
**AUTOCRACY, DEMOCRACY, BUREAUCRACY, OR MONOPOLY:
CAN YOU JUDGE A GOVERNMENT BY ITS SIZE?**

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JEL Code: D72, Public Choice

The views expressed are solely those of the authors and should not be attributed to the Federal Reserve Bank of Dallas or the Federal Reserve System.

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Introduction

Economists have systematically examined the economics of government finance and long ago established that the means of financing government creates inefficiencies in the market. (For instance, see Baumol and Bradford 1970 and Diamond and Mirrlees 1971.) What may be less well examined and understood is that—apart from the distortions that arise from the means of government finance—government officials can have an incentive to provide a combination of services and taxes that are non-optimal. (See Niskanen 1997.) The ability of government to exercise monopoly and coercive power creates these incentives.

A growing number of articles explore the effect of government power on its size. For example, Anderson and Tollison (1988) examine the implications of monopoly power for government size. In his work on bureaucracy, Niskanen (1971) considers the implications of coercive power for government size. Olson (1991), McGuire and Olson (1996), and Niskanen (1997) examine the implications of the joint exercise of monopoly and coercive power by an autocratic government. To our knowledge, however, no previous work systematically examines all the possible combinations of monopoly and coercive power.

In the present analysis, we develop a simple theoretical framework that allows us to examine on an integrated basis the exercise of government power on its size. The framework abstracts from any distortions in the means of government finance and separates government power into two dimensions—pure coercive power and pure monopoly power. Pure coercive power is the ability of a government to compel consumers to accept more of the public good than they desire at each tax price—either through legislative fiat or by price discrimination. Pure monopoly power is the government's ability to restrict output along a given demand curve and earn rents by doing so.

We consider four polar combinations of coercive and monopoly power in comparison to the social optimum: democracy, monopoly, bureaucracy, and autocracy. A purely democratic government exercises neither coercive nor monopoly power. A monopoly government is able to restrict its output to earn rents in a traditional monopolistic fashion, but it cannot engage price discrimination or expropriation to coerce any remaining consumer surplus from its citizens. A bureaucracy can exact all of the surplus that consumers obtain from the public goods it provides, but it must use the surplus in the production of public goods. It cannot restrict output to obtain

rents as a monopoly would. An autocracy exercises both coercive and monopoly power.

The exercises allow us to demonstrate that a government can exert its coercive power to shift demand for its services outward while it simultaneously exerts its monopoly power to restrict the output along that demand curve to earn rents. The joint exercise of coercive and monopoly power in autocracy can be said to result in both too much government (in the sense of Niskanen, 1971) and too little government (in the sense of Anderson and Tollison 1988 and Olson 1991). We also find that size or rents alone may be poor indicators of the extent to which government fails to achieve optimality in its provision of services. Government power may be used to generate rents, provide too much government service, or some combination of both.

Social Optimum

Consider a jurisdiction or economy with n identical individuals and two goods—a purely public good and a purely private good.¹ For each individual, utility (U_i) is a function of the amount of the purely public good that is consumed jointly (G) and the amount of the purely private good that is consumed by the individual (X_i).

$$U_i = U_i(G, X_i) \quad \text{for } i = 1, 2, \dots, n \quad (1)$$

The production opportunities available to the economy are described by an implicit production function for the two goods,

$$F(G, X) = \bar{F} \quad (2)$$

where $X = \sum X_i$.

Assuming that utility is equal for all individuals, maximizing the utility for a representative individual subject to the production function (2), aggregating over n individuals, and then substituting the ratio of marginal costs for the marginal rate of transformation yields a variant of the familiar optimality condition for provision of a public good (Samuelson 1954),

$$n \frac{\partial U / \partial G}{\partial U / \partial X_i} = \frac{MC_G}{MC_X} \quad (3)$$

where MC_G is the marginal cost of providing the public good and MC_X is the marginal cost of providing the private good.²

Democracy

The Lindahl rule is a particularly appropriate model of democracy when one is considering a society of n identical individuals and wants to abstract from the possibility of the redistributive coalitions that can form under majority rule. Under the Lindahl rule, unanimous consent is used to make public good decisions. That is, each taxpayer/voter must agree that the quantity of the public good being provided is the quantity that would maximize individual utility given the tax price the individual faces for an additional unit of the public good.

For the representative individual, the conditions for the Lindahl rule can be obtained by maximizing utility subject to a budget constraint, which is a function of endowment income and the prices of the public and private goods. The budget constraint can be written

$$Y_i = tG + PX_i \quad \text{for } i = 1, 2, \dots, n \quad (4)$$

where Y_i is individual income endowment, t is the tax price that each individual faces per unit of public good and P is the price of the private good.

For each individual i , maximum utility is obtained by maximizing the utility function given

$$\frac{\partial U_i / \partial G}{\partial U_i / \partial X_i} = \frac{t}{P} \quad (5)$$

in equation (1) subject to the budget constraint given in equation (4),

Simplifying assumptions about production allow a sharper focus on the organizational factors that shape government size. Under the assumption that the private good is produced by a competitive industry operating at constant costs, the price of the private good will equal the marginal cost of producing it,

$$P = MC_X \quad (6)$$

Similarly, under the assumptions that production of the public good is characterized by constant costs, and the costs of providing the public good are distributed across the n identical individuals at the per unit tax rate t , the tax revenue per unit of output equals marginal cost,

$$nt = MC_G \quad (7)$$

Aggregating the optimality condition given in equation (5) over n individuals and incorporating the equalities (6) and (7) yields

$$n \frac{\partial U_i / \partial G}{\partial U_i / \partial X_i} = \frac{nt}{P} = \frac{MC_G}{MC_X} \quad (8)$$

As shown by the equations (8), the Lindahl rule satisfies the conditions for optimal provision of the public good under the cost conditions given in equations (6) and (7).

The Lindahl optimality conditions are illustrated in the Figure. In the upper panel, the representative individual faces the budget constraint labeled Y_i , and maximizes utility by selecting the combination X^* and G^* along the indifference curve U_j . For n individuals taken together, the demand curve shown in the lower panel shows the tax and output combinations that satisfy the utility maximization condition. The quantity of the public good provided is G^* and the per unit tax revenue, nt^* , equals the marginal cost of producing the public good, MC_G .

Monopolization

If the government faces no competition in providing the public good, it will not necessarily produce the optimal amount of the public good at the optimal tax price as determined by the Lindahl rule.³ Instead, the government can obtain monopoly rents by restricting output of the public good while raising its tax price (Anderson and Tollison 1988 and Olson 1991).

Government rents can be represented in this framework as the difference between the tax revenue collected and the cost of producing the public good,

$$\Pi = nt(G) - C_G \quad (9)$$

where Π is the government rent obtained from provision of the public good and C_G is the total cost of its production.

Following Anderson and Tollison (1988), we consider a government that has monopoly power but like most private monopolies cannot price discriminate, either because it lacks the information to do so or because a fiscal constitution (Brennan and Buchanan 1980) prevents it from engaging in such discrimination.⁴ In our model, the monopoly government maximizes the rent from provision of the public good by restricting output of the public good to the point where the marginal tax revenue obtained from provision of the public good equals marginal cost,

$$nt + n \frac{\partial t}{\partial G} G = MC_G \quad (10)$$

Because the tax price citizens are willing to pay falls with increased provision of the good, $\partial t/\partial G$ is negative, and the aggregate tax price (nt) is greater than the marginal tax revenue.

Assuming government cannot compel its citizens to pay for more of the public good than they would choose to purchase at any particular tax price, taxpaying voters must still agree that the quantity of the public good being provided is the quantity that would maximize individual utility at the tax price the individual faces for an additional unit of the public good. Therefore, the utility-maximizing condition shown in equation (5) would still apply. Aggregating equation (5) over n individuals and incorporating equations (6) and (10) yields

$$n \frac{\partial U_i / \partial G}{\partial U_i / \partial X_i} = \frac{nt}{P} > \frac{nt + n \frac{\partial t}{\partial G} G}{P} = \frac{MC_G}{MC_X} \quad (11)$$

As shown by the equalities and inequality (11), a government that exercises monopoly power but does not engage in any price discrimination (or coercion) will produce less of the public good than is optimal.

The monopoly conditions are illustrated in the Figure. For n individuals taken together, the demand curve shown in the lower panel shows the tax and output combinations that satisfy the utility maximization condition. For the quantity of the public good G_{LM} , the marginal tax revenue equals the marginal cost of producing the public good, MC_G . The corresponding monopoly price is nt_m . At the tax price t_m , the representative individual faces the budget constraint labeled Y_2 in the upper panel and maximizes utility by selecting the combination X_{LM} and G_{LM} along the indifference curve U_2 . As shown, monopoly provision of the public good yields a lower level of utility for the representative taxpayer, which must be the case since the tax price is higher than in the case without government monopoly power.

Bureaucracy

Conceiving of a government with monopoly power but no coercive power is difficult. In fact, popular writers and the economics literature often describe government monopolies in the language of coercion.⁵ Yet a simple monopoly model in the spirit of Anderson and Tollison

(1988), as presented above, ignores the exercise of coercive power. In contrast, the bureaucracy model captures the coercive potential of government, but assumes the government uses the coercive power to maximize output rather than to earn rents.

According to Niskanen (1971), a government bureaucracy will expand its output beyond the optimal level to the point where consumers are indifferent between receiving and not receiving the public good under a balanced budget constraint.⁶ Bureaucracies engage in this behavior because the compensation (either monetary or psychic) is an increasing function of size. In Niskanen's (1971) analysis, a bureaucracy cannot push its output beyond the point at which consumer surplus is exhausted, however, because an exogenous entity from which the bureau obtains its funds knows the maximum it is willing to pay for each level of service and will not permit the bureau to spend any more.

Alternatively, one might argue that taxpaying voters will abolish a government bureaucracy that pushes output beyond the point at which consumer surplus is exhausted because they would prefer no government at all to such an excessive provision of the public good.⁷ Because elimination of government strips existing government officials of their ability to choose prices and quantities for the public good (and extract whatever rents are available by so doing), bureaucrats adopt the strategy of producing up to the point where consumer surplus is exhausted but no more.⁸

Therefore, taken to an extreme, a bureaucracy has the ability to capture a sizable consumer surplus, but it uses that surplus to produce more of the public good. The surplus may be obtained either through direct expropriation or perfect price discrimination.⁹ Although the two mechanisms operate very differently, both result in government acquisition of all consumer surplus

from provision of the public good and can be represented identically as government coercion.

A bureaucracy that exercises coercive power but no monopoly power can be represented by the maximization of the public good, G , subject to a utility constraint, $U_i \leq \bar{U}_i$, and a balanced budget constraint, $ntG \geq C_G$.¹⁰ Solution of the problem yields the following Kuhn-Tucker conditions:

$$\frac{\partial U_i / \partial G}{\partial U_i / \partial X_i} \leq \frac{t}{P}, \quad \left(\frac{\partial U_i / \partial G}{\partial U_i / \partial X_i} - \frac{t}{P} \right) (\bar{U}_i - U_i^*) = 0 \quad \text{for each individual } i \quad (12)$$

$$nt \geq MC_G, \quad (nt - MC_G) \frac{\partial G}{\partial t} = 0 \quad (13)$$

Aggregating the Kuhn-Tucker conditions given in (12) over n individuals forms a downward sloping boundary at $G = ng(t)$. At points along this boundary, the representative individual is exactly indifferent between no government and the public good and tax price combinations implied by the boundary. In other words, points along the boundary exactly exhaust the consumer surplus that the representative individual obtains from provision of the public good. The boundary might be called “the Hicks-Niskanen demand” for the public good.

The Hicks-Niskanen demand curve represents the maximal combinations of tax price and quantity of the public good that the representative individual will accept before demanding abolishment of the government. As shown in (12), the representative individual has a lower marginal rate of substitution for the public good along the boundary than the tax price of the public good relative to the price of the private good. This inequality means that the representative

individual would be better off with a smaller provision of the public good at each given tax price.

In this sense, the government bureaucracy can be seen as coercive.

The Kuhn-Tucker conditions given in (13) form a lower horizontal boundary at $nt = MC_G$. Therefore, a government that seeks to maximize production of the public good must be content to just cover its costs.

The quantity of the public good, G , is maximized along the two boundaries. Combining the boundary conditions obtained from (12) and (13) together with equation (6) yields

$$n \frac{\partial U / \partial G}{\partial U / \partial X_i} < \frac{nt}{P} = \frac{MC_G}{MC_X} \quad (14)$$

As shown by the inequality and equality (14), the bureaucracy that exercises coercive power to maximize output will produce more of the public good than is optimal.¹¹ Because consumers are indifferent between the bureaucratic outcome and no public good at all and prefer democracy to monopoly, and monopoly to no public good at all, the bureaucratic outcome is necessarily worse than either the monopolistic or the democratic outcomes.

The bureaucratic outcome is illustrated in the Figure under an assumption of constant marginal utility for the private good.¹² In the upper panel, the indifference curve U_i shows the combinations of the public and private goods that leave the representative individual no better off than zero provision of the public good. For n individuals taken together, the Hicks-Niskanen demand curve shown in the lower panel traces out the tax price and public good combinations that would leave the representative taxpayer on the indifference curve U_i . The maximum

provision of the public good is G_{CB} with corresponding tax revenues of mt^* per unit of public good. The representative individual faces a per unit tax rate of t^* which is consistent with the budget constraint Y_1 shown in the upper panel. Every individual would prefer the (optimal) combination X^* and G^* along the indifference curve U_3 , but the taxpayer is forced to consume the combination X_{CB} and G_{CB} along the indifference curve U_1 . Every individual would even prefer the monopoly combination X_{LM} and G_{LM} along the indifference curve U_2 , which illustrates that bureaucracy yields a lower level of utility for the representative taxpayer than can be achieved under either democracy or monopoly.

Autocracy

A government's use of coercive power simply to expand output of the public good beyond the optimal level provides no clear benefit to either taxpayers or government officials. Niskanen (1971) resolved this problem to some extent himself by assuming bureaucratic salaries are tied to output, but it is far from clear (at least for the U.S. government) that bureaucrats in small departments actually receive less monetary and non-monetary compensation than do bureaucrats in large departments. Moreover, Niskanen's approach limits the rent-earning capabilities of the government by implicitly assuming consumer surplus can be used only for production.

Olson (1991) discusses the coercive and monopoly aspects of autocracy. Olson describes autocrats as "stationary bandits" who take income from their citizens—an action that is a form of coercion. He also argues that autocrats have an incentive to produce a monopoly quantity of a public good, which he expects to be less than optimal.

McGuire and Olson (1996) and Niskanen (1997) further develop Olson's concepts of

autocracy. In their models, the autocrat taxes private income and provides a public good, maximizing the difference between the tax revenue and cost of providing the good—without taking any direct interest in citizen welfare. The extent to which a rational autocracy taxes its citizens is limited by the discouraging effects that income taxation has on process by which income is generated.

In model presented here, however, government finance is non-distortionary. The extent to which government can tax its citizens is limited by the Hicks-Niskanen demand curve for the public good, which represents the maximal combinations of the public good and the tax prices that the government can obtain through coercion.¹³ In this framework, autocracy is represented by the maximization of government rent, Π , subject to the utility constraint, $U_i \leq \bar{U}_i$. Solution of the problem yields the Kuhn-Tucker conditions for taxpayer utility (12) and the rent-maximizing condition (10), as shown above.

Once again, aggregating the Kuhn-Tucker conditions given in (12) over n individuals forms a downward sloping boundary at $G = ng(t)$ that is the Hicks-Niskanen demand for the public good. This demand curve represents the maximal combinations of tax rates and provision of the public good that the representative individual will accept before demanding abolishment of the government. To maximize its rent, the autocratic government selects a tax and output combination along the Hicks-Niskanen demand curve that satisfies equation (10). Combining the boundary condition obtained from (12) with equations (10) and (6) yields

$$n \frac{\partial U_i / \partial G}{\partial U_i / \partial X_i} < \frac{nt}{P} > \frac{nt + n \frac{\partial t}{\partial G} G}{P} = \frac{MC_G}{MC_X} \quad (15)$$

As shown by the inequalities and equality (15), an autocracy may produce more or less of the public good than is optimal. Unless the public good is an inferior good, however, the autocracy will produce less of the public good than is optimal.¹⁴ In either case, the combination of coercive and monopoly power substantially reduces taxpayer welfare and yields rents to the government that are much greater than could be earned through monopoly power alone. In exercising its coercive power, an autocracy produces more of the public good than taxpayers would desire at each tax price and, in doing so, substantially reduces welfare. In exercising its monopoly power, an autocracy reduces output along the Hicks-Niskanen demand curve to obtain greater rents than could be obtained through the exercise of monopoly power alone.

The autocratic outcome is illustrated in the Figure. Again assuming constant marginal utility for the private good, the maximal price and output combinations are achieved along the Hicks-Niskanen demand curve shown in the lower panel—which holds the representative taxpayer on the indifference curve U_1 shown in the upper panel. The associated marginal revenue curve is labeled “H-N MR” and is in this example superimposed on the (normal) demand curve.¹⁵ For the quantity of the public good G_{CM} , the marginal tax revenue equals the marginal cost of producing the public good, MC_G . The corresponding monopoly tax price is nt_m . At the tax price t_m , the representative individual faces the budget constraint labeled Y_2 in the upper panel and would maximize utility by selecting the combination X_{LM} and G_{LM} along the indifference curve U_2 , but is forced to consume the combination X_{CM} and G_{CM} along the indifference curve U_1 . Autocracy yields the same level of utility for the representative taxpayer as bureaucracy, which is less than can be achieved under either democracy or monopoly. However, government rents are twice

those earned in a simple monopoly.

Some Implications for Government Power and Size

As shown above, government power has two dimensions: coercion and monopolization. These dimensions are substantially different in nature from each other and have differing implications for the provision of public goods and the size of government. Coercive power is the ability to set government output higher than taxpayers would desire at each given tax price. This coercive power is achieved either through pure price discrimination or legislative fiat. Monopoly power is the ability to restrict output in an economic environment otherwise characterized by competition and earn rents by doing so.

As demonstrated for autocracy, the coercive and monopoly powers of government need not be mutually exclusive. Government can exert its coercive power to shift the demand for its services outward and simultaneously exert its monopoly power to restrict output along a given demand curve to earn rents. Therefore, the exercise of coercive and monopoly power can be said to result in both too much government (in the sense of Niskanen 1971) and too little government (in the sense of Anderson and Tollison 1988 and Olson 1991).

With government having both coercive and monopoly dimensions to its power, neither government size nor rents alone are likely to prove reliable as indicators of the extent to which government power has prevented the maximization of taxpayer utility. The loss in utility associated with moving from Lindahl democracy to an outcome that ranges somewhere from bureaucracy to autocracy (along the Hicks-Niskanen demand curve and U_1) is consistent with a range of tax and output combinations, including one that yields maximum rent and little change in

output of the public good, as well as one that yields no rent and maximum output of the public good. The exact combination of rent and government services that is obtained depends upon both how much power the government has and along which dimension the government is most able to exercise its power.

Limiting Government Power

A number of institutions have been developed in the world's countries to prevent governments from exercising their coercive and monopoly powers. These institutions include constitutional restraint (Brennan and Buchanan 1977 and Buchanan and Tullock 1962), interjurisdictional competition (Tiebout 1956, Buchanan 1965, and McGuire 1972 and 1974), and political competition.

Because interjurisdictional competition can be an effective means of restraining government power, the centralization of government power away from the local level toward the state, national, or international level may reduce consumer welfare (McGuire 1998). Arguments for centralization typically involve the interjurisdictional externalities that can arise when there are competing governments. In some cases, however, the gains from reducing these potential interjurisdictional externalities through centralization may be more than offset by the welfare losses that can result from the increased centralization of government power. In other words, market failure can be replaced by an even more severe government failure.

Even in a constitutional democracy with interjurisdictional competition, professional government managers have an economic incentive to develop and exercise autocratic power. One way for citizens to limit autocratic government behavior is to monitor government behavior, but

citizens must watch both rents and size if monitoring is to be effective. Monitoring government rents, but not size (output), could lead to an increase in government output without any improvement in taxpayer welfare. On the other hand, monitoring government size (output), but not rents, could lead to a substantial decline in consumer welfare at an apparently optimal level of government service provision.

Monitoring of the government is itself a public good and, as such, is likely to be under provided through voluntary exchange. (See Olson 1965.) The complexity of monitoring the government, particularly in a world with multiple government goods that must be monitored in two dimensions, suggests that monitoring itself may be carried out by a portion of the government. That portion is typically elected officials who can compete for the job of monitoring government activity by offering to restrain government size and rents.¹⁶

But the logic of government autocracy implies these elected officials will have their own incentives to develop and exercise autocratic power. Citizens, the media, competing candidates, other jurisdictions, and other branches and levels of government act to monitor elected officials and/or provide competition. At the same time, bureaucrats, politicians, and special interest groups act to reduce competition and weaken monitoring. (See Olson 1965 and 1982.) Tactics to insulate government from competition can vary from simple to elaborate. Some U.S. states have enacted statutes that create significant obstacles to minor party candidates for public office. The French government reduces the mobility of its citizen by limiting their exposure to English, while asserting the obstacle was enacted to benefit its citizenry by preserving French culture. The exact degree to which the interplay between competitive and anti-competitive forces acts to restrain or promote government power is beyond the present analysis.

Concluding Remarks

The combination of coercive and monopoly power provides government with the means and incentive to set its taxes and services at non-optimal levels. (We demonstrate these results without relying on distortionary taxes.) Size or rents alone may be poor indicators of the extent to which government fails to achieve optimality. Government power can be used to generate rents, provide too much of the public good, or some combination of both.

Government power can be thought of in two dimensions: coercion and monopolization. The exercise of its coercive power allows the government to shift the demand for its services outward to the point where taxpayers are indifferent between no government and the combination of public good and taxes the government is offering. This outward shift of demand yields tax and output combinations that are non-optimal. The exercise of its monopoly power allows the government to restrict its output along a given demand curve to earn rents. A government jointly exercising both powers can produce too much government service for the implied tax prices and that the same time restrict its output to earn rents. Constitutional restraint, as well as interjurisdictional and political competition may act to reduce government power in both dimensions and increase taxpayer welfare.

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Notes:

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1. Because a pure public good does not suffer from congestion, the population of the jurisdiction must be exogenously determined. (See McGuire 1972, 1974.) Both this assumption and the one that the population is comprised of n identical individuals simplifies the analysis but leaves the conclusions unaltered.
2. The marginal rate of transformation between G and X is also defined as MC_G/MC_X .
3. Short of autocracy, there are several reasons why a government may have monopoly power. Perhaps taxpayers cannot monitor government activities or fail to overcome the collective action problems associated with doing so. Alternatively, taxpayers might be fully aware of the government's activities but are unable to call government officials to account.
4. The combination of monopoly and coercive power is discussed in a later section.
5. For examples, see DiLorenzo (1999) and Olson (1991).
6. Brennan and Buchanan (1980) echo this theme when they argue Leviathan will appropriate all surplus for its own use unless constraints are imposed upon it.
7. For analytical simplification, we assume voters can costlessly abolish the government but cannot use the threat of such abolition to foster more efficient behavior by bureaucrats. For a more rigorous analysis of this issue and the types of situations in which these assumptions are appropriate, see Romer and Rosenthal (1979).
8. Our formulation of the bureaucratic model eliminates the need for an exogenous source of funds and more firmly integrates the bureaucratic model into our analysis.
9. Consistent with a pure public good, the price discrimination is by unit of output—not by individual.
10. Niskanen modeled the government bureaucracy as maximizing revenue. To examine the implications of coercive power in the absence of rent-seeking, we assume the bureaucracy maximizes output of the public good. Our assumption will yield somewhat different conclusions than Niskanen reached.
11. In fact, a bureaucracy seeking to maximize output under a Lindahl rule will produce the optimal quantity of the public good.

12. Assuming constant marginal utility simplifies the graphical analysis, but does not alter the conclusions.
13. In McGuire and Olson (1996) and Niskanen (1997) analyses, coercion is represented by the ability of the autocracy to set and enforce taxes without taking any direct interest in citizen welfare.
14. If the public good is a complementary input for private production, an autocrat could have an incentive to produce more of it than is optimal. See McGuire and Olson (1996).
15. If the private good were not characterized by constant marginal utility, the Hicks-Niskanen marginal revenue curve would not be superimposed on the (normal) demand curve.
16. Some candidates compete by creating and appealing to redistributive coalitions.

Private Good

Utility for a Representative Individual

X_{LM}
 X^*

X_{CM}

X_{CB}

U_3

U_2

U_1

Y_2

Y_1

Public Good

$n \cdot t$

Demand for the Public Good

nt_m

nt^*

MC_G

MR

Demand
(H-N MR)

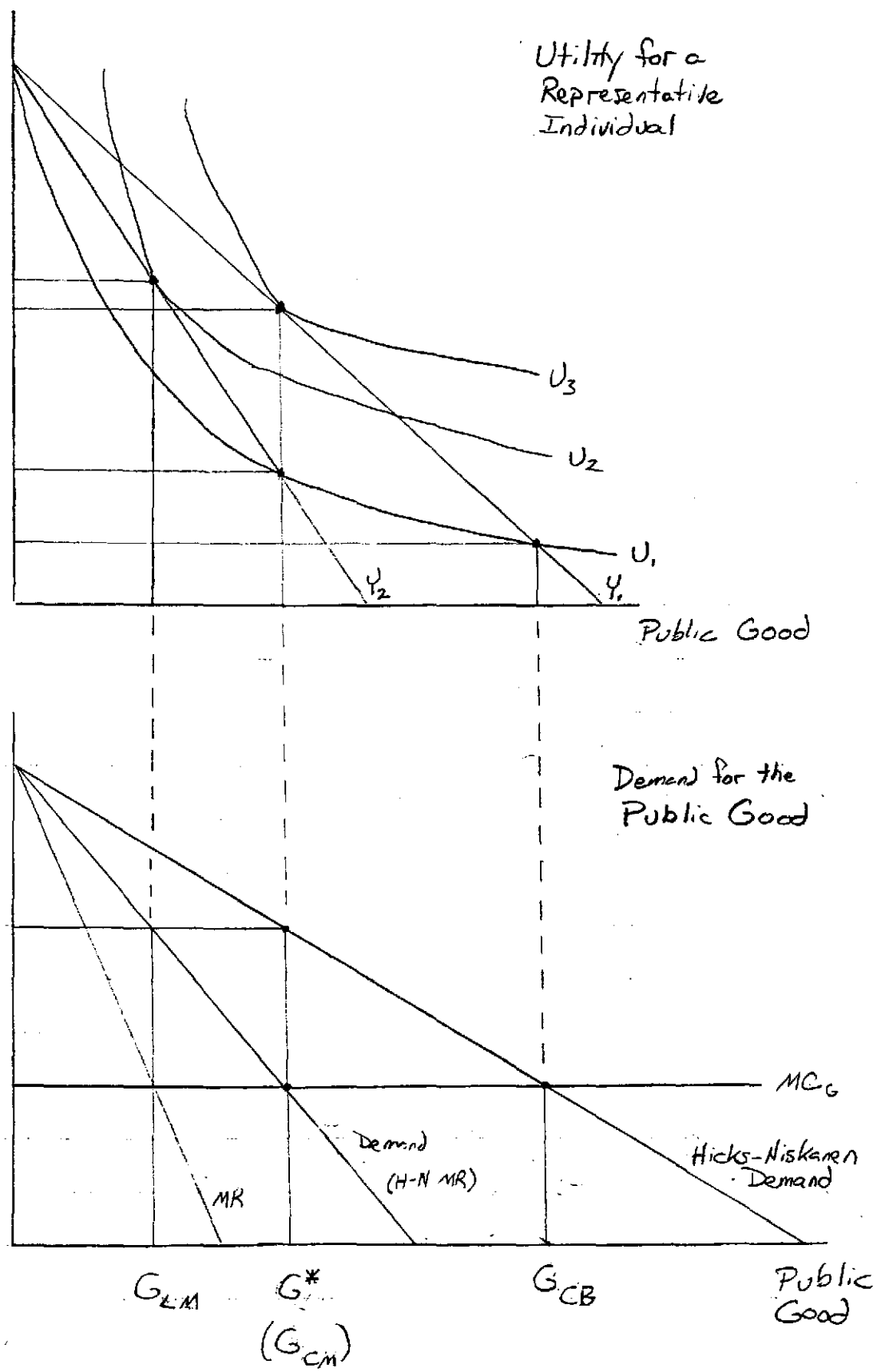
Hicks-Niskanen
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G_{LM}

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