

*blicly provided goods*. Specifically, the theory of federalism applies economies of scale to public economics in order to address the question of (cost-)optimal jurisdiction size. Again the number of consumers or potential users is crucial. The major difference between private and public goods is that in the case of public goods, the focus is now on provision costs instead of *production costs*. Furthermore, we do not start from a level variation of inputs, but from a *level variation of the number of potential consumers*. Thus, the question is how a variation of the number of consumers or users affects provision costs.

*Definition 2:* Let  $c(n)$  denote the unit-costs of providing a public good to  $n$  potential consumers or users, while  $g$  is the quantity-quality of the publicly provided good,  $t$  is the tax rate ( $0 < t < 1$ ) and  $B$  is the tax base of the jurisdiction.<sup>16</sup> A balanced budget requires

$$tB = c(n)g \quad (2)$$

Economies of scale in the provision are present when the following inequality holds:

$$\frac{dc(n)}{dn} \leq \frac{c(n)g}{n} \quad (3)$$

Note that pure public goods in the Samuelsonian sense per definition imply economies of scale, since marginal costs of an additional consumer – on the left-hand side of inequality (3) – are zero, and, therefore, always less than average costs on the right-hand side. By specifying a cost function for the provision of a public good, one can easily calculate optimal jurisdiction size through minimizing average costs of provision.

In view of possible differences between provision costs and production costs of public goods – especially when you think of the possibility of international cooperation and outsourcing to private enterprises – we refer to the costs of providing a public good by a governmental agency as «provision costs» rather than production costs. In passing, note that there is no difference between the two alternative ways of de-

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<sup>16</sup> For similar models see, e.g., Miceli (1993) and Brasington (1999).