3 The Economics of Autocracy and Majority Rule: The Invisible Hand and the Use of Force*

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1 INTRODUCTION

Consider the interests of the leader of a group of roving bandits in an anarchic environment. In such an environment, there is little incentive to invest or produce, and therefore not much to steal. If the bandit leader can seize and hold a given territory, it will pay him to limit the rate of his theft in that domain and to provide a peaceful order and other public goods. By making it clear that he will take only a given percentage of output – that is, by becoming a settled ruler with a given rate of tax theft – he leaves his victims with an incentive to produce. By providing a peaceful order and other public goods, he makes his subjects more productive. Out of the increase in output that results from limiting his rate of theft and from providing public goods, the bandit obtains more resources for his own purposes than from roving banditry.

This rational monopolization of theft also leaves the bandit's subjects better off: they obtain the increase in income not taken in taxes. The bandit leader's incentive to forgo confiscatory taxation and to provide public goods is because of his 'encompassing interest' in the conquered domain. As the monopoly tax-collector, he bears a substantial part of the social loss that occurs because of the incentive-distorting effects of his taxation, and we prove in this paper that this limits the rate of his

tax theft. This control of tax receipts also gives him a significant share of any increase in the society's production and, as we shall here demonstrate, this gives him an incentive to provide public goods. In short, an 'invisible hand' gives a roving bandit an incentive to make himself a public-good-providing king.

The same invisible hand also influences democratic societies. Suppose the majority in control of a democracy acts with self-interest and that no constitutional constraints keep it from taking income from the minority for itself. If those who make up this majority earn some market income, the majority will best serve its interests by limiting redistribution from the minority to itself and by providing public goods for the entire society. Because the majority not only controls the fisc but also earns market income, it has a more encompassing interest in society than does an autocrat. We prove below that an optimizing majority in control of a society necessarily redistributes less income to itself than a self-interested autocrat would have redistributed to himself.

These elemental incentives facing autocrats and majorities have not been addressed seriously – and certainly not analysed formally – in the economics literature. This literature has not explained how the incentives facing dictatorial and democratic governments differ, nor how the form of government affects tax rates, income distribution, and the provision of public goods. There is, in other words, a great gap in the economics literature. This gap has remained unfilled because most economics takes it for granted that the parties that interact will not use coercion to attain their objectives. But, as Hirshleifer (1994) has pointed out, the same rational self-interest that economists usually assume implies that actors with a sufficient advantage in employing violence will use that power to serve their interests: there is also a 'dark side to the force'. Economists have not given nearly as much attention to this implication of self-interest as they have to the social consequences of self-interested interaction in peaceful markets. Some, for example, in Schelling, 1960 and 1966, have analysed the incentive to use force in conflicts among nations, or in crime and punishment, such as in Becker and Landes, 1974, or in explaining most public good provision and income redistribution. Lately economists have begun to focus on the balance between the forces that preserve and protect property rights and those that conquer and expropriate (Grossman, 1994; Hirshleifer, 1991).

Yet economists have not asked whether those who have coercive power have any incentive to exercise this power in ways partly or wholly consistent with the interests of society and of those subject to

this power. We demonstrate that they do – that whenever a rational self-interested actor with unquestioned coerceive power has an encompassing and stable interest in the domain over which this power is exercised, that actor is led to act in ways that are, to a surprising degree, *consistent with the interests of society and of those subject to that power*. It is as if the ruling power were guided by a hidden hand no less paradoxical for us than the invisible hand in the market was for people in Adam Smith's time. In fact, when an optimizing entity with coercive power has a sufficiently encompassing interest – a super-encompassing interest – the invisible hand will lead it, remarkably, *to treat those subject to its power as well as it treats itself.*

In this chapter we formalise and extend some of our earlier analyses (Olson 1991 and 1993; McGuire, 1990; and McGuire and Olson, 1992). We have drawn inspiration from ethnographic and historical accounts (Banfield, 1958; and Sheridan, 1966), from some classics (Hobbes, 1651; Ibn Khaldun, 1377 and Schumpeter, 1991); and from earlier analyses of anarchy and the emergence of government (Tullock, 1974). Though we do not use the transaction costs of voluntary exchanges in our models of the origin government and politics as North (1981 and 1990) and Kiser and Barzel (1991) have done, our models none the less complement theirs. The analysis here emerges partly from the concept of the 'encompassing interest' (Olson, 1982), which has also been developed and applied most notably by Calmfors and Driffill (1988), Heitger (1987), and Summers, Gruber, and Vergara (1993).

We develop formal models of both autocratic and democratic (or, more generally, representative) government. This enables us to compare outcomes of autocracy with various types of democratic and semi-democratic government. In addition to relatively realistic models of autocracy and redistributive democracy, we develop for heuristic reasons, a purposely idealistic model of a society with consensus about income distribution where each individual's tax share is distributionally neutral.

2 PRODUCTIVE PUBLIC GOODS AND DISTORTING TAXES

In our models, public goods are public factor inputs, or producers' public goods required for the production of private goods. Accordingly, with the notation set out below, we specify an aggregate production function with total output a function of the level of provision of public goods. Total output is a flow and so is the provision of the

public good; no regime augments its immediate receipts at the expense of the future by confiscating capital goods; this is excluded either by indefinitely long time-horizons or, alternatively, by assuming that there are no capital goods.

G = amount of public good factor input (price = 1);
Y = potential gross private good production;
$Y - G$ = potential net private good production; and
$Y = Y(G);\ Y'(G) > 0;\ Y''(G) < 0;\ Y(0) = 0.$

$Y(G)$ shows the maximum level of national product that can be generated by labour and other resources in the society, in cooperation with G units of the public good. We assume that G is a pure public good input that is essential for social order and for any and all production, so that if $G = 0$, $Y = 0$. Society's entire output is aggregated into the single good, Y, which includes everyone's income. Y is labelled 'gross' because the cost of the resources that must be used to produce G has not been subtracted; it is labelled a 'potential' product because it omits the losses from incentive-distorting taxation, including the taxation necessary to obtain the resources for producing G.

The significance of the definition of 'gross potential income' is evident when we make the utopian assumption of lump-sum taxation. Because there is no deadweight loss from such taxation, potential gross income, Y, is also realized, or actual gross income. Because the public good, G, in our models, has no direct consumption value, a rational society would maximize product *net* of expenditure on the public good. The maximum net product available is given by $Y(G) - G$. Units of the public good are defined so that G has a price of 1, so the total cost, C, of providing G is just $C(G) = G$. With lump-sum taxation, the unit cost of G is only the direct resource cost 1, so at the social optimum with the marginal product of G equal to its marginal cost, $Y' = 1$; the utopian society then has the lowest possible cost of G^* (that is, $C(G^*) = G^*$) and the citizenry enjoys a net income of $Y(G^*) - G^*$.

Because no society can rely on lump-sum taxation, the challenge for our analysis is to take account of the deadweight losses from taxation and the productivity of public goods at the same time. We assume that all resources available to government, whether for public good provision or for redistribution, are derived from taxation. Keeping to the simplest possible assumptions, we assume that taxes are applied at constant average rates on gross income. We use the following notation

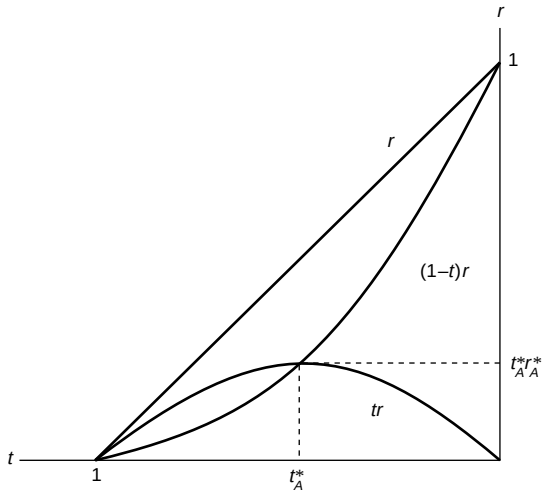

Figure 3.1 Tax relationships

to capture these ideas:

t	= constant average 'income tax' rate;
$r(t)$	= percentage of potential Y produced for given t; $r(t)$ is the same for all G; $r' < 0$, $r(0) = 1$;
$1-r(t)$	= percentage of Y lost when tax is imposed, i.e. pure efficiency loss. Let us call $1-r(t)$ the 'deadweight loss function';
$tr(t)$	= percentage of potential Y collected in taxes;
$(1 - t)r(t)$	= percentage of potential Y not taken in taxes; and
$r(t)Y \equiv \mathrm{I}$	= actual or realized income; if taxation did not distort incentives, $Y = \mathrm{I}$.

An example of these relationships is shown in Figure 3.1. Although $r(t)$ is depicted as linear, this is not assumed in our model; if deadweight losses from taxes rise faster than tax rates, then $r(t)$ would be convex from above.

Because real-world regimes, in contrast with the utopia described earlier, have incentive-distorting taxation, (that is, $r < 1$), the production function must be stated in terms of actual income, $I = I(G, t)$.

Impartially, we assume that the percentage of potential income lost due to the deadweight losses from taxation, at any given rate of tax t, is the same across all regimes: that is, all face the same deadweight loss (DWL) function, $(1 - r(t))$. Similarly, all our regimes are limited by the same production function, $Y(G)$, and are financed by proportional taxes at rate t.

3 THE AUTOCRAT'S TAX AND EXPENDITURE PROBLEM

A dictatorial ruler consumes not only the palaces and pyramids he may build for himself, but also the armies and aggressions that may lift him above the leaders of other governments. He is no more likely to have satisfied all his wants than any other consumer, and obtains the resources to satisfy his objectives from the taxes exacted from his subjects. (We assume he does not sell his labour or any other services in the market.) Because of his self-interest, he extracts the maximum sustainable transfer from society – that is, he *redistributes* the maximum possible absolute amount to himself without regard for the welfare of his subjects.

Paradoxically, the self-interest that leads an autocrat to maximize his extraction from society also gives him an interest in the productivity of that society. This interest shows up in two ways. First, his monopoly[1] over tax collection induces him to limit his tax rate. When the deadweight loss from his taxation reduces the income of society enough at the margin so that his collections begin to decrease, he makes no further exactions. Thus a rational autocrat always limits his tax theft: he takes care not to increase his rate of taxation above the point where the deadweight losses at the margin are so great that his share of these losses offsets what he gains from taking a higher percentage of income. Second, the rational autocrat spends some of the resources he could have devoted to his own consumption on public goods for the whole society. He does this because it increases his tax collections. If, for example, his tax rate is 50 per cent, he will obtain a half of any increase in national output brought about by the provision of public goods. He therefore has an incentive to provide the public good up to the point where his marginal cost of providing it just equals his share of the increase in the national income.[2] Both in curtailing redistribution to himself and in providing public goods, the autocrat, as we demonstrate below, uses the reciprocal of his tax rate as the governing mechanism for achieving his optimum.

These conclusions follow from postulating that the autocrat finds his optimum by solving the following maximization problem:

$$\underset{t,G}{Max}\ tr(t)Y(G) - G; \quad s.t.\ G \leq tr(t)Y(G) \tag{1}$$

The autocrat must choose both the tax rate and the level of public good provision to obtain an optimum. Because the provision of G affects the level of income, it also affects tax receipts. At the same time, the autocrat's tax rate determines his share of any increase in income from the provision of more public goods. But although the *yield* from any tax rate obviously depends on G, the optimal tax *rate* does not.[3] The ruler pockets all tax revenues beyond those he spends on public goods. Thus, for any value of G whatever he wants to obtain as much product as possible for his treasury. This is clear from differentiating Equation (1) with respect to t; because the constraint in Equation (1) does not bind, differentiation gives:

$$r(t)Y(G) + tr'(t)Y(G) = 0 \tag{2}$$

The term $Y(G)$ drops out, which means that the level of G affects the tax yield but not the optimal tax rate. The necessary condition in Equation (2) simplifies to

$$r + tr' = 0 \tag{3}$$

In effect, the autocrat can optimize his tax rate simply by choosing t to maximize $tr(t)$, so that at his solution,

$$t_A^* = -\frac{r(t_A^*)}{r'(t_A^*)}. \tag{4}$$

Therefore the maximum[4] value of the autocrat's share of potential GNP becomes

$$\text{Maximum value of } tr(t) = -\frac{(r_A^*)^2}{(r_A^*)'} \tag{5}$$

where the '*' notation means the variable is evaluated at the maximum.

We can now see in a more intuitive way why an autocrat limits the amount of redistribution to himself. The maximum of $tr(t)$ occurs where

the effect of the fall in r on the autocrat's revenues, ($tr'dt$), just offsets the effect of the increase in t, that is, rdt. The autocrat bears t per cent of the total deadweight loss that arises from the taxes imposed to redistribute income to himself. Thus he will not gain from further redistribution to himself when the social loss as a proportion of actual income – $-r'(t_A^*)/r(t_A^*)$ – is the reciprocal of his chosen tax rate, $1/t_A^*$, as is clear from Equation (4). We shall see later that a simple reciprocal relationship such as this characterizes all redistributive taxation.

Because the decision on the optima t is independent of that on G, we can show the autocrat's choice of G by inserting t_A^* into Equation (1). The right amount (for him!) of G will maximize his surplus:

$$\underset{G}{Maximize}\ \{[t_A^* r_A^*]Y(G)\} - G \tag{6}$$

This requires

$$Y'(G) = \frac{1}{t_A^* r_A^*} \tag{7}$$

Because of incentive-distorting taxation, this society (the autocrat and his subjects) does not realize its potential income, Y, but instead obtains an actual income of $rY \equiv \mathrm{I}$. So, in terms of actual income I,

$$r_A^* Y'(G) \equiv I'(t_A^*, G) = \frac{1}{t_A^*} \tag{8}$$

This condition states that the autocrat provides G until the marginal increase in society's actual realized income from public goods equals the reciprocal of his share of national income. As we know, the autocrat curtailed his redistribution to himself when the proportionate social loss $[-r'(t_A^*)/r(t_A^*)$ was also equal to $1/t_A^*$. Thus the same reciprocal rule applies to both margins because the same linear tax rate determines his share of both the society's benefits from the public good and its losses from redistributive taxation.

For the sake of a simple example, suppose that the optimal tax rate for an autocrat is two-thirds. At this optimum the proportionate social loss from the autocrat's redistribution to himself, $-r'/r$, is therefore $1/t$ or 3/2s. Then the autocrat also provides the public good up to the point where its marginal social product ($rY' \equiv I'$) is 3/2s as a great as his/her marginal cost. For the autocrat (who gets two thirds of so-

ciety's actual product in taxes) his marginal benefit of the last unit of public good is just equal to the marginal cost he must pay; 2/3 times $3/2 = 1$.

Because the autocrat chooses a tax rate that redistributes income to himself, he finances the public good out of infra-marginal tax receipts, so the marginal cost to him of the public good does not include the deadweight loss from additional taxation to finance the public good (there is no such additional taxation), so the marginal private cost to him of G is simply the direct resource cost of 1.

Returning to Equations (7) and (8) and substituting from Equation (4), we identify two additional relationships that obtain at the autocrat's optimum and will be of use in depicting his choices:

$$Y'(G) = -\frac{[r_A^*]'}{[r_A^*]^2} \equiv Q(t_A^*), \tag{9}$$

$$I'(t_A^*,G) = -\frac{[r_A^*]'}{r_A^*} \equiv P(t_A^*). \tag{10}$$

The functions Q and P[5] help to show, in a remarkably simple way in one figure, how all the optimizing conditions of the autocrat are satisfied simultaneously, and at the same time depict the level of output of the society – and also its distribution between the autocrat's consumption, the subjects' consumption, and the expenditure on the public good – plus the extent of deadweight losses. The second quadrant of Figure 3.2 depicts the choice of optimal t for an autocrat. The product $tr(t)$ is shown as beginning at zero at the origin, rising to a maximum and falling off again as t increases. The autocrat chooses the value of t where $1/t = -(r_A^*)'/r_A^*$, which is the maximum on $tr(t)$. At the autocrat's optimal tax rate, t_A^*, the percentage of potential output realized is r_A^*, the percentage lost because of efficiency distortions of taxation is $(1 - r_A^*)$, and the autocrat gets his maximum share of income, $t_A^* r_A^*$.

Now consider the points directly above the optimal tax rate. From Equations (7) and (9), $1/tr$ and $Q(t)$ at the autocrat's optimum must equal Y' and from Equations (8) and (10) $1/t$ and P must equal I'. The first quadrant shows the functions Y' and $r_A^* Y' \equiv I'$ together with their values at the autocrat's optimum. We see that an autocrat provides G_A^* where its marginal product, that is, $r_A^* Y'(G)$, equals the reciprocal of his share of the national income, $1/t$.

Proceeding downwards, the fourth quadrant shows that the autocrat

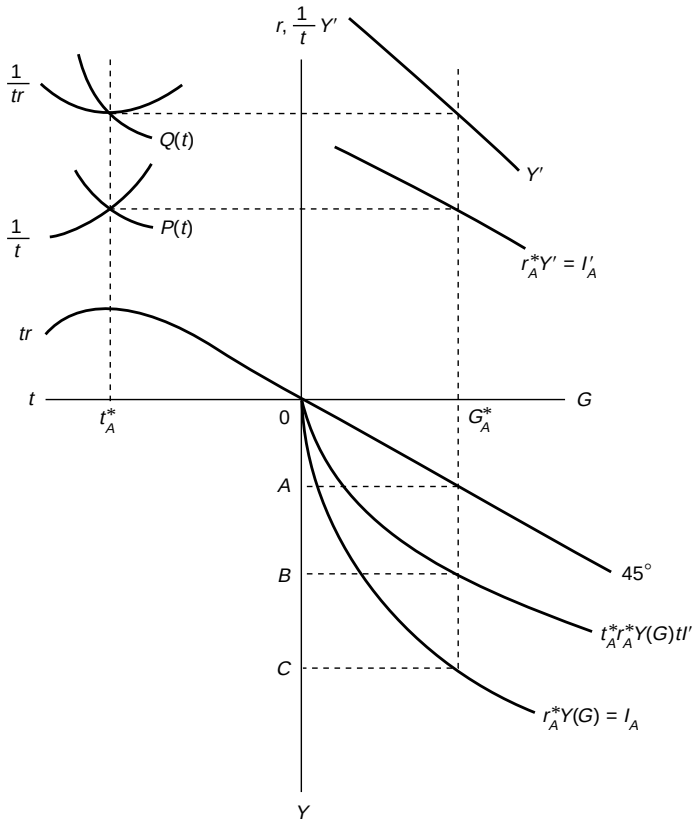

Figure 3.2 Optimizing conditions of the autocrat and society's output

equates the marginal cost of *G*, given by the slope of the 45° line[6] with the extra tax revenue he receives out of the increase in national income that additional provision of the public good brings about – shown by the slope of $t_A^* r_A^* Y' = tI'$. The autocrat's tax receipts – and the income of society, $rY(G) = I(t_A^*, G)$ – would have been different had he chosen a different level of taxation, but the choice t_A^* has already been made: the optimum *G* depends on the optimum *t* but not vice versa. We can now see how the national output is used: the total output or income of the society is *OC*, of which *OA* is spent on the public good, *AB* is the autocrat's surplus, and *BC* is consumed by the subjects.

Returning to the first quadrant, the vertical distance between Y' and I' gives the reduction in the marginal productivity of the public good caused by the autocrat's incentive–distorting taxation; if all his revenues had been raised by lump–sum taxes, r would have had the value 1, and Y' and I' would have been identical. This reminds us that, if the autocrat had somehow been able to impose lump-sum taxation, the whole situation would have been different; He would have imposed higher taxes and therefore provided more of the public good.

Though the conclusion changes drastically when (as often happens) an autocrat has short time-horizons, it is nonetheless remarkable how much the encompassing interest of the secure autocrat leads him to take account of the welfare of his subjects. Our autocrat has the motivation of a bandit. Yet, if he has a lasting hold on his domain, an invisible hand leads him to cease redistributing to himself beyond a certain point, because of the loss in social efficiency his taxation brings about. It also leads him to use some of the resources he controls to provide public goods that serve the whole society. Moreover, the larger the share of output the autocrat takes in taxes, the more encompassing his interest, and the closer he comes to taking full account of the gains to society from the public good. Though the citizens in our democratic models enjoy larger post-tax incomes than the autocrat's subjects, the degree of overlap between the interests of the autocrat and his subjects is startling. Most of human history and even some of humanity's progress has occurred under autocratic rule, and this record of survival and occasional advance under autocracy cannot be explained without reference to the encompassing interests of autocrats.

The evaluation of autocracy changes dramatically the moment we consider the forces, such as insecurity of tenure and uncertainty of succession, that give so many autocrats short time-horizons. Whenever the tax yield from a capital good, over an autocrat's planning horizon, is less than its total value, the rational will confiscate the capital good. As DeLong and Shleifer (1993) found, even in the dynastic systems of historic Europe, long time-horizons were the exception and confiscations commonplace, so that city growth was substantially slower under autocratic than under non-autocratic governments. Thus we must remember that, just as roving bandits who can seize and continue to hold a territory gain from becoming autocrats, so autocrats, whenever they have short time-horizons, become, in effect, roving bandits.

4 A BENCHMARK SOCIETY: THE CONSENSUAL

DEMOCRACY

We now deveop an idealized 'consensus democracy'.[7] While consensus is not a realistic assumption, it will prove to be fruitful. Most of the realistic democracies we shall analyse generate allocations that fall between the consensual society and the autocracy. Others, remarkably, under a range of conditions, behave in exactly the same way as a consensual society.

For our consensual democracy we assume that a society either began with – or achieved through redistributions in the past – a distribution of endowments that enjoys unanimous support. Because there is no demand to change the distribution of income in such societies, we shall designate them with the subscript '*N*' for 'non-redistributional'. In keeping with the assumption that there is no redistribution of income, each citizen pays a share of the cost of the public good that is exactly proportional to his or her share of the gains (marginal and average) from the public good.

Because G is a productive input that is needed for the generation of any and all income [$Y(G)$; $Y(0) = 0$] – that is, a pure non-exclusive and non-rival public good equally available for all income generation, a simple proportional tax on all income automatically generates non-redistributive or 'Lindahl' tax shares! Real-world societies are not, of course, as simple as this – and they also lack the naive honesty in preference revelation or preference-eliciting mechanisms typically needed for 'Lindahl' tax prices – we abstract from such difficulties to examine public good provision in a Pareto-efficient society with no coercive redistribution of income. As is well known, with 'Lindahl' tax shares, every voter wants the same, socially-efficient amount of the collective good.[8]

Welfare depends on net or *post-tax* income. One way to characterize this consensual society's welfare optimization problem, therefore, is to maximize:

$$W = \underset{t}{Max}\ (1 - t)r(t)Y(G) \tag{11}$$

Public good expenditures cannot exceed tax revenues. It is feasible for the consensual democracy to collect more taxes than needed to finance public goods and redistribute the surplus to itself, but because this society already has unanimity about its income distribution, doing this would cause deadweight losses from incentive-distorting taxation for no purpose.[9] Accordingly, the consensus society collects no more in

taxes than it spends on the public good. We can then treat the maximization of this society as always proceeding with the constraint that $tr(t)Y(G) - G = 0$. This, in effect, determines G as a function of t: $G = G(t)$. Because the society's choice of t implies a choice of G, and vice versa, we cannot partition its decision into two phases as we did with the autocrat. The consensual democracy chooses a tax rate such that, when all tax proceeds are spent on G, the marginal social benefit of the tax as perceived by the consensual democracy just equals its marginal social cost as perceived by that society.[10]

An alternative way to characterize the consensual society is to focus on its optimal provision of G. To do this we calculate its income as its gross product minus the costs of G. This calls for formulating its social welfare maximization as:

$$U = \underset{G}{Max}([r(t[G])Y(G)] - G); \quad s.t.\ tr(t)Y(G) - G = 0 \qquad (12)$$

Here, the variable of choice is taken as G, with $t = t(G)$ being implicit from the constraint. Either of these formulations – Equation (11) or (12) – is sufficient to solve the entire problem for the consensual society. But with (12) marginal resource costs and marginal deadweight losses show up separately and explicitly. Thus the derivative of (12) with respect to G yields:

$$\begin{array}{cccc} \textit{Marginal Benefits of } dG & & \textit{Marginal Costs of } dG & \\ rY' & + & Yr'\dfrac{dt}{dG} - 1 = 0 & (12') \end{array}$$

The marginal cost of G consists of the direct resource cost, given by the term just to the left of the equals sign, and the extra deadweight losses attributable to the additional taxation to finance G, given by the next term to the left. This equation also shows, as would be expected, that the consensual democracy takes account of *all* the benefits of the public good (by contrast, the autocrat's provision of the public good took account only of his/her share of the benefit, trY'). We shall show later that, whether it has consensus or not, *every regime that abstains from redistribution necessarily takes account of all of benefits and costs of the public good to the society as a whole.*

When the constraint $tr(t)Y(G) = G$ is totally differentiated, solved for dG/dt,[11] and the result substituted into Equation (12′), we obtain, after collecting like terms, the relation between t and G that must obtain at the optimum.[12]

$$Y'(G) = \frac{r(t) - (1 - t)r'(t)}{r^2} \equiv V(r(t), t) \tag{13}$$

Because incentive-distorting taxation is needed to finance G, $r < 1$, potential product Y cannot be produced; rather, it is $rY \equiv I$ that is observed. With t^* and r^* denoting the solution values of t and r, both for the consensus democracy and for other non-redistributional societies, the actual marginal product of G is $r(t_N^*)Y'(G) = I'(t_N^*, G)$. When we multiply both sides of Equation (13) by r, we obtain the necessary first-order condition for public good provision by a non-redistributive society:

$$r^*Y'(G^*) = I'(t^*, G^*) = r(t^*)V(t^*) = 1 - (1 - t^*)\frac{[r^*]'}{r^*} \equiv MSC_N^* \tag{14}$$

MSC_N^* stands for the marginal social cost, given the optimal tax rate t^* of the resources a non-redistributional society needs to obtain a unit of G.[13] On the right side of Equation (14), the 1 represents the direct resource cost of the public good. The expression $\{-[(1 - t^*)(r^*)'/r^*]\}$ represents the marginal deadweight loss, at the tax rate t^*, of the tax collection needed to obtain one unit of the public good. Because r' is negative, the right side of Equation (14) is necessarily greater than 1, so that the marginal cost of the public good for a non-redistributional society, because of the deadweight loss of taxes, is necessarily greater than the direct resource cost of G. As taxes increase, r must become smaller;[14] if, in addition, r declines at an increasing rate, this is sufficient to ensure that the second-order conditions for a maximum will be fulfilled.[15]

These relationships are shown in Figure 3.3. The second quadrant shows tax shares, $tr(t)$, at each tax rate as before. For illustration, $V(t)$ and MSC are drawn as increasing throughout and the consensual society's t_N^* is assumed as shown. Above t_N^* we find the marginal social cost of the public good, $1-(1-t)r'/r \equiv MSC_N$. Further up, $V(t)$ shows this same marginal cost in terms of potential income. The first quadrant shows that actual marginal cost is equated to I', the actual marginal social product of G. The corresponding match of the relevant values of $V(t)$ and Y' shows marginal costs and benefits in terms of potential income.

Reading down from I', the horizontal axis shows the optimal quantity of public good G_N^*. The fourth quadrant of Figure 3.3 shows ac-

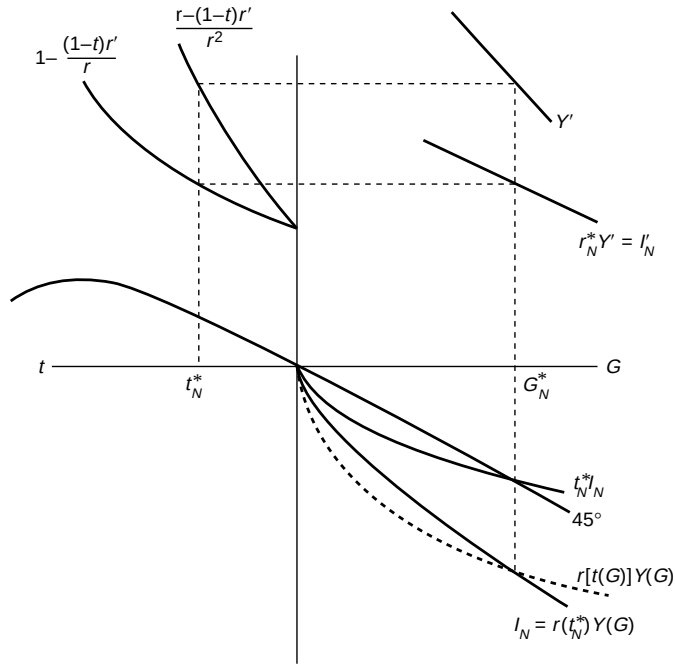

Figure 3.3 Relationships between marginal social cost and direct resource cost of the public good

tual income $I(t_N^*,G)$ and tax collections $t_N^*I(t_N^*,G)$ as functions of G given that $t = t_N^*$. In contrast with the autocrat, who took account only of his share of the benefit of the public good in deciding how much to provide, the consensual democracy, as we see in quadrants I and II, equates the entire marginal social cost of the public good – including deadweight losses – to its total marginal social benefit. Below G_N^* we see that tax revenues at the optimal tax rate are just sufficient to produce this optimal amount of the public good. The distance from the 45° line down to $I(t_N^*,G)$ then shows the amount of actual output left over after taxes as net income for the citizenry.[16]

5 REDISTRIBUTIVE DEMOCRACIES

Our consensual and normatively ideal democracy is obviously based on assumptions that do not fit real world societies. Most governments do not enjoy unanimous support, but represent some ruling interest, such as a majority, that leaves out part of the society. There is normally

a minority of the society that is not part of the government. Accordingly, we now develop a model of a democratic (or at least representative or non-autocratic) government that does *not* embody a social consensus, but governs the society solely in the interest of a majority or other ruling interest. We shall describe the ruling interest typically as a majority, but the analysis is general and covers oligarchies and other ruling groups.[17] Unlike the autocrat, however, the members of this ruling interest also earn income in the market economy.

All democratic societies, even in our broad sense, share three fundamental features. First, there is competition for votes to determine who controls the government; second, they can, and often do, redistribute income as well as provide public goods; and third, their behaviour depends dramatically on the share of the economy that parties or officeholders include in their decision calculus. The model incorporates all three of these features, and shows how they affect the allocation of resources and the distribution of income.

When other things are equal, government policies that increase the aggregate income or welfare of society also make the majority or other ruling interest better off. This provides a powerful incentive for democratic governments to take account of citizens' interests. But the interests of the majority are often served best if there is both a prosperous economy and a redistribution of income from the minority to it. Therefore we assume that no scruples prevent democratic political leaders from using taxpayers' money to obtain the votes of a majority, and we describe this process as if the majority or ruling interest acts as an optimizing monolith. The ruling interests considered in this section necessarily gain from using their control over the government to redistribute to themselves;[18] in Section 5 we consider majorities that would not redistribute. We also assume that the majority or other ruling interest is always decisive in determining the level of taxation and in deciding how much of the tax proceeds are used for redistribution to itself and how much for provision of the public good.

As before, the entire national product ($rY \equiv I$) is produced in a market economy; because the society's output depends on the public good, some of its product is spent to provide G; the remainder, $I - G$, is net income. Because the majority earns market income, its net income comes from two sources: (i) the income that its members earn in the market and (ii) any redistribution that this ruling interest, after defraying the costs of the public good, extracts from the rest of society. We therefore need two additional pieces of notation to cover the majoritarian democracy:

F = the *fraction* of the total income *produced and earned in the market* accruing to the redistributive ruling interest; some of the market income in a majoritarian democracy will be earned by the ruling interest and some by the rest of the society, so $0 < F < 1$. This ruling application consists of the people who produce 100 F per cent of the national product. The identity of the ruling interest and its F are exogenously given parameters in our mode. If $F = 1$, everyone would be included in the ruling interest and a consensual model would be appropriate. In an autocracy, where the dictator obtains all of his income through the government and does not sell labour or other factors of production in the market place, $F = 0$.

S = the *share* of the total actual production, $rY \equiv$ I, that the ruling interest receives from redistribution – what it takes for itself from the 'minority' through its control of government – *plus* its market earnings. At the redistributive majority's optimum, its share is the sum of these two sources as a percentage of the total income of the society. The formula for its share is

$$S = F + (1 - F)t \tag{15}$$

Thus S gives the share a majority receives of the marginal social benefits of public goods and the share it bears of the marginal social costs of taxation. Note, however, that, unlike F, S is not an exogenously given feature of the society. S depends not only on F, but also on the value of t that the ruling interest chooses, and therefore on the shape of the $r(t)$ function. For an autocrat with a constant average tax rate, $F = 0$ and the share, S, is simply t.

Because we consider here only majorities that in fact choose positive redistribution from the minority to themselves, these majorities necessarily collect more in taxes than they spend on the public good ($trY > G$) and keep the difference for themselves. Like the autocrats we considered earlier, such ruling interests first decide what redistributive tax rate best serves their interests and then decide how much to spend on the public good; their tax and public-good supply decisions are independent. Because of this independence we can represent[19] the optimization problem of the governing interest as:

$$\underset{t,G}{Max}\ (1 - t)r(t)FY(G) + [tr(t)Y(G) - G];\ s.t.\ G < tr(t)Y(G) \tag{16}$$

The first term of the objective function in Equation (16) shows the market income of the ruling majority after both deadweight losses and taxes, and the second term is the surplus that the majority transfers to itself. Given positive redistribution,[20] the first-order conditions[21] for maximization of Equation (16) are:

$$F[-r + (1 - t)r'] + (r + tr') = 0 \tag{17}$$

and

$$\{(1 - t)rF + tr\}Y' - 1 = SrY' - 1 = 0 \tag{18}$$

S and F are as already defined. The optimal tax rate for a majoritarian democracy that redistributes is given by Equation (17) and its optimal provision of the public good is given by Equation (18).

Condition (17) requires that the marginal cost of the tax (of dt) to the majority party – the negative of the first term in Equation (17) – be equal to the marginal benefit from redistribution – the second term. The majority ceases raising taxes to redistribute to itself when the reduction in its share of market income is exactly as large as what it gains at the margin from redistribution. The majority limits the deadweight losses it imposes on society because it bears a substantial proportion of these losses. In short, the majority is led, as though by a hidden hand, to limit the extent to which it uses the coercive power of government to redistribute income to itself. *Its encompassing stake in the society gives it an interest in moderating the deadweight loss it imposes on society, and thus also the extent of its exactions from the minority.*

Recall that an autocrat ($F = 0$) also limited the deadweight losses his taxation imposed upon society. As we shall see, because a majority's stake ($F > 0$) is necessarily more encompassing than an autocrat's, it elects a lower rate of redistributive taxation than an autocrat would impose. Rearranging Equation (17) gives:

$$F = \frac{r + tr'}{r - (1 - t)r'} \equiv R(t) \tag{19}$$

As the tax rate is increased from $t = 0$, $R(t)$ tends to fall, because deadweight losses at the margin (the denominator) tend to increase, and the marginal gain from redistribution (numerator) to decrease.[22] The majority increases its tax rate until $R(t)$ falls to the point where it

equals F, which determines its optimal tax rate. For t such that $R > F$, the marginal benefits of further redistribution to the majority exceed the marginal costs, and therefore taxes are increased. For $R < F$ the opposite is true. In short, a redistributing majority stops raising taxes when the fraction F of the deadweight loss that it bears is just equal to the redistribution it receives at the margin, or equivalently when the marginal loss to the society as a whole reaches $1/F$ times the majority's gain.

The importance of F as a determinant of the degree of redistribution becomes evident when, from Equation (19), we derive this expression[23] for the optimum redistributive tax:

$$t_R^* = -\frac{r}{r'} - \frac{F}{(1-F)}\ ;\ F \neq 1 \tag{20}$$

Equation (20) confirms the foregoing argument that *the larger a majority's fraction* F, *the lower its optimal tax rate will be.* It also shows that a majority, or other ruling interest that earns some of the society's market income, necessarily levies lower taxes than an autocrat. If, as in an autocracy, $F = 0$, then the equation reduces to Equation (4), which gave t_A^*. Thus *an autocrat will choose a higher tax rate than a majority and redistribute a larger proportion of the national product.*[24]

Now let us compare the majority's *private* marginal costs and benefits with the marginal *social* costs and benefits of the whole society. From the definition of S, the ruling interest's share, we know that at its optimum it receives S per cent of any increase or decrease in the society's income. It follows immediately that the marginal costs and benefits of its actions to the society as a whole are the reciprocal of its share S – that is, of the share of social income that it receives given F and the redistribution to itself implied by its choice of the optimal t_R^*.

To see this another way, we substitute F from Equation (19) into $1/S \equiv 1/[F + (1 - F)t]$, from Equation (15). This yields:

$$\frac{1}{S} \equiv 1 - \frac{(1-t)r'}{r} \equiv MSC \tag{21}$$

Note that this expression for marginal social costs (MSC) is the same as the one derived for consensual societies in Equation (14). We show elsewhere (McGuire and Olson, 1995) that this simple expression makes it possible to illuminate important relationships between incentive-

distorting taxation – including the increased rates of such taxation that income redistribution entails – and the productivity of public goods.

We can now see how much public good a redistributive ruling interest will provide. Just as the autocrat chose his optimal tax rate independently of his/her decision on how much G to provide (see footnote 6), so does every majority that redistributes. Because we have assumed proportional deadweight social loss, $1 - r(t)$, to be independent of the public good supply, the public good does not enter into Equations (17), (19) and (20). Having chosen the tax rate to give optimal redistribution, the majority then chooses its optimal public good level. Thus the redistributive majority, like the autocrat, finds that its marginal *private* cost of G does not include the deadweight loss of taxation and is therefore the direct resource cost, 1.

The majority's marginal private benefit from G is given by Equation (18) as SrY'. Accordingly, the majority equates its *share* of the society's increase in actual realized income resulting from one additional unit of the public good, $SrY' \equiv SI'$, to its marginal private cost of 1. The best tax rate and best public good provision depend not only on F and S but also on the specifics of the functions giving the productivity of public goods, $Y'(G)$, and the deadweight loss from taxes given by the $r(t)$ function. To identify this, we combine Equations (17) and (18). Expressions (22), (23), and (24) are all equivalent.

$$Y' = \frac{r - (1 - t)r'}{r^2} \equiv V(t) \tag{22}$$

$$Y' = \frac{1}{rF + (1 - F)tr} \tag{23}$$

$$rY' \equiv I' = \frac{1}{F + (1 - F)t} \equiv \frac{1}{S} \tag{24}$$

The redistributive majority's incentives are immediately evident from Figure 3.4. The majority's total income is given by adding its market income, $FrY(G)$, to the redistribution it exacts from the minority, $(1 - F)trY(G)$. If we drop the $rY(G)$ terms we obtain a fraction, $F + (1 - F)t$,[25] that indicates the proportion of the society's actual output that the majority receives. Accordingly, Figure 3.4 shows by the line Fr the fraction of r, and thus the market income of this ruling interest, as a share of Y. The fraction of potential income collected from the minority is shown by $(1 - F)tr$. The combined income share

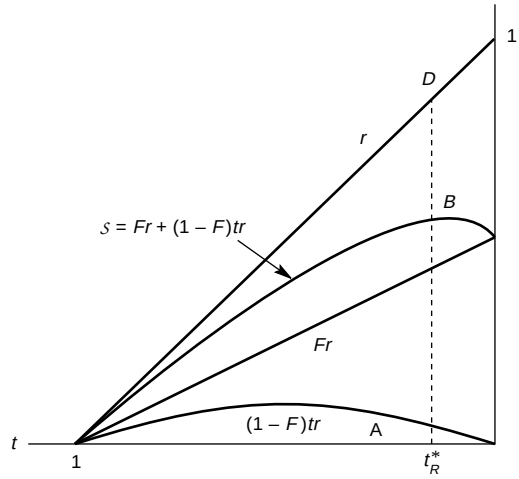

Figure 3.4 The redistributive majority's income and redistribution incentives

of this ruling interest is then $Fr + (1 - F)tr \equiv rS \equiv \mathcal{S}$. After G has been financed, the remaining tax receipts are available to the majority for redistribution to itself. The redistributive majority, accordingly, maximizes its proportionate share of realized output irrespective of the amount of public good it decides to supply. The maximum[26] of $\mathcal{S}$ and the optimal redistribution from the minority to the majority occur at the tax rate, t_R^*. Note that at the ruling interest's optimum the slope of Fr equals the slope of $(1 - F)tr$ in absolute value: at the margin the majority's market income share falls by just as much as the redistribution to it goes up.

This exposition makes it obvious why the majority's redistribution to itself will be higher for smaller F: a smaller value of F makes the decline of Fr, as taxes and deadweight losses increase, less important to the majority, so that the tax rate at which the majority's loss in market income just equals its gain from additional redistribution must be higher. As F approaches zero the majority becomes indistinguishable from an autocracy and the majority's optimal tax rate converges on the one that maximizes tax collections.

When the redistributive majority has found the peak of $\mathcal{S}$ and thus its optimal tax rate, it then decides how much of the public good to

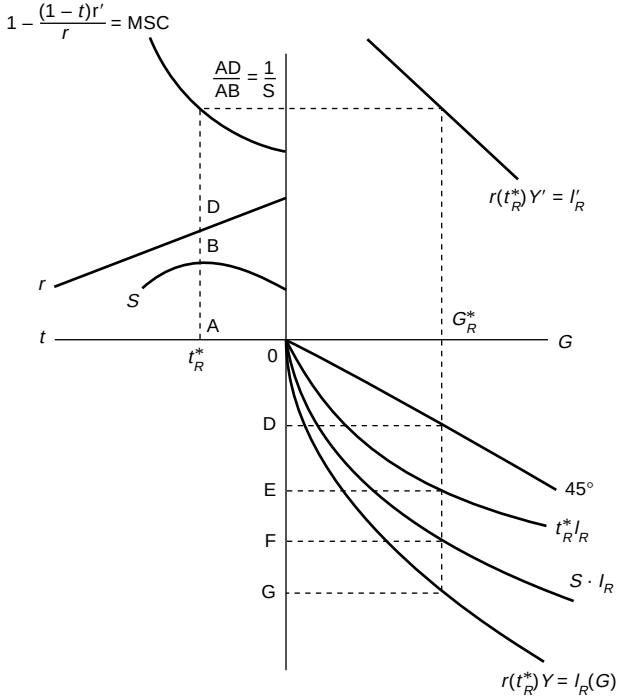

Figure 3.5 Equalization of the majority marginal private cost of G to its share of S, the marginal social product of the public good

supply. To understand this we must know what share of the benefits of the public good the majority will receive. This is S. It is shown in Figure 3.4 as AB/AD. The deadweight loss from taxation has no effect on the *marginal* private cost of G to the majority.[27] The majority equates its marginal private cost of G – that is 1 – to its share, S, of the marginal social product of the public good. At the optimal value of G, therefore, $Sr(t_R^*)Y'(G) \equiv SI'(t_R^*, G) = 1$ – or equivalently $I'(t_R^*, G) = 1/S$.

Figure 3.5 shows the two sides of this equalization. In the second quadrant, the marginal social cost of resources, from Equation (21), is plotted as MSC. At its optimal tax rate the majority's chosen $1/S$ equals MSC – consistent with Equation (24). The majority then provides G until its marginal private benefit equals 1, or equivalently until the society's marginal social return equals $1/S$. This equalization decides

G_R^*. The actual marginal social product of G – given that the majority has set $t = t_R^*$ – is given by the schedule $I_R'(t_R^*, G)$ shown in the first quadrant. The fourth quadrant also pictures this optimum G. There the rate of increase in $SI = FI(t_R^*, G) + (1 - F)t_R^* I(t_R^*, G)$ with respect to G, just equals the marginal direct resource cost of G (the slope of the 45° line). The national product, OG, is then divided as follows: OE are total taxes, of which OD is spent on the public good and DE is retained by the majority; EF is the post-tax market income of the majority; and FG is the post-tax income of the minority.

At the majority's optimum, the marginal social product of the public good equals the reciprocal of that ruling interest's share (taking both its market income and its redistribution to itself into account) of the increase in the income of the society, that is, to $1/S$. This general rule applies to *all* redistributive regimes. Recall that the autocrat's share of social income is given by the reciprocal of the tax rate, and we know from Equation (8) that I' is equal to the reciprocal of his/her tax rate.

6 NON-REDISTRIBUTIVE MAJORITIES

We now come to the most striking example of the argument that, when coercive power is in the hands of a stable encompassing interest, a hidden hand prevents the disastrous outcomes that might have been expected. As we have seen, secure self-interested autocrats, because their monopoly over tax collection gives them an encompassing interest, generate better outcomes than might have been anticipated. We have also shown that a majority whose members earn income in the market has a more encompassing interest than an autocrat, so optimization by such a majority therefore necessarily generates outcomes better than autocracy for every market participant.[28] The hidden hand that guides encompassing interests can, in circumstances that are by no means rare, make their coercive power totally beneficent. *If a ruling interest is sufficiently encompassing – if it is what we call a super-encompassing ruling interest – there is no redistribution whatever. Those with no power are treated fully as well as those with total power and the allocation of resources is the same as that of our idealized consensus democracy.*

To see why, consider the two driving forces in our whole theory. First, the greater a ruling interest's market fraction, F, the larger its share of any deadweight losses arising from its taxation and the *lower*

the tax rate it desires. Second, the greater the value of S for a ruling interest, the larger its share of the benefits from a public good and the *more* it wants to provide. Thus, as a ruling interest becomes more encompassing, it wants to tax less and, at the same time, spend more of the taxes it does raise on the provision of G.

Consider a society in which the ruling interest is replaced by one with a larger F, but in which the $r(t)$ and $Y(G)$ functions remain unchanged, and where public good provision is necessary for social order and the production of any output [$Y(G)$; $Y(0) = 0$]. As F increases, so does S,[29] and a point will be reached where the ruling interest allocates all taxes to public-good provision. At this point, the ruling interest becomes so encompassing that it ceases redistributing and treats the minority as well as it treats itself! Such a ruling interest, and any ruling interest that is still more encompassing, will *not* redistribute to itself. It will, in fact, act in exactly the same way as the consensual democracy does.

The first of the two driving forces is identified by Equation (20), which shows that t_R^* declines with increases in F:

$$t_R^* = -\frac{r}{r'} - \frac{F}{(1-F)}\,;\; F \neq 1 \qquad \text{(20 repeated)}$$

In fact, standing alone, it implies, for sufficiently large values of F, a tax rate that is zero or even negative. Equation (20) was derived from Equation (17), one of the two first-order conditions for a redistributive majority. Therefore, the tax rate t_R^* solution from Equation (20) must be entered in Equation (18) – the first-order condition for optimal public-good provision.

The second driving force is evident in Equation (24):

$$I' = \frac{1}{F + (1-F)t} \equiv \frac{1}{S} \qquad \text{(24 repeated)}$$

The public good is needed to produce output and, as F – and therefore S – goes up, the ruling interest obtains a larger share of the benefits of G, which makes it want to provide more, thereby requiring that more taxes be allocated to provision of G. This equation shows that, as F, and thus S, increases, the solution value of Y' declines and therefore G_R^* increases. Once F reaches a high enough value, t_R^* will be so low and G so great that all tax revenue is needed to pay for public goods and there will be no redistribution.

The existence of ruling interests that leave out part of society, yet act in the interest of all, is not only a possibility, but also (with incentive-distorting taxation) a necessity. For $F = 0$ the autocrat obtains a positive surplus for himself while he provides G_A^* of the public good. By Equation (20) there is also a value of $F = F^0 < 1$ that entails that $t_R^* = 0$. At this tax rate, there is no revenue for G. It follows that some value of F $(0 < F < F^0)$ will entail a positive tax rate just sufficient to pay for the optimal provision of G. Let us designate the 'cross-over' values at this point as $\hat{F}$, $\hat{t}^*$, $\hat{G}^*$. A value of $\hat{F} \leq F^0$ must exist where the ruling interest is best served by a tax rate just sufficient to finance optimal provision of public goods: at $\hat{F}$, by definition $\hat{t}^*\hat{r}^*Y(\hat{G}^*) = \hat{G}^*$. *That is ruling interests must become 'super-encompassing' and thus abstain from redistribution before* $F = F^0$ *and therefore before* $F = 1$. Thus we have proved that, when a majority or other ruling interest is sufficiently encompassing, it will not redistribute any income, and will treat those subject to its power as well as it treats itself.

By analysing their optimization problem explicitly, we obtain a further understanding of super-encompassing interests. The appropriate Lagrange function is:[30]

$$L = (1 - t)r(t)FY(G) + tr(t)Y(G) - G + \lambda\{tr(t)Y(G) - G\} \tag{25}$$

The Kuhn–Tucker condition is $\lambda[tr(t)Y(G) - G] = 0$, $\lambda \geq 0$, and $[tr(t)Y(G) - G] \geq 0$.

First assume that $trY = G$. Then $\lambda > 0$ and the first order conditions with respect to t yield:

$$\frac{F}{1 + \lambda} = \frac{r + tr'}{r - (1 - t)r'} \equiv R(t) \tag{26}$$

$$F = (1 + \lambda)\, R(t) \tag{27}$$

From differentiating with respect to G, we obtain:

$$\frac{F}{1 + \lambda} = \frac{1 - trY'}{(1 - t)rY'} \tag{28}$$

Equations (26) or (27) give the condition for optimal distribution when the majority just supplies the public good out of tax collections with

nothing left over for redistribution, and $\lambda > 0$. Under these conditions (evaluated at zero redistribution) the majority's marginal costs of redistribution exceed the marginal benefits it would gain. Condition (26) says that, if it were possible to reduce taxes towards equality of their marginal costs and benefits, the ruling interest would do so. Lower taxes, however, would cut into the revenue needed to finance the desired level of the public good. Analogously, Equation (28) indicates that at the constrained optimum of G, the marginal benefits of G exceed marginal costs. Equations (26) and (28) also indicate that every ruling majority with an F so high that it rejects redistribution behaves just like a majority with $F = \hat{F}$. All ruling interests that are required by the constraint $trY = G$ not to redistribute behave as if their $F = \hat{F}$ and as if they had *chosen* $trY = G$: that is, for all $F > \hat{F}$, $F/[1 + \lambda] = \hat{F}$.

Combining Equations (26) and (28) will give the general relation between marginal deadweight loss from taxation and marginal productivity of public goods that must obtain at an optimum. Doing this yields the same general condition for the optimal provision of G as for majorities that actually redistribute (Equation 22) and for the consensual democracy (Equations 13 and 14). One implication of this equivalence is that every non-redistributive ruling interest, whatever its F, will make the same decisions about public-good provision it would have made had its F been $\hat{F}$, and all will have the same tax rate $\hat{t}^*$. It also means that such super-encompassing majorities will provide the same level of G and have the same tax rate as a consensual democracy.

These results can be interpreted from either of two vantage points. If we start with the perspective of ruling interests that actually redistribute and thereby have a marginal private cost of G of 1, the super-encompassing majority chooses $\hat{t}^*$, and therefore the corresponding $\hat{S}$. From this perspective, $\hat{S}$ is the effective share of the every super-encompassing ruling interest, so $\hat{S}r(\hat{t}^*)Y'(G) = 1$, and $MSC = 1/\hat{S}$. Alternatively, because both societies with $F \geq \hat{F}$ and consensual democracies avoid redistribution, take account of the deadweight costs of taxation in the marginal cost of G, and weigh all the benefits of the public good in choosing how much to provide, we can also take the perspective of the consensual democracy. From the perspective of consensual democracies – for which by definition $S \equiv F \equiv 1$ – we can specify that super-encompassing majorities always act in such a way that $S^u \equiv 1$, and describe the super-encompassing interest's choice of G with $S^u r(\hat{t}^*)Y'(G) = MSC$. Because $S^u \equiv 1$, and $MSC = 1/\hat{S}$, both accounts give the same answer. Every ruling interest with $F \geq \hat{F}$ makes exactly the same choices as the democratic consensus.

The key to the matter is that with $F \geq \hat{F}$, *the absence of redistribution implies that both the majority and the minority each pay their proportional share of the tax burden*. The majority receives F per cent of the benefits of the public good and pays F per cent of the tax. It therefore chooses exactly the same level of public-good provision as the consensual democracy. Thus the society ruled by a super-encompassing majority is twice blessed: *the ruling interest not only abstains from redistributive taxation, but it also chooses an ideal*[31] *level of public-good provision that reflects the minority's interests as its own*.[32]

Ruling interests so encompassing that they abstain from redistribution are by no means oddities. Consider those super-majorities required for major decisions in political systems with numerous checks and limits on the use of power, such as Switzerland and the USA, or even simple majorities composed mainly of those with above-the-median incomes (Niskanen, 1992). It is easily possible for such majorities to represent, say, three-quarters of the income-earning capacity of a country, in which case they would cease any redistribution to themselves when the last dollar redistributed brings a marginal deadweight loss of four-thirds of a dollar. Suppose that at the same time the $Y(G)$ function is such that it pays the majority to spend a fourth of the national product on public goods. In such circumstances, it does not require any remarkable deadweight loss function, $1 - r$, for tax rates of 0.25 to make the deadweight loss from the last dollar raised in taxes a third or more of a dollar, and in this case the majority will not redistribute. Thus coalitions so encompassing that they abstain from redistribution are a feature of reality.[33] McGuire and Olson (1995) provide a more detailed analysis of the Langrangian maximization underlying these results, as well as further interpretation of the symmetry along the continuum from autocratic regimes, to redistributive majorities, to super-encompassing ruling interests, to consensual societies. This symmetry derives from the equivalence between Equations (13), (14) and (22).

7 QUALIFICATIONS AND IMPLICATIONS

In the interest of unity and manageable length, the foregoing analysis has abstracted from some most important determinants of the economic structure of governance and performance. Most notably, it has abstracted from the great problems that arise when coercive power is dispersed among many individuals or groups, each with only a narrow or minuscule interest in society, and it has only mentioned in passing the problems that arise from short time-horizons.

Because we have focused on unitary governments with monopoly power to tax and redistribute, we have not analysed, for example, the problems that arise when individuals have only a tiny stake in the success of society at large, yet may in the aggregate impose substantial losses upon society. Criminal behaviour is an example: the typical criminal obviously does not have any incentive to moderate his depredations because of his stake in the society. Thus the invisible hand does not prevent crime. Nor does it solve public-good, externality, or collective action problems – it is precisely because there is often no relevant encompassing interest that these problems are sometimes very serious.[34]

Similarly, the foregoing models do not explain the social losses from special-interest groups, each of which constitutes only a minute part of the economy and thus has only a narrow interest in society. So these groups have virtually no incentive to limit the deadweight losses they impose upon society as they use their political influence or collusive power in their own interests.[35] These narrow special interests face incentives far more perverse for society than those that confront a security stationary bandit. To the extent that such interests correlate with democracies and prevail in them, democracies will perform much worse than the majoritarian redistributive democracy or the super-encompassing democracy depicted here. The neglect of this aspect may have biased our analysis in favour of democracy and against strong autocrats.

By giving only passing attention to short time-horizons, we may, however, have, biased the analysis in favour of autocracy. An autocracy is by definition a society where one person (or clique) is above the law. When that person or group has a short time-horizon, the person or group will gain from confiscating all capital goods whose tax yields over the horizon are less than their capital value: in effect, reverting to roving banditry. Under a democratic rule of law, there is no individual who can use the power of the state to seize assets for himself. Thus our analysis here has ignored the inherent connection between democratic (or at least non-autocratic) governance and individual rights, especially with respect to private property and contract enforcement.

We are still a long way from filling the gap in the economics literature. None the less, the simple $r(t) - Y(G)$ analytical machinery offers a tool that can help in generating the necessary literature.[36] In McGuire and Olson (1995) we show that we can fill in part of the remaining gap by further exploiting this framework and by adding the concept of the 'social order'. Any society that obtains the benefits of social cooperation through the provision of public goods, and controls how the gains from social cooperation are shared through its arrangements for

the distribution of income, is a social order. It turns out that there are important interactions between a society's arrangements for the distribution of income and the productivity and cost of public goods that have not previously been understood. Moreover, as long as there is rational and self-interested behaviour, all possible social orders or regimes may be arrayed along a single continuum.

We have also demonstrated rigorously that a hidden hand leads encompassing and stable interests with coercive power to act, to a significant and surprising degree, in the interests of the entire society, including those who are subject to their power. The outcome from stationary banditry is not nearly as bad as might have been supposed. This analysis helps to explain why, even though most of human history is a story of rule by self-interested and often extravagant autocrats, there has been, even under such rulers, a surprising amount of progress.

The clearly superior results that emerge from an optimizing redistributive majority with a stake in the market economy also have great practical significance. It was, for example, once generally believed that democracy with anything approaching universal suffrage would inevitably lead to the abolition of private property: a low-income majority would, it was thought, gain from confiscating all the property of those with wealth and redistributing to themselves. In fact, there is not a single democracy that has voted to eliminate private property. The argument here shows that even those voters with less than median incomes have, in the aggregate, an encompassing interest: they earn a significant percentage of the national income in wages and, when they control the tax and transfer system of the society as well, this gives them a large stake in the society. If, as is plausible, the deadweight losses from the elimination of private property were substantial, it is easy to see why even the part of the social loss from the abolition of property that would be borne by a low-income majority would give that majority an incentive to avoid confiscating all wealth.

Some observers of economic development, especially in East Asia, argue that a 'hard' state – one that does not alter its agenda because of pressures from particular industries or occupations – is favourable to economic development. To the extent that this argument has a theoretical basis, it is the theory offered here.

Our argument also helps to explain why US presidents, irrespective of party, seem to have a lesser propensity to favour 'pork-barrel' projects and special-interest measures than do members of Congress, again irrespective of party. No president can be re-elected without pleasing a nationally-encompassing constituency, but that is not true of an indi-

vidual member of Congress, nor (given the weakness of political parties in the USA) of any large optimizing majority in the Congress. The argument here also suggests that there is much to be said for a two-party system with disciplined political parties, because large and disciplined parties may approximate to optimizing entities with encompassing interests, while small or weak political parties do not.

Finally, there can be no doubt that the hidden hand does lead to the benign – even the beneficent – use of force when there is a super-encompassing interest, and that such an interest can readily arise. A super-encompassing majority, even when it thinks only of itself and has no concern for the losses of the minority, abstains from redistribution and treats the majority as well as its treats itself. Economics must take account of this remarkable phenomenon and the other ways in which encompassing interests bring society the blessings of the invisible hand.

Notes

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1. Competition among autocrats for control over taxpayers (at least if they have no military power of their own) *reduces* the welfare of taxpayers. When there is more than one tax collector in a domain, each has a less encompassing interest than a monopoly tax collector would have had; the aggregate rate of redistributive taxation is higher and public-good provision lower. Warfare among tax collectors also generates uncertainty, and this, by shortening time-horizons, can give autocrats an incentive to confiscate capital goods.
2. If an autocrat, in providing public goods, were motivated by a desire to increase social efficiency or the welfare of his subjects, rather than to serve his/her own interests, then our conclusion that s/he would ignore some of the social benefits of provision of G need not apply (see Barro, 1990).
3. The independence of the $r(t)$ function from G is empirically very plausible. Though there are utility functions that are not consistent with this independence and require writing $r(t, G)$, there are also utility functions from which this independence may be derived. Let wage $= w(G)$; net wage $= v = (1 - t)w$; labour supply $= L(v)$. Then $Y = w(G)[L\{(1 - t)w(G)\}]$. Suppose, for example, $L = v^{(0.5)} = (1 - t)^{(0.5)}[w(G)]^{(0.5)}$; then

$Y = (1 - t)^{(0.5)}[w(G)]^{(1.5)}$, and we have the result that $r(t)Y(G)$ are multiplicative.

4. The second order condition for t_A^* to give a maximum is that $d^2[tr(t)]/dt^2 = d[r + tr']/dt < 0$ when evaluated at t_A^*. The second derivative works out as $2r' + tr'' < 0$. To evaluate this expression at the maximum of tr, we incorporate Equation (3), which gives $-2(r')^2 + r''r < 0$ as the second order condition which must obtain at the autocrat's optimum.
5. At $t = t_A^*$, Q necessarily slopes upwards, but this does not have to be true of P. Differentiating Q gives: $dQ/dt = [-rr'' + 2(r')^2]/[r]^3$. Then it follows from the second-order condition derived in Note 4 that in the vicinity of the autocrat's optimum, t_A^*, $dQ/dt > 0$. Elsewhere $Q(t_A)$ may be increasing or decreasing.

   In particular, note that marginal deadweight losses from taxation could be U-shaped. The marginal losses could have a high value at low tax rates, then decline as the tax rate increases, and then increase at still higher tax rates. In this case, the function $Q(t)$ may have a range over which it declines, followed by a range over which it increases. The necessary/sufficient condition for $Q(t)$ to decline is $-2(r')^2 + r''r > 0$, or $r''r > 2(r')^2$. The function $r(t) = [c/(c + t)]$, with c any arbitrary constant, has the property $r''r = 2(r')^2$. Thus any deadweight loss function with a more positive local second derivative will generate a locally declining $Q(t)$. Because $Q(t)$ must increase in the neighbourhood of the autocrat's optimum, such behaviour can only be local. In any case, whenever $r'' \leq 0$ both curves will be upward-sloping.
6. Since an autocrat imposes a higher tax rate than the one that would just pay for his/her public good provision, s/he finances the public good out of inframarginal tax receipts. Therefore, the marginal deadweight loss from taxation to finance G does not affect the autocrat's marginal *private* cost of G. As can be seen in the fourth quadrant of Figure 3.2, at G_A^* this is given by the slope of the 45° line. The marginal *social* cost of resources – the aggregate cost to the autocrat plus his subjects – depends on the tax rate, but the autocrat's marginal *private* cost of G is simply 1. We demonstrate presently that just as an autocrat finances G out of infra-marginal tax receipts, so does *any* government that redistributes income. Therefore, the marginal deadweight loss from the taxation need to finance G does not affect the marginal *private* cost of G to any redistributive ruling interest.
7. The consensus democracy can also be thought of as a perfectly benevolent and fair dictator.
8. When public good provision is too low (high), there is unanimous agreement to increase (reduce) it. The consensual society comprises the same individuals as the autocracy, except that the autocrat is just another individual. This assumption allows us to make welfare comparisons across regimes.
9. We thank Gueorguiev for clarifying our argument at this point.
10. Maximization of (11) therefore requires as a necessary condition:

$$\underbrace{[(1 - t)r(t)Y'(G)]\frac{dG}{dt}}_{\text{Marginal benefits of } dt} + \underbrace{Y(G)[(1 - t)r' - r]}_{\text{Marginal costs of } dt} = 0$$

where, as shown, the first term represents the marginal after tax benefits to the consensual society from an incremental change in the *tax rate t*, while the second term indicates the marginal post-tax costs because of a change in the tax rate. Marginal costs and benefits in (11) and in the equation in this note are stated *after* tax, whereas in (12) and (12′) they are stated *before* tax, with the marginal resource cost explicitly shown.

11. This gives: $dG/dt = -Y[r + tr'] / [trY' - 1]$.
12. Differentiating $V(t)$ gives: $dV/dt = (1 - t)[-rr'' + 2(r')^2]/(r)^3$. In the neighbourhood of the autocratic maximum, t_A^* by the second order condition $dV/dt > 0$, and $V(t)$ is upward-sloping.
13. Because it takes the optimal tax rate as given, the right side of Equation (14) defines only a point on the overall marginal social cost curve of G for a non-redistributional society. If such a society had provided a different level of G, it would have a different tax rate and thus a different value for Equation (14). We show in McGuire and Olson (1995) that Equation (14) provides important insights, even for societies that redistribute income.
14. As tax rates increase from $t = 0$, $V(t)$ and $r(t)V(t)$ may increase or decrease depending on the specific shape of the deadweight loss function $1 - r(t)$. However, because r must get smaller as taxes increase, MSC_N will rise with the tax rate unless there is a sufficiently offsetting reduction in the absolute value of r'. If the marginal deadweight loss function (that is, $d[1 - r(t)]/dt = -r'$) continually increases (that is, $-r'' > 0$), there can be no offsetting decline in the absolute value of r'. But if, as t rises, the marginal deadweight loss function declines at first and then increases, then MSC_N as well as $V(t)$ can decline with increases in t.
15. For this solution to represent a maximum the second order conditions require:

$$d^2[(1 - t)r(t)\ Y\ (G)]dt^2 < 0,\ s.t.\ tr(t)Y(G) = G$$

Utilizing the expression for dG/dt, its derivative, and Equation (13) simplifies this condition to:

$$-2(r')^2 + rr'' + YY''[(r)^2/(1 - t)]^2 < 0$$

Evidently, $r'' < 0$ may be sufficient, but not necessary to ensure a maximum.

16. Note that $I(t_N^*,G)$ differs from $r[t(G)]Y(G)$ for $t \neq t_N^*$. Specifically, I is greater than, equal to, or less than $r(G)Y$ depending on whether t is greater than, equal to, or less than t_N^*. The I or $r(t_N^*)Y$ curve is *not* parallel to the 45° line at the optimal level of provision of the public good because the resource cost of the public good is only part of its marginal social cost.
17. Our original intention was simply to construct a model of majority-rule democracy that paralleled the model of autocracy. We thank Polishchuk for noting that our model applies to any ruling interest, such as an oligarchy, whose members earn some market income.
18. In practice, government subsidies and transfers cannot be perfectly targeted to the benefit of a redistributive ruling interest. Some of the redistribution will not reach its intended targets and thus, from the point of

view of the majority, will be lost. Such difficulty in targeting reduces majoritarian redistribution. This difficulty of targeting has no counterpart in the models of autocracy or of the consensual society and thus makes comparisons with these societies less transparent. We shall therefore assume that the ruling majority, like the autocrat, obtains everything that is redistributed.

19. Alternatively, we could let the taxes the majority levies on itself and pays back to itself cancel out and focus only on the transfer from the minority to majority:

$$\text{Max } Fr(t)Y(G) + (1 - F)tr(t)Y(G) - G; \text{ s.t. } G < tr(t)Y(G)$$

Using this formulation would not change the results.

20. We are greatly indebted to An for our presentation in this section.
21. The second-order condition with respect to t requires that the derivate of Equation (16) be negative. This in turn entails $[-2(r')^2 + rr''] < 0$, which implies that the ruling majority's optimum must lie in a region where the curves $Q(t)$ and $V(t)$ are increasing.
22. $R(t)$ begins at $r(0)/[r(0) - r'(0)]$; thus the greater the absolute value of $r'(0)$ the lower is $R(0)$. Depending on $r(t)$, $R(t)$ may have rising and falling stretches. Differentiating $R(t)$ with respect to t gives $dR/dt = rr'' - 2(r')^2/[r - (1 - t)r']^2$ which is positive when $rr'' - 2(r')^2 < 0$, and negative when the sign is reversed. Note that dR/dt must therefore be negative in the neighbourhood of the autocrat's optimum, because of the second-order conditions on that optimum. Just exactly where $R(t)$ starts the course of its downward slope depends on $r(t)$ and all its derivatives. In the text we generally follow the assumption that deadweight losses from taxes rise more than linearly with the tax rate, and thus assume that $R(t)$ is continuously decreasing in t.
23. We are grateful to Kähkönen for this valuable simplification.
24. It may seem natural at this point to ask what could happen when $F = 1$, but we shall deal with values of F that equal or approach 1, and with how this analysis relates to no-minority (consensual) societies later. Note that Equation (20) is derived from Equation (16), the optimization problem for a majority maximizing the sum of its share of market income plus any redistribution to itself from the minority. When $F = 1$ there can be no minority and we can also see directly that Equation (20) has no meaning. And for $F = 1$, Equation (18) similarly loses meaning for societies constrained by distortionary taxation.
25. The majority's share of social income, after the public good has been financed, can also be given as $t + (1 - t)F$.
26. Maximization of S with respect to t is given by the equation in Note 20 which is equivalent to Equation (16) and entails the same first order conditions, namely those of Equation (17).
27. In the same way, this deadweight loss had no effect upon the autocrat's marginal private cost. See Note 6.
28. Redistributive majorities tax less and provide more public goods than do autocrats. Thus everyone except the autocrat is better off than under autocracy, with the majority more so.

29. Because $S = F + (1 - F)t$, it follows that $dS/dF = [1 - t + (1 - F)dt/dF]$. But by the second-order conditions for a redistributive majority, $dt/dF = [r - (1 - t)r']^2/[rr'' - 2(r')^2] < 0$. Substituting F from Equation (19) and dt/dF implies $dS/dF > 0$.
30. We thank An for suggesting this setup.
31. Public-good provision is 'ideal' but still subject to deadweight losses from taxation.
32. This can be seen by comparing the net income of the redistributive majority at $\hat{F}$ where it redistributes nothing, with its welfare if it had no separate power, and was just 100 $\hat{F}$ per cent of a consensus democracy.

    Redistributive majority's net income $= SrY - G$
    Majority's fraction of society's net income $= F[rY - G]$

    When all taxes are spent on G, then $trY = G$, and the two incomes of the $\hat{F}$ – majority are the same.
33. Bozzo has demonstrated this by computer simulations over a broad range of F and $r(t)$ values.
34. When one of the parties that gains from providing a collective good obtains a substantial share of the total benefits, the rationality of this party tends to ensure that there is, because of the encompassing interest, significant provision of the collective good. If the party with the encompassing interest, unlike the autocrat and the redistributive majority in our model, does not have the capacity to coerce the other beneficiaries of the public good, there will be a disproportionality in burden sharing. Encompassing interests without coercive power show up, for example, in the role of dominant countries in defensive alliances, in hegemonic action by the dominant country in an international system, and in price-leadership by the largest firms in oligopolies. See, for example, Olson (1965); Hardin (1982); and Sandler (1992).
35. A number of studies suggest that this is a major determinant of the relative economic performance among countries. See Olson (1982); Mueller (1983); Rauch (1994); and the array of empirical studies cited in Olson (1988), p. 61.
36. For an example of the potential for further developments along the present line, see Moselle and Polak (1995).

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