Applying PV to Policies Instead of Classes

Largest PV identifies **largest feasible set** for policies as well

Example with three options:

Policy	Details
BAU	Provides **$100k** in 0 and **$100k** in 1
Option A	Costs **$10k** in 0 relative to BAU, provides additional **$20k** in 1
Option B	Costs **$25k** in 0 relative to BAU, provides additional **$30k** in 1

As a table of net payments:

Policy	Net in 0	Net in 1
BAU	$100k$	100k
A	$100k - 10k = 90k$	$100k + 20k = 120k$
B	$100k - 25k = 75k$	$100k + 30k = 130k$

Computing PVs at $r = 10\%$:

Policy	PV calculation	PV	Ranking
BAU	$100k + \frac{100k}{1.1}$	$190.9k$	#3
A	$90k + \frac{120k}{1.1}$	$\mathbf{199.1}\boldsymbol{k}$	#1 Best
B	$75k + \frac{130k}{1.1}$	$193.2k$	#2 Better than BAU

These are *gross* or *absolute* payoffs:

- Show what *actually happens* under each policy, including BAU

Often convenient to measure payoff *relative to BAU*

- Show *changes from BAU as **net** payoffs*
- Use to compute **net present value (NPV)**

Net present value:

NPVs for the example:

Policy	Policy PV	BAU PV	NPV	Ranking
BAU	$190.9k$	$190.9k$	0	#3
A	$199.1k$	$190.9k$	$\mathbf{8.2k}$	#1 Best
B	$193.2k$	$190.9k$	$2.3k$	#2 Better

Can compute NPVs directly from changes in payoffs:

Policy	Change in 0	Change in 1	PV of changes	NPV
A	$-10k$	$+20k$	$-10k + \frac{20k}{1.1}$	$\mathbf{8.2k}$
B	$-25k$	$+30k$	$-25k + \frac{30k}{1.1}$	$2.3k$

Approaches are always equivalent:

Difference in PVs	PV of differences

$$NPV = PV(A) - PV(BAU) \qquad NPV = PV(A - BAU)$$

$$\left(I_0^A + \frac{I_1^A}{1+r}\right) - \left(I_0^{BAU} + \frac{I_1^{BAU}}{1+r}\right) \qquad (I_0^A - I_0^{BAU}) + \frac{(I_1^A - I_1^{BAU})}{1+r}$$

Can use whichever way is clearest and most convenient.

Bottom line:

Policy option with the highest PV or highest NPV:

- **Largest feasible set** of C_0 and C_1 options
- **Either or both** periods can be made better off
- *Pareto efficient*