

A NOTE ON MUSGRAVE'S DIAGRAMMATIC EXPLANATION OF TAX LIABILITIES UNDER VARIOUS SACRIFICE FORMULAS*

G. THIMMAIAH

IN his monumental work, *The Theory of Public Finance*, Professor Richard A. Musgrave has used a diagram to explain tax liabilities of two individuals under equal absolute sacrifice formula, equal proportional sacrifice formula and equal marginal (or minimum aggregate) sacrifice formula. The purpose of this note is (1) to show the economic inconsistency in the relation between total utility and income which is present in his diagram and (2) to suggest some modifications in his diagram so as to satisfy the logical relation between the total utility and income and support his conclusions which he has drawn on the basis of his diagram.

Professor Musgrave's Figure 5-1¹ is reproduced in this note in diagram-1. His explanation regarding this diagram and his conclusions on the tax liabilities of two individuals A and B under the above mentioned three sacrifice formulas are reproduced below to escape from the charge of quoting him out of context:

"On the horizontal axes of Figure 5-1 [diagram-1 in this note] we measure income, where OZ and DC are the amounts required for subsistence. On the vertical axis from O up, we measure marginal utility, and from D up, we measure total utility of income, leaving the utility of subsistence income undefined. CE is the total, and CF is the marginal income-utility curve. Now suppose that taxpayer A has income above subsistence equal to ZG. While taxpayer B has income equal to ZH. The total utility received by A equals IE, and his marginal utility equals GF. The total utility received by B equals JK, and his marginal utility equals HL".²

On the basis of the above explanation of his diagram, he has drawn the following conclusions:

"An income tax yielding MG is introduced. Under equal absolute sacrifice, A will pay NG, and B will pay TH, where $NG + TH = MG$.

* An earlier version of this note was presented at a staff seminar of the Department of Economics, University of Queensland, Australia, in 1972. I wish to acknowledge valuable comments from Mr. L. R. Lane and Dr. M. M. Metwally.

¹ *The Theory of Public Finance*, McGraw-Hill Book Company, New York, 1959, p. 97.

² *Ibid.*, p. 96.