

On the marginal cost of public funds and the optimal provision of public goods

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Abstract

This paper argues that, in models with heterogeneous agents, the concept of the marginal cost of public funds (MCPF) will only be useful if it is compared with an analogous concept for the benefit side. The MCPF does not assume a unique value and is not particularly illuminating in and out of itself. Also gone is the benchmark status of $MCPF = 1$. Turning to the provision of public goods, using a mechanism design approach, the paper constructs a two-stage proof for Kaplow's [Kaplow, L., 1996. The optimal supply of public goods and the distortionary cost of taxation. *National Tax Journal* 49, 513–533.] proposition concerning the “irrelevance” of labor supply and distributional concerns in public good provision. This highlights the two fundamental ingredients for his result. First, the provision of public goods per se, when it satisfies the Samuelson's rule, is only *potentially* Pareto-improving. Second, the actual Pareto improvement will materialize when, or if, one reforms the income tax structure. If the reform is not forthcoming, the decision on public goods provision must rely on redistributive concerns. Finally, the paper generalizes Broadway and Keen's [Broadway, R., Keen, M., 1993. Public goods, self-selection and optimal income taxation. *International Economic Review* 34, 463–478.] result to a model with many types of agents, many private goods and without making any assumptions regarding which self-selection constraints are or are not binding.

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1. Introduction

The concept of the marginal cost of public funds (MCPF) has been studied at length in the literature, both in its own right, as well as in the role it plays in decisions regarding the provision

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of public goods.¹ Recent contributions have centered around two issues. The first generalizes the concept of the MCPF to take account of the government's redistributive concerns (see, e.g., Dahlby, 1998; Sandmo, 1998; Slemrod and Yitzhaki, 2001). The second studies the question of the optimal provision of public goods in the presence of a *general* income tax.² The central contribution here is Christiansen (1981) and Boadway and Keen (1993).³ They have proved that distortionary taxation notwithstanding the optimal provision of public goods continues to be characterized by the simple Samuelson (1954) rule of equality between the marginal rate of transformation and the sum of individuals' marginal rates of substitution between public and private goods (as long as the government levies an optimal general income tax, and that preferences are separable in labor supply and other goods, including the public good). Kaplow (1996, 2004) has extended this result to circumstances under which neither the tax system nor the provision of public goods are optimal. He argues that, in a benchmark case in which a distribution neutral income tax adjustment is employed, labor supply and distributional concerns should play no role in decisions regarding the provision of a public good. Instead, the decision must rest solely on a simple benefit cost rule that compares the marginal rate of transformation and the sum of individuals' marginal rates of substitution between public and private goods. Kaplow's paper has created a lot of controversy as it seems to fly in the face of previous contributions in this area, particularly the seminal paper by Atkinson and Stern (1974). Two recent examples of this are Auerbach and Hines (2002) who write in support of Kaplow's result and Slemrod and Yitzhaki (2001) who seem to reject it.

This paper assesses the usefulness of the concept of the MCPF in models with heterogeneous agents within a second-best framework à la Mirrlees (1971).⁴ Second, I use a mechanism design approach to present an alternative demonstration and explanation of Kaplow's claim. In this way, I am able to emphasize the two fundamental ingredients of his argument.⁵ This is important because the key to resolving the controversy surrounding Kaplow's rule lies in the roles that the two ingredients play in attaining his claim. The first ingredient calls for provision of public goods according to Samuelson's rule and the second for an adjustment in the income tax

¹ The early literature has been cast within the confine of a representative-consumer economy with linear taxes. A selective sample includes Atkinson and Stern (1974), Hansson and Stuart (1985), Browning (1987), Gahvari (1990, 1995), Mayshar (1990), Fullerton (1991) and Ballard and Fullerton (1992).

² A third recent application of the MCPF concept is found in the literature on optimal environmental taxation in the presence of distortionary taxes. The value of the MCPF has assumed a central role in the discussions on the size of the optimal environmental tax relative to the Pigouvian tax. On this see, among others, Sandmo (1975), Bovenberg and de Mooij (1994), Kaplow (1996, 2004), Fullerton (1997) and Cremer et al. (2001).

³ See also Tuomala (1990).

⁴ Christiansen (1999) also studies the concept of the MCPF in Mirrlees's framework. Dahlby (1998) develops a formula for the MCPF when different taxpayers are in different income tax brackets. However, most of the contributors to this literature have remained within the Ramsey framework with linear taxes.

⁵ The mechanism design approach adopted here is particularly suited for this purpose. The existing proofs in the literature, working directly with an existing tax function, do not adequately highlight the relevance of the two ingredients for the attainment of the result. Kaplow's exposition of his proof proceeds as follows. Assume that the government increases the supply of public goods while simultaneously changing all individuals' income taxes in such a way as to keep their net utility constant *on the assumption that their labor supplies do not change*. He then argues that "for each ability level (w), each choice of l [labor supply] produces the same utility when g [public goods] is raised and T [the income tax] is adjusted in an offsetting manner as it does when g is not raised. Because individuals' opportunity sets are thus unaffected, they will choose the same l " (1996, p. 531). In Auerbach and Hines's (2002, pp. 1390–1391) proof, the income tax is conditioned on the public goods provision. They then show, as initially suggested by Kaplow (1996, note 4, p. 533), that the individuals' first-order condition for utility maximization remains satisfied for the initial levels of labor supplies and utilities, as the public goods supply and consequently the individuals' tax payments change.

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