Problems with Cost-Benefit Analysis due to WATP's inequality with WTA
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"WATP" is "willingness and ability to pay." It is usually just called "WTP," "willingness to pay." "WTA" is "willingness to accept." Economists have known since around 1940 that in general WATP ≠ WTA (assuming "rational" consumers), although they usually express this inequality using different terms[1] which you do not have to know.

Suppose the policy question is whether to adopt climate policies which will result in the extinction of polar bears. These policies have supporters, who stand to gain in a pecuniary way from adoption of these policies, and these policies have opponents, who stand to lose in various ways if polar bears go extinct. (Some of these opponents may not yet be alive, but their future existence is assumed.)

We deal with two cases: in the first, the supporters of the policy have a benefit of polar bear extinction of exactly \$100. In the second, the supporters of the policy have a benefit of polar bear extinction have a WATP which is different from their WTA.

1. Unique Benefit of Extinction

Suppose the benefit of Polar Bear Extinction is exactly \$100. Consider three possible values for the cost of Polar Bear Extinction:

Cost of
Polar Bear Extinction

	(i)	(ii)	(iii)
WATP save bears	\$200	\$25	\$90
WTA if bears are killed	\$300	\$55	\$105

In Case (i), the polar bears should not be allowed to go extinct.

In Case (ii), the polar bears should be allowed to go extinct.

Case (iii) is ambiguous. "Net Social Benefit" is the benefit of extinction minus the cost of extinction. We've been supposing that the benefit is \$100; using the costs given in the above table, we have

Scenario (iii)
Net Social Benefit

	Save Bears	Kill Bears
WATP save bears	−\$10*	+\$10
WTA if bears are killed	+\$5	−\$5*

[1] Namely, "equivalent variation" and "compensating variation."

Explanation of first row: the cost of extinction is \$90 and the benefit is \$100. Explanation of second row: the cost of extinction is \$105 and the benefit is \$100.

One could argue that WATP is irrelevant for the "Kill Bear" column because it's the "willingness and ability to pay to save the bears." So in the WATP row, the figure in the "Save Bears" column has an asterisk, denoting its more important status.

Similarly, one could argue that WTA is irrelevant for the "Save Bear" column because it's the "willingness to accept compensation if the bears are killed." So in the WTA row, the figure in the "Kill Bears" column has an asterisk, denoting its more important status.

If one agrees with the position argued in the previous two paragraphs, then since the number in the table's "Save Bears" column is negative, society should not save the polar bears. Also, since the number in the table's "Kill Bears" column is negative, society should not kill the polar bears. This is obviously problematic, because society has to do one of these or the other. We conclude that, even just looking at the Net Social Benefit numbers with asterisks, no conclusion can be drawn about which policy society should adopt.

2. Non-unique Benefit of Extinction

In this Section, retain Case (iii)'s description of the polar bear supporters, but now suppose that the polar bear opponents have a benefit of Polar Bear Extinction which is not \$100, but rather has a WATP of \$80 and a WTA of \$110. Then we have:

Scenario (iii)
Net Social Benefit

		Polar Bear opponents	
Polar Bear Supporters		WTA saving bears	WATP killing bears
		\$110	\$80
WATP save bears	\$90	90 – 110 = –20	
WTA if bears killed	\$105		80 – 105 = –35

This is problematic: society should not save the bears, because that has a negative net social benefit (of –\$20), but society should also not kill the bears, because that also has a negative net social benefit (of –\$35).

Another possibility would be the following. (It is somewhat unlikely because the polar bear opponents have WATP larger than WTA.)

Scenario (iii)
Net Social Benefit

		Polar Bear opponents	
Polar Bear Supporters		WTA saving bears	WATP killing bears
		\$85	\$110 (unlikely?)
WATP save bears	\$90	90 – 85 = +5	
WTA if bears killed	\$105		110 – 105 = +5

This is also problematic: society should save the bears, because that has a positive net social benefit (of \$5), but society should also kill the bears, because that also has a positive net social benefit (of \$5).

Certainly there are non-problematic cases. Here is one, in which the polar bear opponents' valuations are both smaller than \$90:

Scenario (iii)
Net Social Benefit

		Polar Bear opponents	
Polar Bear Supporters		WTA saving bears	WATP killing bears
		\$85	\$80
WATP save bears	\$90	90 – 85 = +5	
WTA if bears killed	\$105		80 – 105 = −25

In this example, saving the bears has a positive net social benefit and killing the bears has a negative net social benefit, so the bears should be saved. If you change the polar bear opponent's WTA and WATP so that both of them are larger than \$105, the conclusion will flip. Here is an example of that:

Scenario (iii)
Net Social Benefit

		Polar Bear opponents	
Polar Bear Supporters		WTA saving bears	WATP killing bears
		\$120	\$110
WATP save bears	\$90	90 – 120 = −30	
WTA if bears killed	\$105		110 – 105 = +5

Basically, if the polar bear opponents' "WTA saving bears" is less than \$90, the net social benefit of "saving bears" will be positive; and if the polar bear opponents' "WATP killing bears" is less than \$105, the net social benefit of "killing bears" will be negative.