**Peacefully Resolve a Conflict between Bordering Countries over an**

**Oil Reserve**



# Introduction:

Hermania and Broland are two fictional neighboring countries. Hermania discovers an oil deposit worth $100 billion, under the imaginary Patris sea. Broland hears about this and claims the resource.

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|  | As a result, both countries face an impending war. The governments of both the countries evidently know that Hermania and Broland have 60% versus 40% chances of winning this war, at costs of $15 billion and $20 billion respectively.  To avoid the war, both countries agree to bargain and share portions of the oil deposit. |

# Bargain for Pacifism:

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| Each countries’ prospect of winning the war is calculated as their chance of winning, times total value of the oil deposit.  Their minimum threshold to forego the war may be deduced by subtracting their cost of war from their prospect of winning.  This is $45bn for Hermania:  60% x $100bn - $15bn = $45bn  and $20bn for Broland:  40% x $100bn - $20bn = $20bn |  |

# Sequential Negotiation towards Solution:

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| Hermania starts negotiating by offering some share to Broland. If Broland accepts that, the two countries settle without a war. Otherwise, if Broland asks for more, they attack Hermania and the war breaks.  Expected Returns from War:  In the worst case, if negotiations fail and the war breaks, each country’s benefit from winning the war can be calculated as their probability of them winning, times, the remaining value of oil deposit after subtracting their cost of war.  The country’s deficit from losing the war is their probability of losing, times their cost of war.  Therefore, each country’s expected returns from fighting the war can be measured as their benefit minus their deficit. |  |

Hermania’s expected returns from war will thus be $45bn.

60% x ($100bn-$15bn) + 40% x (-$15bn) = $45bn

While, the same for Broland will be $20bn.

40% x ($100bn-$20bn) + 60% x (-$20bn) = $20bn

Broland’s Acceptance of Hermania’s Offer:

Broland’s expected returns from the war is $20bn. While their minimum bargain of not fighting is also $20bn. Therefore, if Hermania offers a share worth $20bn or more, Broland will rationally accept that and not have any reason to reject that and fight the war.

Hermania’s Rational Offer:

Knowing this, Hermania will initiate the entire negotiation with an offer worth exactly $20bn and keep the rest worth $80bn for themselves. Hermania gets more than their expected returns from war, which was $45bn, also their minimum bargain for not fighting.

# Conclusion:

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| Hermania will offer Broland a share of $20bn and keep the rest share worth $80bn for themselves. Thus, both countries will settle by maximizing their payoffs and even without starting any war. |  |

# References:

* Visualization:

<https://github.com/anodiamadmin/AIML/tree/main/01StrategicDecision/Nashpy>