MATHEMATICAL REPRESENTATION OF THE DROUGHT DECISION MODEL

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1. Indices

Time is indexed by t, units in years. Variables with this index are allowed to vary by year.

Insurance decision is indexed by i, where $i = 1$ corresponds to the purchase of insurance and $i = 0$

2. Profit Model

$$\pi_t = R_t - C_t \tag{1}$$

2.1. Revenues.

$$R_t(h, \phi, w_t, p_t) = q_t(h, \phi, w_t)p_t \tag{2}$$

$$q_t = \phi h * w_t \tag{3}$$

Parameters:

- q_t: Quantity of calves sold (pounds)
- ϕ: Average percentage of calves sold,
- h: herd size (number of cows, does not include calves),
- w_t: calf weight at weaning in year t (pounds),
- p_t: price of calves at weaning in year t (\$/pound)

2.2. Costs.

$$C_t = \gamma h + \tag{4}$$

Parameters:

- ϕ: Average percentage of calves sold,
- h: herd size (number of cows, does not include calves),
- w_t: calf weight at weaning in year t (pounds),
- p_t: price of calves at weaning in year t (\$/pound)
- γ: base operating costs (\$/cow)