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Fraudulence and the competitive supply of public goods

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FRAUDULENCE AND THE COMPETITIVE SUPPLY OF PUBLIC GOODS

Alfred Endres

12. 10. 1978

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Fraudulence And The Competitive Supply Of Public Goods

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I.

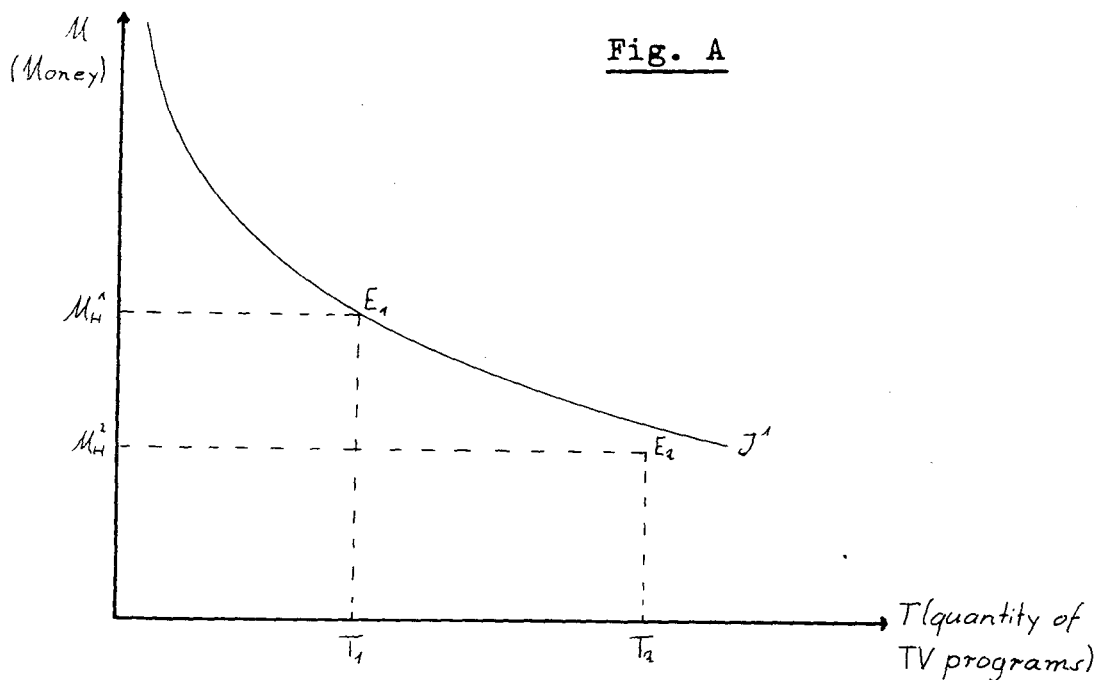
In his [1970], [1973] and [1973a] papers, H. Demsetz pointed out that private firms can supply public goods efficiently if non-purchasers can be excluded (e.g. [1970], p. 293) and if "buyer or market characteristics of transactions that are correlated with the variations in marginal rates of substitution can be discovered" ([1973], p. 400). Furthermore, he claimed, fraudulent behavior of consumers is self-defeating in the public goods case and therefore does not destroy the optimality of supplying public goods privately ([1973], p.403). Demsetz illustrates his arguments by the example of competitively supplied TV-programs which can be viewed at home and in taverns. The demand for home and tavern views is assumed to be independent ([1973], p. 401). Demsetz analyzes the case of tavern viewers allowing home viewers to tap the cable that brings the program to taverns. Initially, they "ask no fee from their fraudulent neighbours" ([1973], p. 403) for the allowance. Given that, the tavern subscribers demand programs up to an amount (T_1) where the sum of their demand prices equals marginal costs. But T_1 is too small to satisfy the demand of both, home and tavern demanders, being less than a quantity T^+ for which the sum of tavern and home viewers' demand prices (marginal willingnesses to pay) equals supply price (marginal cost). In this situation, competition between home viewers to secure more programs would result in their offering higher prices to tavern subscribers (owners)¹⁾ to induce them to increase their demands beyond T_1 . "Ultimately, in equilibrium,

¹⁾The result of the model does not depend on whether the home viewers pay their fees to the tavern viewers or to the tavern owners.

this will result in an increase in the demand of tavern [subscribers] to a level where the total demand just equals the vertical summation of [the demands of the two groups of subscribers]. In effect, the attempt at fraud merely converts tavern [subscribers] into collective agents for program producers, and the price collected from home viewers by tavern [subscribers] is precisely the price they would have paid directly to program producers absent the attempt at fraud."²⁾

Demsetz concludes that even in the presence of fraudulence, private supply of public goods is efficient.

This result has recently been questioned by J. R. Hulett, R. B. Ekelund and W. M. Crain [1976] who claimed "that some of the home TV-viewers might rationally decide not to pay to secure more programs if they can continue to consume a lesser quantity without paying" (p. 51) and thus, "the output of TV programs will not be expanded to the point where the combined demands of the two groups of viewers equal the cost of producing added programs" (p. 53). They illustrate their argument as follows (see their Fig. 1, p. 52):



²⁾H. Demsetz [1973], p. 403. The words in brackets are only "editorial" alterations, (most of them) given in Hulett, Ekelund and Crain's ([1976], p. 51) quotation of this Demsetz-passage.

Suppose the initial endowment (E_1) of a home viewer is a money amount M_H^1 and an amount of T_1 program units (to be consumed free of charge). If, for an increase from T_1 to T_2 , he has to pay an amount of $(M_H^1 - M_H^2)$ and I^1 is the home viewers indifference curve through E_1 , "he will choose to continue being a free rider" (p. 52) and not offer to pay to secure more programs, as Demsetz foresaw.

Hulett, Ekelund and Crain conclude, contrary to Demsetz, that the output of TV programs will not be expanded to a Pareto optimal level.

II.

It is shown below that the fraudulence criticism does not hold. Hulett, Ekelund and Crain solely examine whether or not it is desirable for a home viewer to offer a given fee to have output expanded from T_1 to T_2 (i.e., to go from E_1 to E_2). They are correct in demonstrating that he prefers E_1 to E_2 ; but they are wrong to conclude that E_1 is the home viewer's optimal position. The fraudulence critics overlook that E_1 and E_2 are not the only alternatives open to a home viewer. To derive the position an utility maximizing home viewer will ultimately choose, one has to describe, first, the complete set of the alternatives available to him.

How much must the home viewer pay to a tavern viewer in order to have output expanded beyond the tavern viewer's equilibrium quantity T_1 ?³⁾ To find out, we first show T_1 as the tavern viewer's equilibrium consumption.

Let B_T be the tavern viewer's budget line, \bar{U}_T his highest attainable indifference curve. In his equilibrium position E_1 , he consumes T_1 TV-units and holds an amount of money M_T^1 .⁴⁾

³⁾ To ease exposition and to preserve the identity with the illustration of Hulett, Ekelund and Crain, the argument given above is explained for the case of just one home viewer and just one tavern viewer, who behave as competitive buyers do. Of course, the results do not depend on this simplification.

⁴⁾ M_T^1 is assumed to equal M_H^1 for expository purposes only.

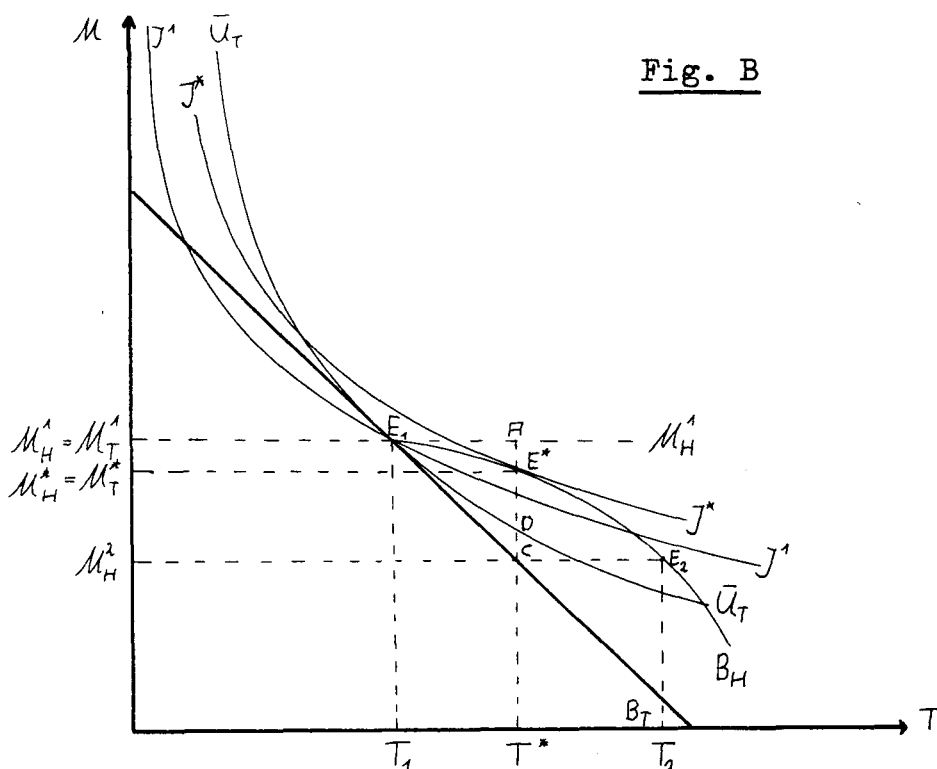


Fig. B

For any TV-quantity $\bar{T} > T_1$, the minimum amount of money that the tavern viewer must receive in order to expand his consumption beyond T_1 equals the vertical difference between his indifference curve through E_1 (\bar{U}_T) and his budget line B_T . When exactly receiving this amount

$$\int_{T_1}^{\bar{T}} (M_T(\bar{U}_T, T) - M_T(B_T, T)) dT, \quad 5)$$

he maintains his initial utility level \bar{U}_T . ⁶⁾

Thus, to illustrate all combinations of money and TV programs that the home viewer can achieve beyond E_1 , for each $\bar{T} > T_1$ the

5) $M_T(\bar{U}_T, T)$ is the amount of money the tavern viewer holds if he views T TV-units and reaches the utility level \bar{U}_T . $M_T(B_T, T)$ is understood analogously.

6) Competitive behavior of the tavern viewer secures that no higher fee is charged.

amount of $M_T(\bar{U}_T, \bar{T}) - M_T(B_T, \bar{T})$ must be subtracted from his initial money endowment M_H^1 . This defines the home viewer's quasi-budget line B_H . (The point E_2 examined by Hulett, Ekelund and Crain is one of the many on this line.) Note that the slope of B_H is zero in E_1 , since \bar{U}_T is tangent to B_T in this point.

Given the indifference curve I^1 as discussed by Hulett, Ekelund and Crain, which is negatively sloped in E_1 , E_1 is no equilibrium position for the home viewer as these authors think. The home viewer will prefer E^+ to E_1 . In E^+ , his quasi-budget line B_H is tangent to the highest attainable indifference curve I^+ which is superior to Hulett, Ekelund and Crains' equilibrium utility level I^1 . The home viewer reaches E^+ , giving an amount of $M_H^1 - M_H^+$ ($\overline{AE}^+ = \overline{CD}$ in Fig. B) to the tavern viewer and thereby expanding TV consumption from T_1 to T^+ .

Since, by construction, in E^+ the sum of the tavern viewer's and the home viewer's marginal rates of substitution (willingnesses to pay) equals the price of TV, output is optimal⁷⁾, as Demsetz claimed and his critics tried to disprove.

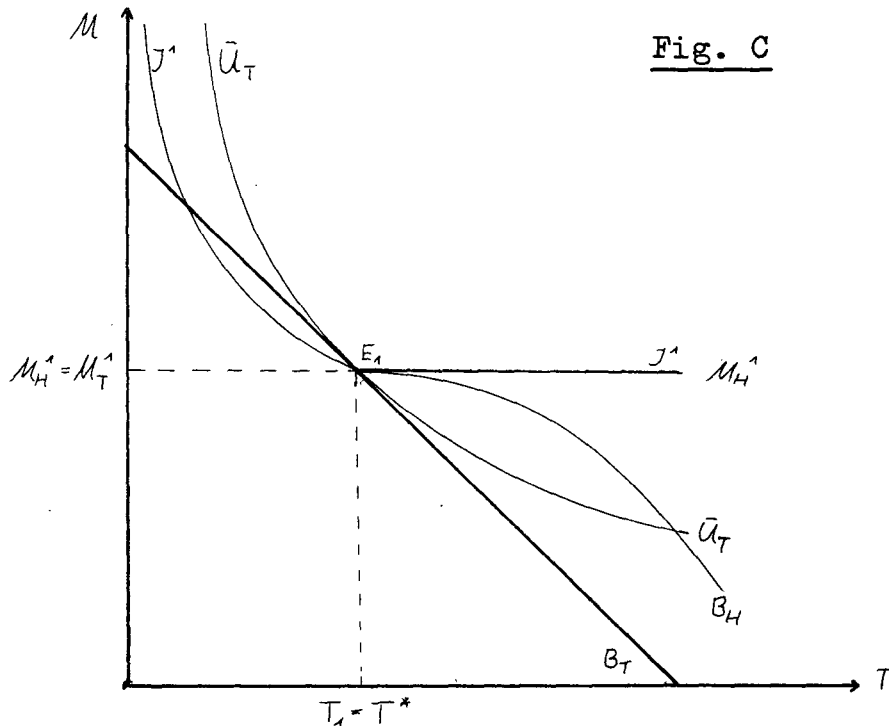
This result can be generalized as follows:

Whenever the home viewer's marginal rate of substitution differs from zero in the tavern viewer's equilibrium position E_1 (i.e. whenever the tavern viewer's equilibrium consumption T_1 is below the home viewer's satiation point), Demsetz is right to claim that home viewers will induce tavern owners to subscribe for more frequent program series.

The only way to arrive at Hulett, Ekelund and Crain's conclusion that a home viewer will choose to accept the tavern viewer's equilibrium position E_1 rather than pay, is to assume that his marginal rate of substitution is zero in E_1 , - an argument not used by Hulett, Ekelund and Crain.

⁷⁾ Given Demsetz' assumptions, which were accepted by his critics and which are not commented here.

This assumption would indeed lead to an exception from Demsetz' rule of output expansion:



In Fig. C the slope of I^1 is zero in E_1 and thus I^1 is tangent to the home viewer's quasi-budget line B_H in this point. Hence there is no incentive for him to pay the tavern viewer for securing more programs. Situation E_1 is preserved. Nevertheless, the Demsetz assertion that supplying public goods privately is efficient, still holds: Since in E_1 the tavern viewer's marginal willingness to pay for TV equals price and the home viewer's marginal willingness to pay is zero, in E_1 , the sum of both willingnesses to pay also equals price precisely as required for Pareto optimality.

Thus, the one case where Demsetz' rule of output expansion beyond the tavern viewer's equilibrium demand T_1 does not apply, turns out to be the one case where it is optimal to leave things as they are.

III.

Demsetz overlooked the (special) case of home subscribers being satiated at T_1 when claiming that they would always shift equilibrium TV output beyond the tavern subscribers' original TV consumption T_1 . The validity of his assertion that fraudulent behavior of some consumers leaves the optimality of privately supplying public goods unaffected, however, does not depend on whether or not the home subscribers are satiated in T_1 (given the assumptions of his [1970] and [1973] model).

Hulett, Ekelund and Crain fail to develop a case where a home subscriber refrains from inducing tavern subscribers to expand consumption although his own marginal willingness to pay is still positive in the tavern subscriber's equilibrium situation. Thus, they fail to prove what they claim to have proven: that fraudulent behavior would destroy, within the framework of Demsetz' model, the optimality of privately supplying public goods.

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A. Endres, Fraudulence And The Competitive Supply Of Public Goods

A b s t r a c t

H. Demsetz claimed that under certain conditions private firms can supply public goods efficiently. Recently, it was argued that the optimality of the Demsetz equilibrium is destroyed when consumers engage in fraudulent behavior. In this paper, fraudulence is explicitly introduced in the Demsetz model. It is shown that fraudulent consumers do no harm to the optimality of supplying public goods privately, within the framework of the Demsetz model.