- $\theta \sim [\underline{\theta}, \bar{\theta}]$
- $U(\theta) = u(q(\theta)) - a$
  - $q = c$
  - $q = \theta a$
- $f(\bar{\theta}) > \varepsilon > 0$

1. autarky
2. First best
   - before learning types, what is optimal insurance contract?
   - can observe a and θ
3. θ is observable
4. Neither a nor θ is observable

assume $\underline{\theta} > 0$

1. $\max_a u(c) - a \Rightarrow u'(\theta a^A)\theta = 1$

$$\Rightarrow c^A(\theta) = u'^{-1}\left(\tfrac{1}{\theta}\right)$$

$$\underbrace{h^A(q)}_{\text{density of output}} = \frac{d\Pr(\theta a^A \le q)}{dq} = -\frac{u''(q)}{(u'(q))^2} f\left(\frac{1}{u'(q)}\right)$$

2. θ, a observable
   - Let $P(\theta, a)$ be the transfer paid by agent
     - if $a \neq a^*(\theta)$, make $P(\theta, a) = -\infty$
       $\Rightarrow P(\theta) \equiv P(\theta, a^*(\theta))$
     - $U(\theta) = u(\theta a^*(\theta) - P(\theta)) - a^*(\theta)$

$$\max_{P(\theta),a(\theta)} \int_{\underline{\theta}}^{\bar{\theta}} \left[u(\theta a(\theta) - P(\theta)) - a(\theta)\right] f(\theta)d\theta$$

s.t. $\int_{\underline{\theta}}^{\bar{\theta}} P(\theta)f(\theta)d\theta \le 0$ (budget balance)

$$\Rightarrow \max_{p(\theta),a(\theta)} \lim_{\hat{\theta}\to\bar{\theta}} \int_{\underline{\theta}}^{\hat{\theta}} u(-P(\theta))f(\theta)d\theta + f(\bar{\theta})\left[u(\bar{\theta}a(\bar{\theta}) - P(\bar{\theta})) - a(\bar{\theta})\right]$$

s.t. $\int_{\underline{\theta}}^{\bar{\theta}} P(\theta)f(\theta)d\theta = 0$

$$\Rightarrow a(\bar{\theta}) = \bar{\theta}^{-1}\left[u'^{-1}(\bar{\theta}^{-1}) + P(\bar{\theta})\right]$$