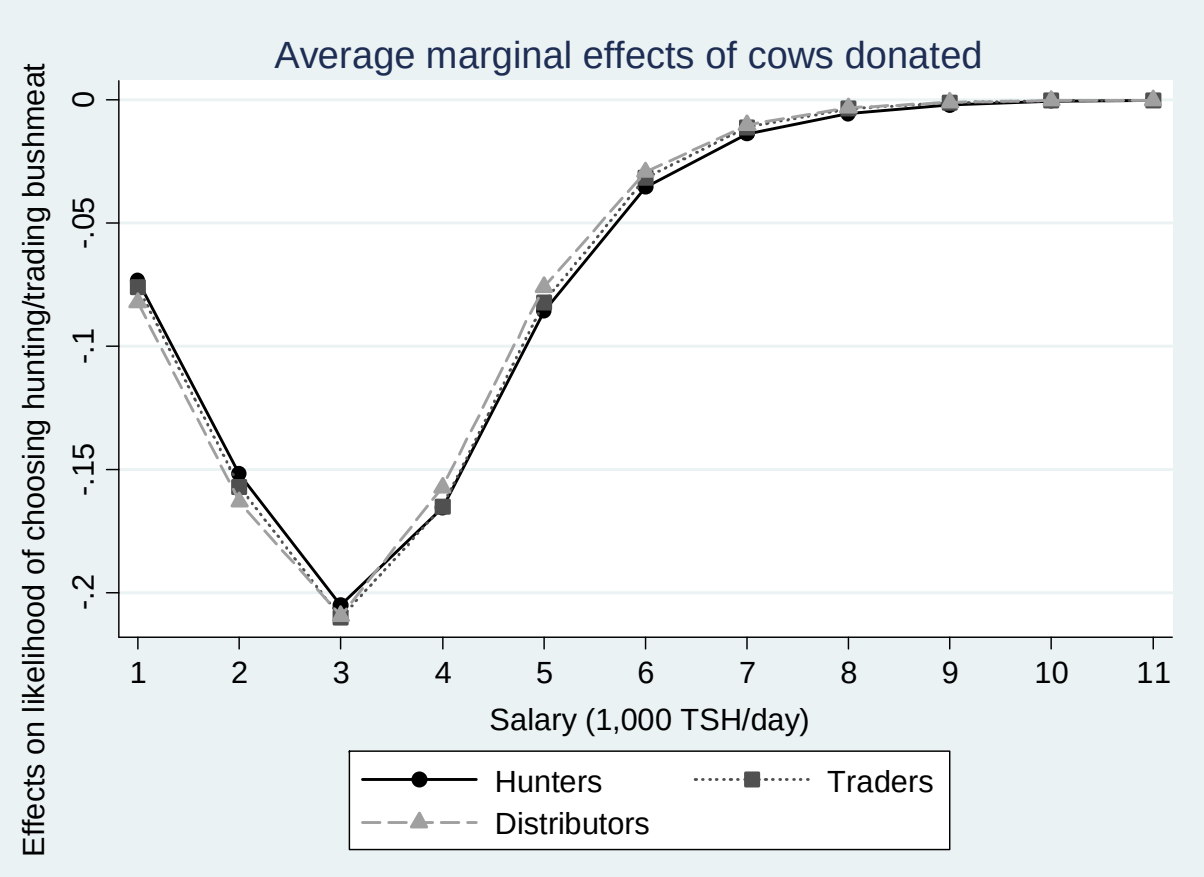

Figure 3. Average marginal effects, in terms of likelihood of choosing hunting/trading bushmeat, of one unit change in cows donated at each level of salary per day for the three actor groups. One unit change is equivalent to four cows donated and 1,000 TSH/day. The full black line with circular marks represent hunters, the dotted line with square markers represents traders and the grey dashed line with triangular marks represents distributors.

Results

Table 3. Calculated trade-offs (i.e. willingness to accept) in relation to daily salary for the combined sample and for the three actor groups.

	Combined	Hunters	Traders	Distributors
Donated cows	-0.09882 (0.01566)***	-0.04751 (0.03510)	-0.09497 (0.02305)***	-0.13363 (0.03417)***
Price of domestic animal meat (1,000 TSH/kg)	0.01424 (0.00385)***	0.02355 (0.00908)***	0.01314 (0.00563)**	0.00831 (0.00693)
Interaction between fine and patrol frequency (10,000)	-0.00050822 (0.0002001)**	-0.00046840 (0.0007158)	-0.00022520 (0.0002525)	-0.00011 (0.0003609)***

*, ** and *** signify statistical significance at 0.1, 0.05 and 0.01 levels, respectively.

Discussion

- Fines and patroling low influence on choice
  - Patrol frequency increased 1100 times
  - Fine increased to 25-30 mill TSH
- Salary in an available job
  - 5,400 TSH/day
- Donation of four cows
  - Likelihood of hunting reduced to 20%
- Price of domestic animal meat
  - Likelihood of hunting reduced to 27% if free

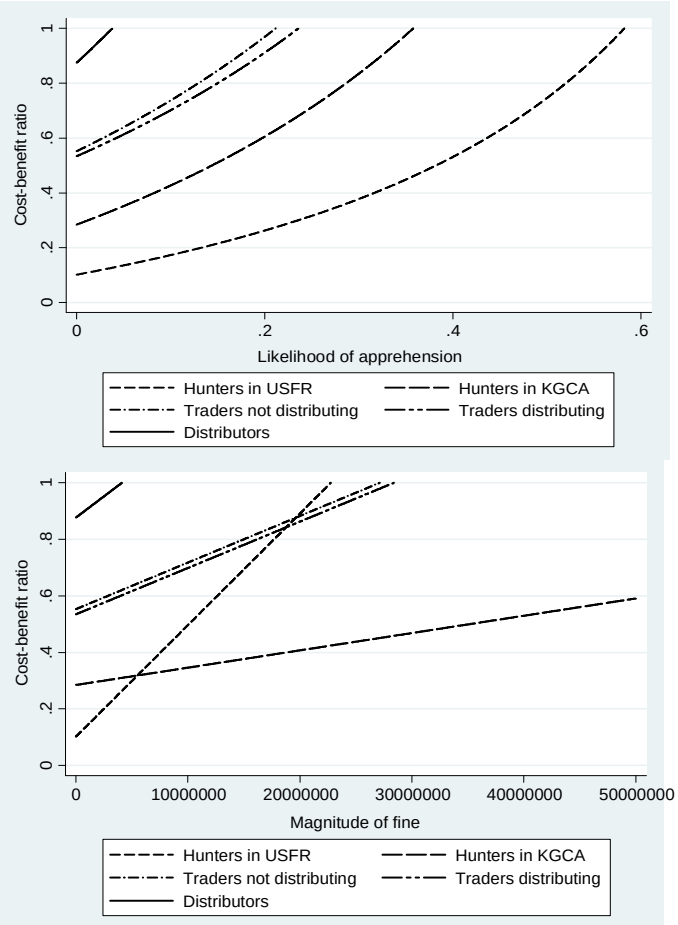

Figure 4 and 5. Simulated cost benefit ratios as a function of likelihood of apprehension and The magnitude of the fine if caught.

Discussion

- Wealthier households more likely to choose hunting
  - Assets
  - Income
- More land cultivated – less likely to chose hunting

Conclusion

- Choice experiments has a large potential in eliciting information on the drivers of the bushmeat trade
- Traditional patrols and fines approaches has limited effect on the choice of engaging in the bushmeat trade
- The availability and salary in an alternative occupation has the largest effect on the choice of hunting and trading bushmeat
- But we need to be realistic