

Elasticity / Sensitivity

"Sensitivity Analysis"

Can sensitivity analysis  
substitute for parameter  
uncertainty in PVA?

Example: PVA with environmental variability in birth rates, characterized by a mean ( $\bar{b}$ ) and std ( $\sigma_b$ ). If the  $\bar{b}$  and  $\sigma_b$  are "known", this is PVAX01  
But if  $\bar{b}$  and  $\sigma_b$  are estimates based on sample there is uncertainty.

# Table of sensitivity analysis results

$\bar{b}$	$P(Q_x)$	$P(\bar{b})$
0.50	.6	.0
0.51	.3	.1
0.52		.2
0.53		.3
0.54	0.25	.2
0.55		.13
0.56	.1	.
0.57		.
0.58	0.0	.

"Elasticity"  $\equiv$  1st derivative  
normalized sensitivity

$$\frac{d p(Q_n)}{d \bar{b}} \bigg|_{\bar{b}}$$

- \* extrapolation assumes linearity
- \* derivation is infinitesimal valid  
for small  $\Delta$

Chain rule to reexpress  
sensitivity / elasticity / derivative

$$\frac{d\lambda}{d\$}$$

efficiency of intervention