

## 2.2 Public Good Model + Equalization Scheme

$$g = \tau k^i + \xi(\tau^i, \tau^j)$$

$$\frac{\partial g}{\partial \tau^i} = \tau^i \frac{\partial k^i}{\partial \tau^i} + k^i + \frac{\partial \xi}{\partial \tau^i}$$

### Tax Base Equalization

$$\xi := \gamma \bar{\tau} (\tilde{k} - k^i)$$

$$\frac{\partial \xi}{\partial \tau^i} = \left( \gamma \left( (\tilde{k} - k^i) \frac{\partial \bar{\tau}}{\partial \tau^i} + \bar{\tau} \frac{\partial \tilde{k}}{\partial \tau^i} \right) \right) - \gamma \bar{\tau} \frac{\partial k^i}{\partial \tau^i}$$

$$\frac{\partial g}{\partial \tau^i} = k^i + \tau^i \frac{\partial k^i}{\partial \tau^i} - \gamma \bar{\tau} \frac{\partial k^i}{\partial \tau^i}$$

$$\frac{\partial g}{\partial \tau^i} = k^i + (1 - \gamma) \tau^i \frac{\partial k^i}{\partial \tau^i}$$

### Tax Revenue Equalization

$$\xi := \phi \left[ \frac{\sum_{j \neq i}^n \tau^j k^j}{n-1} - \tau^i k^i \right]$$

$$\frac{\partial \xi}{\partial \tau^i} = \phi \left( \frac{\partial \sum_{j \neq i}^n \tau^j k^j}{\partial \tau^i} - k^i + \tau^i \frac{\partial k^i}{\partial \tau^i} \right)$$

$$\frac{\partial g}{\partial \tau^i} = (1 - \phi) (k^i + \tau^i \frac{\partial k^i}{\partial \tau^i})$$