

Empirical Evidence Equilibria

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Game Theory

What?

How?





Model



Empirical Evidence Equilibria

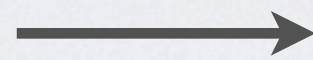
$$x^+ = f(x, a, s)$$

$$u(x, a, s), \delta$$

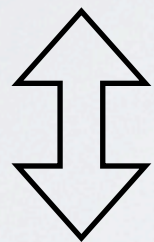
$$\left. \begin{array}{l} z^+ = g(z, s) \\ s = h(z) \end{array} \right\} \mu$$

$$y^+ = \varphi(y, x, a)$$

$$s = \omega(y)$$



$$\sigma(X)[a] \sim e^{-\frac{1}{\tau} Q(X, a)}$$



$$X^+ = F(X, a)$$

$$U(X, a), \delta$$

$$Q(X, a) = U(X, a) + \delta \mathbb{E} [V^*(X^+) \mid a]$$

$$V^*(x) = \max_a Q(X, a)$$

$$\left. \begin{array}{ll} x^+ = f(x, a, s) & y^+ = \varphi(y, x, a) \\ \sigma & s = \omega(y) \end{array} \right\}$$

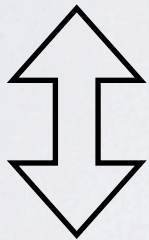
$$\left. \begin{array}{l} z^+ = g(z, s) \\ s = h(z) \end{array} \right\} \mu \qquad z^t = (s^{t-k}, \dots, s^{t-2}, s^{t-1})$$

$$\chi^k[d] = \lim_{t \rightarrow \infty} \mathbb{P} \left[(s^{t-k}, \dots, s^{t-1}, s^t) = d \right]$$

Consistency

$$\chi_{\mu}^k = \chi_{\sigma}^k$$

$x_i^+ = f_i(x_i, a_i, s_i)$	$x_j^+ = f_j(x_j, a_j, s_j)$
σ_i	σ_j
$y^+ = \varphi(y, x, a)$	
$s = \omega(y)$	



$$Y^+ = \Phi(Y)$$

$$s = \Omega(Y)$$

$$\pi_\Phi$$

$$\mu_i$$

Models \longrightarrow Strategies \longrightarrow Models

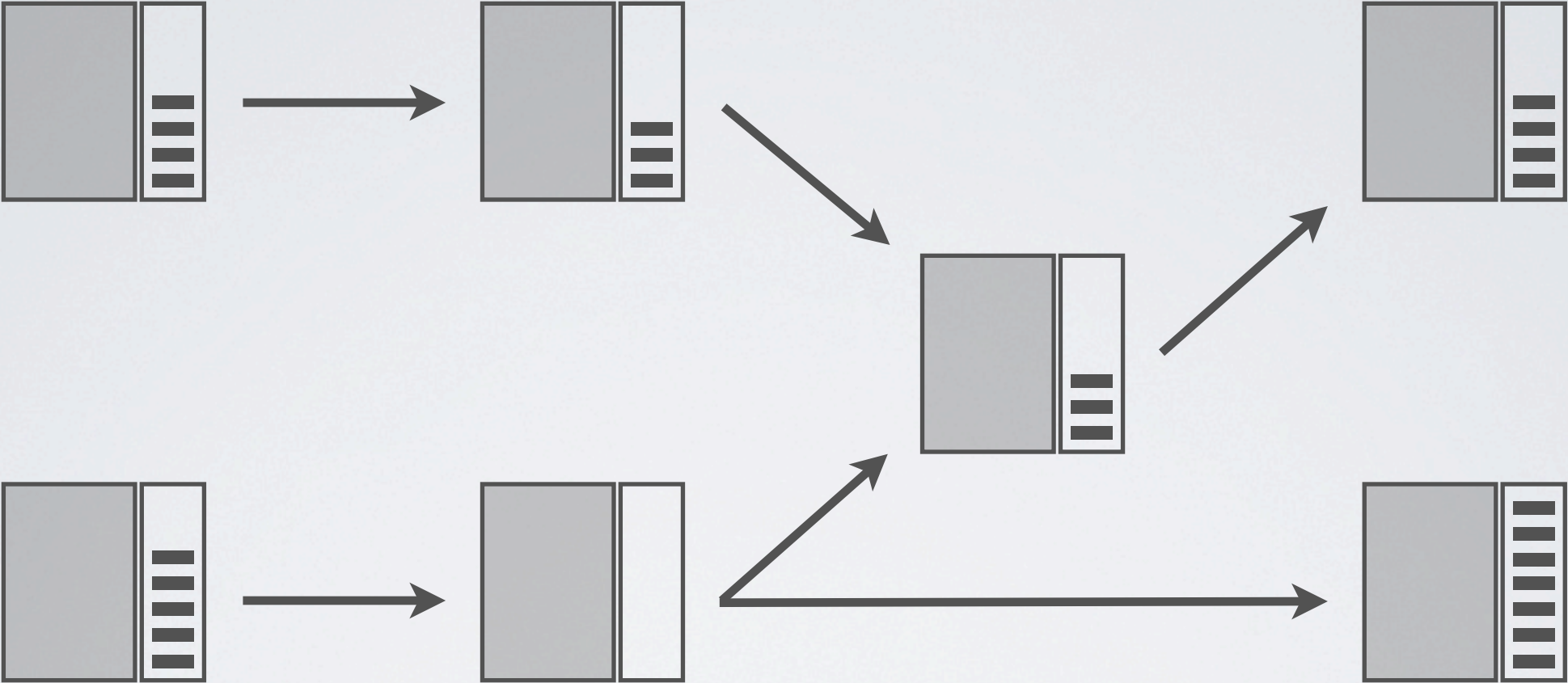
μ_i

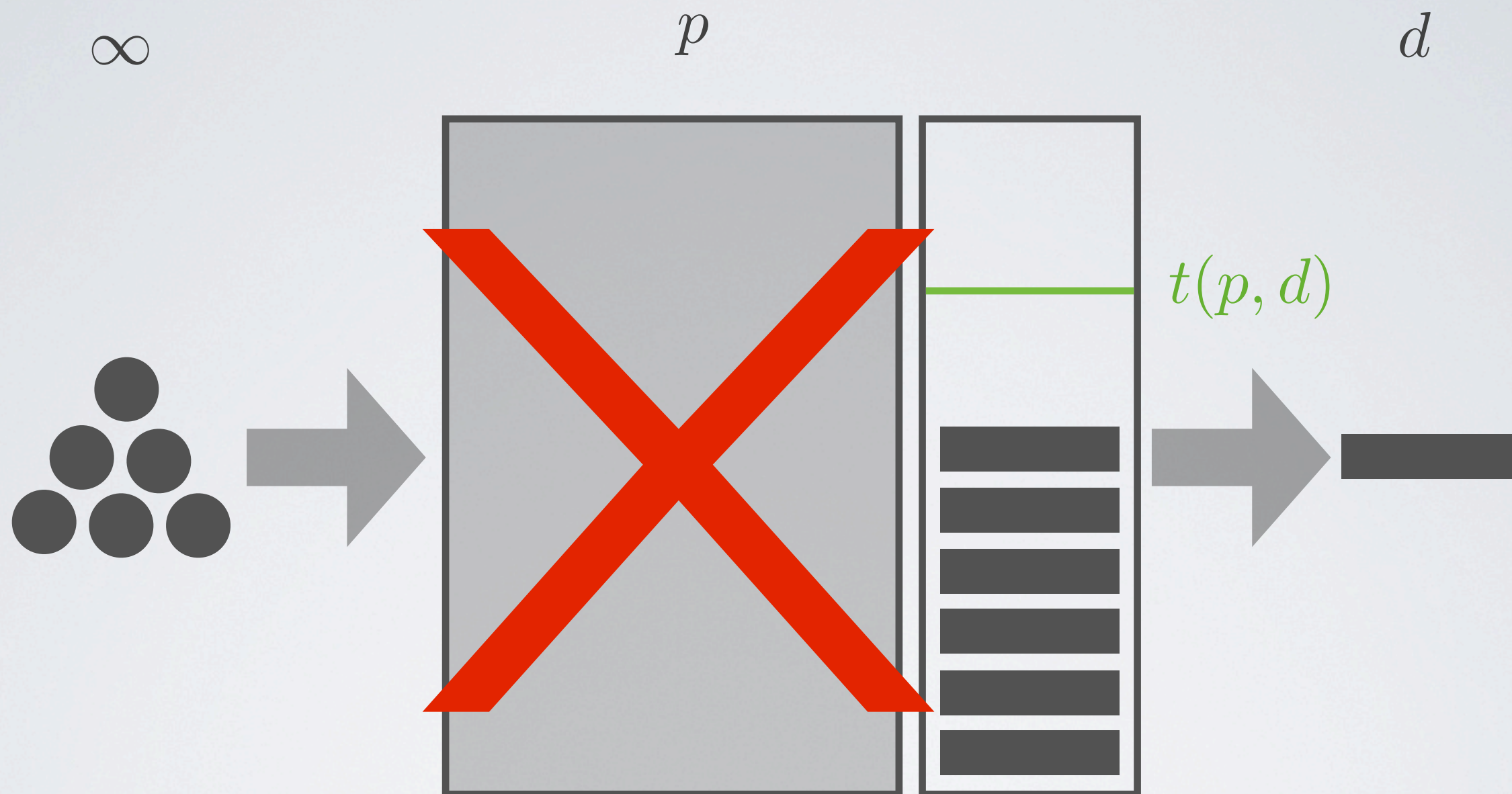
$\sigma_i \sigma$

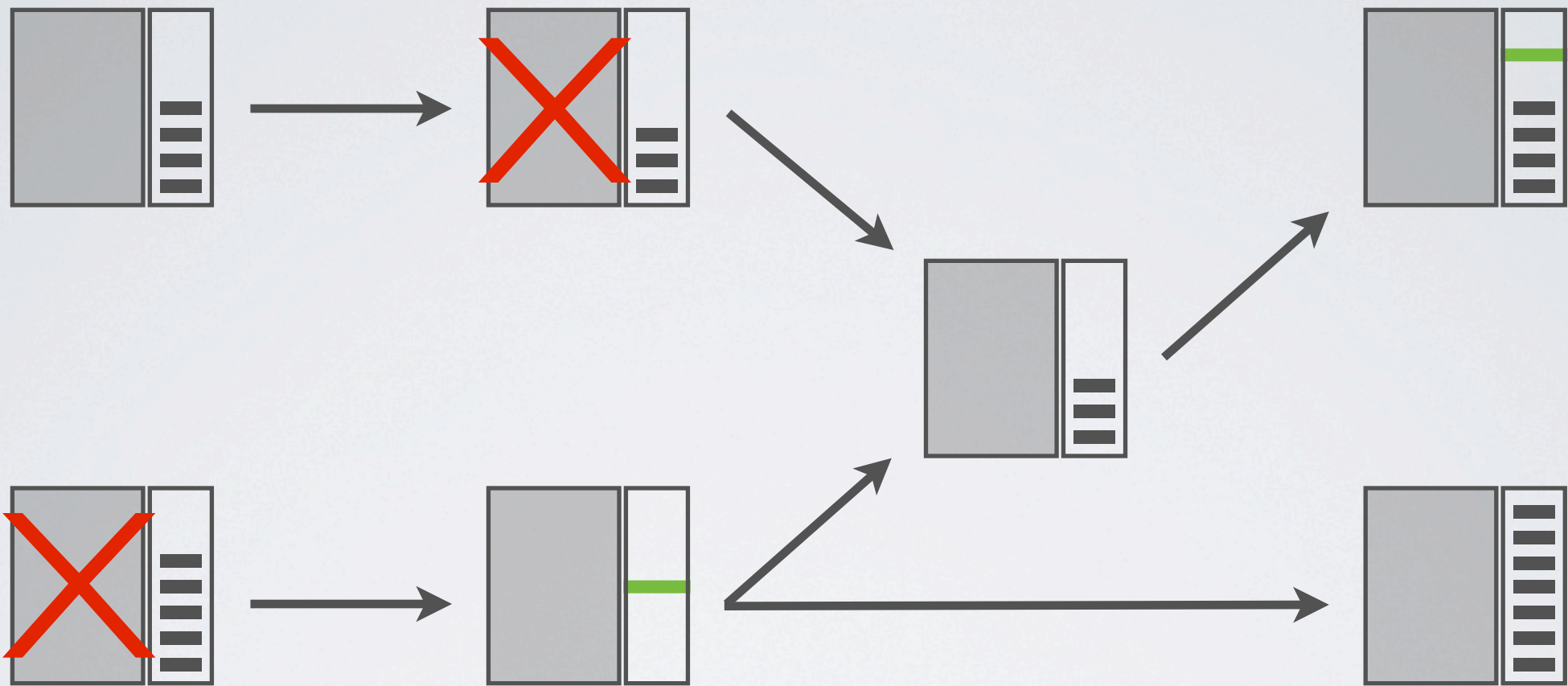
μ_i

Brouwer's fixed point theorem

Decentralized Control







N. Dudebout and J.S. Shamma, “*Empirical Evidence Equilibria in Stochastic Games*”, submitted to CDC 2012.