The political economy of publicly provided private goods

Sören Blomquist\textsuperscript{a,\,*}, Vidar Christiansen\textsuperscript{b}
\textsuperscript{a}Department of Economics, Uppsala University, Box 513, SE-751 20 Uppsala, Sweden
\textsuperscript{b}Department of Economics, University of Oslo, P.O. Box 1095 Blindern, N-0317 Oslo, Norway

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Abstract

This paper integrates two different approaches to the analysis of public provision of private goods (education, health care, day care, etc.). While normative public economics has established an efficiency case for such provision, the commonly held political economy view has been that it is an economically inefficient phenomenon generated by the political process. We establish a political economy framework which in general yields an efficient choice of distributional policy. It follows that the central mechanism studied in the normative theory is equally relevant to voting models of decisions on public provision. It is shown that under plausible information constraints economically efficient public provision of private goods will be part of politically rational decisions. The result is established both within a median voter process and a representative democracy of political parties. © 1999 Elsevier Science S.A. All rights reserved.

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1. Introduction

Public provision of private goods (education, health care, day care, etc.) is quantitatively important in all developed countries, amounting to as much as

\*Corresponding author.
E-mail address: Soren.Blomquist@nek.uu.se (S. Blomquist)
15–20% of GNP in some countries. In several countries, like the Nordic ones, education and health care are almost exclusively publicly provided, whereas in other countries, like the U.S., there is a mix of private and public provision. Public provision of daycare for preschool children is also an important part of public expenditure in the Nordic countries. There is an ongoing public debate both in North America and Europe to what extent the public sector should provide private goods. Particularly in the U.S. there is also a debate on whether individuals should be allowed to supplement and/or upgrade publicly provided goods with private purchases. Especially with respect to education voucher systems have been discussed (Epple and Romano (1998)).

Standard textbooks in public economics provide no explanation for this type of public expenditure. However, there is an emerging, fast growing, literature attempting to explain the role of public provision of private goods. This literature consists of two quite disparate parts providing very different views on what the function of publicly provided goods is in the economy. One strand of literature with normative theories shows how public provision of private goods under certain conditions can be beneficial and improve efficiency. These theories distinguish between two basic functions of public provision of a private good. One is to mitigate an informational constraint that restricts the redistribution that can be accomplished by an optimal nonlinear income tax. Another function is to mitigate a time inconsistency problem.

In another strand of literature consisting of voting models there is no efficiency enhancing role for publicly provided goods. In the voting models publicly provided private goods is a means for some groups in the economy to redistribute resources to themselves. One conclusion of an influential article, Epple and Romano (1996a), is that public provision of health care leads to inefficiency.¹

The two strands of literature model the economy in quite different ways. The voting models usually impose highly restrictive assumptions on the available tax and transfer instruments. Normative theories on the other hand frequently use models where a nonlinear income tax is available for redistribution. Our purpose is to make a synthesis of the two strands of literature. Two steps are essential in our approach. First, we construct a political economy framework which establishes a case for a choice of efficient policy. Second, we construct a positive theory of public provision of private goods where we allow the tax instruments to be as flexible as possible, and where as an essential part of the model we include one of the mechanisms for improved efficiency that are described in the normative literature. It is shown that there will be a voting equilibrium with publicly provided private goods in models where publicly provided private goods do not serve as a substitute for tax instruments, and the equilibrium will be Pareto efficient.

¹Epple and Romano denote the publicly provided private good as health care. However, the good does not possess any inherent properties suggesting that it is in the capacity of health care that it should be publicly provided.
Meltzer and Richard (1985) is an early contribution to the literature on publicly provided private goods. One can see this paper as a forerunner both for later normative models and positive voting models. Their article studies a voting process. However, in contrast to later articles on voting models, public provision of a private good is in their model not driven by severe restrictions on the tax instruments but by a mechanism whereby the publicly provided good affects the size of the tax base. More recent articles like Epple and Romano (1996a), Gradstein and Justman (1996) and Gouveia (1997) are examples of voting models where the result that there is public provision of a private good is driven by severe restrictions on the tax instruments. For example, in Epple and Romano (1996a), where the publicly provided private good is financed by a proportional income tax, the *raison d'être* for public provision is that it serves as a substitute for a demogrant. If the model allowed a linear tax, there would not exist a voting equilibrium with public provision.

The normative models focus on the efficiency enhancing role of publicly provided private goods. Nichols and Zeckhauser (1982) is a fascinating paper pointing to the role of in-kind transfers in improving the efficiency of redistribution schemes. Public provision schemes imply that some individuals will face quantity constraints. Guesnerie and Roberts (1984) show that if the economy initially is at a second-best position it is in general possible to achieve a Pareto improvement by introducing a small quantity constraint. Besley and Coate (1991) make the observation that different groups of people can value publicly provided goods differently. Using a model with a head tax to finance the publicly provided good they show how public provision can induce self-selection and achieve redistribution with lower efficiency costs than if cash transfers were used. Boadway and Marchand (1995) and Blomquist and Christiansen (1995) show that even if an optimal nonlinear income tax is available for redistribution there is a role for publicly provided private goods. The problem they study is how to...
achieve redistribution from high-skilled to low-skilled individuals when the identity of the two types of individuals is not observed by the government. Because of this asymmetric information the redistribution is hampered by a self-selection constraint. The potential role of public provision is to alleviate the self-selection constraint by giving part of the transfer to the low-skilled persons in the form of the publicly provided good. This is the mechanism we will build into our voting models.

In Section 2 we elaborate on the mechanism by which publicly provided private goods can improve the efficiency of the economy. Even though the public provision of private goods provides the motivation for the present study our political economy models will also yield results that are of interest beyond this particular issue. The central political economy considerations are valid more generally and in models with other policy instruments affecting the distribution of welfare. In Section 3 we introduce a median voter model and characterize the voting equilibrium in general and in the particular case in which we embed the public provision scheme of Section 2. Since policy making rarely is decided through simple majority voting we study in Section 4 the more realistic case of representative democracy with two political parties competing for votes. Section 5 concludes.

2. Publicly provided private goods as a skill screening device

A central purpose of our study is to discuss from a political economy perspective the case for public provision of private goods that has been established in the normative theory. As a background for the rest of the paper and for subsequent reference it is helpful to summarize the main aspects of the model which has been the vehicle of much of the normative analysis. The motivation for focusing on this particular model is not only that it has been central in the literature, but more importantly it has a number of features that enables us to establish a more fundamental case for public provision than does a number of alternative models. In particular the case rests on basic information asymmetries rather than on deficiencies of the tax design or ad hoc restrictions on the available tax instruments.

In the political economy models we study below public provision of private goods serves as a skill screening device, allowing redistribution to take place with less distortions than if only taxes and cash transfers were used. This mechanism has been studied by, for example, Blomquist and Christiansen (1995, 1998a), Boadway and Marchand (1995) and Cremer and Gahvari (1997).

The model considers an economy with two types of individuals, one group of low productivity and one group of high productivity individuals. Skill levels are reflected in wage rates. Information about individual skills (wage rates) is private information not available to the government. Let $h$ be hours of work, $y = wh$.
before-tax labor income and $B$ after-tax income. Let $c$ denote a quantity of a good that is only available on the market and $x$ be the quantity of a good that can be bought on the market, but also can be publicly provided. For convenience we normalize the producer prices of $c$ and $x$ to one. Individual preferences are represented by a strictly quasi concave utility function $U(c, x, h)$. We define the conditional demand function $x(B, h)$ by $\text{Max } U(c, x; h)$ w.r.t $c$ and $x$ s.t. $c + x = B$. We will assume the preferences are such that $\frac{\partial x(B, h)}{\partial B} < 0$ and $\frac{\partial x(B, h)}{\partial h} > 0$, i.e. $x$ is a normal good and the demand for $x$ increases in hours of work for a fixed income. Blomquist and Christiansen (1998a,p. 405) show that $\frac{\partial x(B, h)}{\partial h} = 0$ is equivalent to $\frac{\partial MRS_{x/c}}{\partial h} < 0$, i.e. that the marginal valuation of $x$ in terms of $c$ increases in hours of work. Blomquist and Christiansen (1998a) also show that, provided that $\frac{\partial x(B, h)}{\partial h} < 0$, the best public provision scheme is the one that allows the consumers to top up the public quantity at their own expense.

The instruments available to the government are income taxes and public provision of $x$. We denote the publicly provided quantity by $\tilde{x}$. No restrictions are imposed directly on the shape of tax schedule that can be used. However, the asymmetric information implies that the policy must be designed subject to an information constraint. The income/consumption bundle assigned to a person must be chosen subject to being unattractive to the other person. Let $V(\tilde{x}, B, Y/w)$ denote the indirect utility function conditional on the labour supply $h = Y/w$ and the public provision $\tilde{x}$. We use a superscript to indicate type of individual. $N^i$ denotes the number of individuals of type $i \in \{1, 2\}$. The problem of designing a Pareto optimal income tax and public provision structure is then given by:

$$\text{Max}_{B^1, Y^1, B^2, Y^2, \tilde{x}} V(\tilde{x}, B^1, Y^1/w^1)$$

s.t. $V(\tilde{x}, B^2, Y^2/w^2) \geq \tilde{V}^2$  \hspace{1cm} (2)

$$V(\tilde{x}, B^2, Y^2/w^2) \geq V(\tilde{x}, B^1, Y^1/w^2)$$

$$V(\tilde{x}, B^1, Y^1/w^1) \geq V(\tilde{x}, B^2, Y^2/w^1)$$

$$N^1(Y^2 - B^2) + N^2(Y^1 - B^1) - (N^1 + N^2)\tilde{x} \geq 0$$  \hspace{1cm} (5)

The conditional demand function $x(B, h)$ has been used quite much in the theoretical study of optimal commodity taxes. However, it has not been empirically studied. For some goods we can make an informed guess about the sign of $\frac{\partial x}{\partial h}$. For example, if $x$ is day care it seems likely that the demand for $x$ increases in hours of work.

As discussed by Cremer and Gahvari (1997) the availability of commodity taxes makes little difference for the case for public provision. However, as discussed in Blomquist and Christiansen (1998b) commodity taxes may be redundant provided that an income tax and public provision are both available.
Fig. 1. The Pareto frontier with and without public provision.

is the self-selection constraint imposing that the taxes must be set in such a way that person 2 does not gain by mimicking person 1. Eq. (4) is the corresponding constraint that person 1 does not gain by mimicking person 2. One can show that at most one self-selection constraint is binding. The most studied case (often called the normal case) is the one where redistribution is from the high skill group to the low skill group to the extent that constraint (3) is binding. This constraint causes the optimal taxation to be such that a distortion is imposed on the low skill person. He is induced to substitute leisure for market consumption so that the before tax/after tax income is too low as compared with the first best. Inequality (5) is the government’s budget constraint.

When \( x \) is restricted to zero, the problem above reduces to the standard optimal income tax problem as formulated by Stiglitz (1982) and Stern (1982). The solid curve in Fig. 1 depicts the corresponding Pareto frontier. For levels of \( V^2 \) sufficiently close to the laissez faire level, indicated by point A, redistribution can take place without the self-selection constraint being binding. However, for more ambitious redistribution the self-selection constraint will bind. As shown in detail in Blomquist and Christiansen (1995, 1998a), if leisure is nonseparable from goods, public provision of a suitable private good can alleviate the self-selection constraint and generate a Pareto improvement.\(^{10} \) Fig. 1 illustrates how public

\(^{10}\)Given the assumption that \( \delta x / \delta h > 0 \) a commodity subsidy on can also be used to alleviate the self-selection constraint (see Edwards et al. (1994) and Blomquist and Christiansen (1998b)).
provision can shift the frontier outwards. To the left of point $B$ and to the right of point $C$ public provision is part of the Pareto efficient policy.

One can show that the pure tax optimization has a unique solution. This implies that to each point on the Pareto frontier there exists a unique policy point $(Y^1, B^1, Y^2, B^2)$. For $x > 0$ there might exist multiple solutions to the optimization problem, i.e., there might be points on the Pareto frontier that could be implemented by alternative policies. This does not create any problems for the following analysis except that it complicates notation. For notational simplicity we therefore in the following write as if the solution to the problem defined by Eqs. (1)–(5) always is unique. We will briefly comment on this in Section 3.

To get further intuition for the role of public provision, consider the case in which there is redistribution from high-skill to low-skill individuals and constraint (3) is strictly binding. Note that if the high-skill type mimics the low-skill type, the former has more leisure as less work effort is required to obtain a given income when the wage rate is high. With the assumption that has been made about the demand for $x$, the mimicker has a lower demand than person 1. This means that it is possible to give the low-skill person a transfer in terms of $x$ that is at the same time within the consumption level desired by person 1 and beyond the level desired by the mimicker. Then for the low-skill person the transfer is equivalent to a transfer in cash, while from the perspective of the mimicker it is inferior. The advantage is that the transfer is achieved with less inducement for person 2 to mimic. The self-selection constraint is softened and it is possible to achieve a more favorable optimum.

Blomquist and Christiansen (1995) discuss how public provision of education, day care and health care can be fitted into this framework. To be concrete we could exemplify with day care. If low skill women working full time require, say, 1800 h of day care and buy this in the market, then their situation would be unchanged if one introduced the same amount of publicly provided day care and at the same time added the cost of provision to the tax bill. The situation for high skill women who work full time, requiring 1800 h of day care, would also be unchanged. However, high skill women thinking of working half time instead of full time will now find the former option less attractive. This is because the after tax income earned by working half time has decreased with an amount equal to the cost of 1800 h of day care whereas the day care they need is only 900 h.

Blomquist and Christiansen (1995) characterize goods suitable for public provision:

1. The good should be such that it is impossible (or at least very hard) to resell the publicly provided quantity.
2. There should not be any close market substitutes to the good in question.
3. The demand for the publicly provided good should vary much as leisure varies.
4. Leisure should not be weakly separable from goods.

The idea behind these characteristics is that it should be possible to impose a
quantity constraint on person 2 when mimicking and that this quantity constraint should hurt. Clearly, if it were possible to resell the publicly provided quantity the mimicker would not be hurt by public provision. Likewise, if goods $c$ and $x$ were close market substitutes it would not hurt the mimicker much to have the composition between $c$ and $x$ changed from the point selected if he could choose $c$ and $x$ freely given his after tax income.\footnote{There could very well exist a nonmarket perfect substitute for the publicly provided private good. For day care this is clearly the case. Care of children at home is a very good substitute for day care bought in the market. This is the very reason why it is reasonable that the market demand for day care increases with hours of work (decreases with amount of leisure available.)} That the very same good as the one provided can be purchased in the market when topping up is possible, poses no problems as the mimicker will not want to use this option. Characteristic iii ensures that it is possible to find a public provision level that hurts the mimicker but is fairly harmless for the low skill person. Characteristic iv is a necessary condition for the scheme to work. If leisure is weakly separable from goods the low skill person and the mimicker would have the same demand for $x$ and public provision would hurt the low skill person as much as the mimicker.

The normative theory of taxation and public provision described above derives a number of results. Confining our attention to the so-called normal case, we may draw attention to the following results:

**Result 1.** Suppose $\partial x/\partial h = 0$, then no Pareto-improvement can be obtained by public provision of $x$. See Blomquist and Christiansen (1995), (Proposition 1), Boadway and Marchand (1995), (Proposition 1), (Blomquist and Christiansen (1998a), (Proposition 2) and Cremer and Gahvari (1997), (Proposition 2).

**Result 2.** Suppose that $\partial x/\partial h > 0$, and individuals are allowed to supplement the public provision on the market, then a policy with optimal taxation and optimal public provision strictly Pareto dominates the pure tax optimum. See Blomquist and Christiansen (1998a, Lemma 2).

### 3. A median voter model

We shall study a voting equilibrium of a model where there are only two skill classes as in Section 2. However, we shall take a more general approach to policy making while still using the model above to infer implications of the voting equilibrium for public provision of private goods in particular. As discussed in the introduction the literature on this issue has provided a major motivation for the present study. A central assumption in our voting model will be that individuals differ with respect to how much redistribution they want. To establish the building blocks of our model we shall discuss each of these elements in turn.
3.1. Policy instruments

At the general level we let a vector of policy instruments be denoted by $z$ while $Z$ is the policy set such that $z \in Z$. By definition $Z$ is the set of available and feasible policies that captures all relevant restrictions. We shall interpret the policy as some kind of economic policy with distributional implications, but otherwise this is a very general policy formulation. The tax and public provision model above is a special case in which a policy $z$ consists of a constellation of before and after tax incomes intended for the high and low skill groups $\{Y^1, B^1, Y^2, B^2\}$ and a value of the public provision. In this special case $Z$ is the set of combinations $\{\bar{x}, Y^1, B^1, Y^2, B^2\}$ that achieve budget balance, and satisfy the self-selection constraints as stated by Eqs. (4) and (5) above.

3.2. Political preferences

In general each individual has preferences over consumption bundles including leisure (or labour) that can be represented by a (direct) utility function. We impose the standard assumption from optimum tax theory that the basic utility function is the same for everybody. When deciding on his consumption/labour choice the individual is supposed to maximise his utility. Maximising behaviour in response to a given policy then implies a utility level indicated by an indirect utility function $V(z)$, which in the specific model is given by $V(\bar{x}, B', Y'/w')$.

When voting the individual will express his preference for choice of policy. This is a decision which is of a different nature than the choices made in the market place. To vote is to express an opinion also about distributional policy. The voter can then adopt three different attitudes. (i) He can take a purely selfish and myopic attitude voting for the policy from which his own well-being will benefit more given his present position. (ii) The voter can be basically selfish, but may feel uncertain about his own future and perhaps that of his children. He may then have an insurance motive for supporting transfers that will make him a net contributor in his present position, but from which he will benefit if in the future state he is deprived of his present skill. The perception of distributional policy as a social insurance scheme is fairly common in the literature, see e.g. Barr (1992), Sinn (1995, 1996). (iii) The voter may be genuinely altruistic and care about the welfare of other people.

In practice it is hard to distinguish insurance and genuinely altruistic motivation, but in the present context identifying the true motivation is of little interest. What we shall assume is that not everybody is myopically selfish even though it is perfectly possible that there is such a category of people in the model. There is a subgroup of individuals who care about the welfare of people in the other skill class.

The notion that people are not entirely selfish is not a novel idea. Lindbeck and Weibull (1993) assume that a voter is motivated both by a party identification and
the utility she derives from a particular policy. With two parties A and B a voter who is a `B-partisan' may vote for party B even though she would derive a somewhat higher utility from A’s policy. See also Fiorini (1981) for a discussion. Dixit and Londregan (1998) assume that in addition to caring about the implications of income transfers for their own wellbeing, voters genuinely care about social issues: ‘That voters’ equity concerns are not mere rhetorical masks for self-interest is clear; there are rich liberals who will vote for a leftist party that promises a high tax rate, and poor libertarians who will support a rightist party even though they will personally benefit little from its tax and transfer policies” (op.cit. p. 499).

Our assumptions imply that when voting an individual attaches a weight to the utility of the own group, but in general also to that of the other group. It is still possible that a number of voters assign a zero weight to the utility of the other skill group, and that voters from one class typically attach a greater weight to the utility of his/her own class. Let \( \alpha \) be the weight given to the utility of the low-skill class and \( 1 - \alpha \) the weight given to the high-skill class where \( 0 \leq \alpha \leq 1 \). The value of \( \alpha \) characterises the political preferences of each voter, and \( \alpha \) has a continuous distribution with a class specific density \( f(\alpha) \), \( i = 1, 2 \). Let \( V_i \) denote the utility of an individual in skill class \( i \) that is obtained at the policy \( z_i \), and recall that \( N_i \) is the number of individuals in that class. An individual’s political preferences are then represented by a policy preference function:

\[
W^p = \alpha N^1 V^1_p + (1 - \alpha) N^2 V^2_p
\]  

In the tax and public provision model the policy preference function will take the form

\[
W^p = \alpha N^1 V(\bar{\xi}, B^1_p, Y^1_p/w^1) + (1 - \alpha) N^2 V(\bar{\xi}, B^2_p, Y^2_p/w^2)
\]  

The person will support the policy that yields the higher \( W^p \) for the value of \( \alpha \) corresponding to his preferences.

It is of interest to note that (6) is general enough to accommodate the class of ‘mixed’ preference functions \( \beta V^1 + \gamma N^1 V^1 + (1 - \gamma) N^2 V^2 \) for a person who is a member of class 1 (and likewise for class 2). We can interpret \( \beta V^1 \) as a ‘selfish’ part with the parameter \( \beta \) measuring the degree of selfishness, whilst the remaining parts constitute a ‘social part’. We assume that \( \beta \geq 0 \), \( 0 \leq \gamma \leq 1 \), and at least one of the parameters is strictly positive. These preferences are equally well represented by a function \( \sigma(\beta V^1 + \gamma N^1 V^1 + (1 - \gamma) N^2 V^2) \) where \( \sigma \) is an arbitrary positive parameter. Let \( \sigma \) and \( \alpha \) be defined by the following equations: \( \sigma(\beta + \gamma N^1) = \alpha N^1 \) and \( \sigma(1 - \gamma) = 1 - \alpha \), and we see that we are back to a preference function of type (6). Solving with respect to \( \sigma \) and \( \alpha \) we get

\footnote{Dixit and Londregan (1998) also introduce ‘mixed’ preferences made up of a selfish part and a social part, but they use other specifications of the respective parts.}
We note that $\sigma > 0$ and $0 \leq \alpha \leq 1$ as should be the case. One might argue that truly social preferences should not be biased in favour of any class so that $\gamma = 0.5$. Then we immediately see that any deviation of $\alpha$ from 0.5 reflects selfishness.

Having assumed that everybody has the same basic preferences for own consumption bundle, we do not capture the possibility that preference for equality (or selfishness) and preference for leisure are interrelated. One might for instance suspect that more hard-working people would feel more entitled to keep the fruits of their work than the rich and lazy, and would be more opposed to give transfers to others. Otherwise it is hard to see convincing arguments in general why social attitudes should vary systematically with work preference.

### 3.3. Individuals’ voting behaviour

How an individual ranks different policies according to (6) only depends on how the policies affect $V^1$ and $V^2$. When studying how an individual ranks different policies we can therefore study how he ranks different combinations of $V^1$ and $V^2$. Since all individuals within a skill class are treated equally we can draw the Pareto frontier as in Fig. 1.

**Definition.** We denote the median $\alpha$ as $\alpha_m$ and define the median voter as the voter characterized by $\alpha_m$.

### 3.4. The voting equilibrium

The voting equilibrium can be characterised by the following proposition.

**Proposition 1.** The median voter’s preferred policy will be a Condorcet winner.\(^{13}\) This policy is Pareto efficient.

**Proof.** Let us consider two policies $z_m$ and $z_\alpha$, where the former is the policy preferred by the median voter and the latter is a feasible, but otherwise arbitrary alternative policy. The policy $z_m$ implies the utility levels $V_m^1$ and $V_m^2$ for the respective skill types. For simplicity, and without loss of generality, we now assume there is one person of each type Since the median voter assigns positive weights to the utilities of both skill types his preferred policy is obviously Pareto efficient. The utility levels corresponding to $z_\alpha$ are $V_\alpha^1$ and $V_\alpha^2$. Let us define $D(\alpha)$

\[\sigma = \frac{N^1}{N^1 + \beta} \quad \text{and} \quad \alpha = \frac{\beta + N^1 \gamma}{\beta + N^1}.\]

\(^{13}\)A Condorcet winning policy is one that will win in majority voting against any other feasible policy that may be proposed.
as the difference between the welfare level resulting from $z_m$ and the welfare level obtained from $z_a$ as perceived by a voter of type $\alpha$. $D(\alpha) = [\alpha V_1^m + (1 - \alpha)V_2^m] - [\alpha V_1^a + (1 - \alpha)V_2^a] = \alpha[(V_1^m - V_1^a) + (V_2^a - V_2^m)] + V_2^m - V_2^a$, and $D'(\alpha) = [(V_1^m - V_1^a) + (V_2^a - V_2^m)]$. There are three cases to consider. (i) Assume first that $V_1^m - V_1^a < 0$, $V_2^a - V_2^m < 0$, i.e. the alternative policy is more generous to type one and less generous to type two. Then $D'(\alpha_m) < 0$. Since $z_m$ is the preferred policy of the median voter, obviously $D(\alpha_m) > 0$. It follows that all voters with $\alpha \geq \alpha_m$ (and some voters with $\alpha$ greater than but close to $\alpha_m$) will prefer $z_m$ to $z_a$. (ii) Assume next that $(V_1^m - V_1^a) > 0$, $(V_2^a - V_2^m) > 0$, i.e. the alternative policy is more generous to type two and less generous to type one. Then $D'(\alpha) > 0$. It follows that all voters with $\alpha \leq \alpha_m$ (and some voters with $\alpha$ less than but close to $\alpha_m$) will prefer $z_m$ to $z_a$. We may note that in the cases considered so far $z_a$ may or may not be a Pareto efficient policy. The only assumption is that this policy is not Pareto dominated by $z_m$, which is the final case to be considered. (iii) Assume that $(V_1^m - V_1^a) > 0$, $(V_2^a - V_2^m) < 0$. Since the alternative policy is Pareto dominated by $z_m$, everybody will prefer $z_m$ to $z_a$. QED

Readers familiar with the median voter theorem know that the theorem is only applicable to voting over one dimensional issues. So why do we obtain a median voter result here? The reason is that the voting is de facto over points on the Pareto frontier, which is one-dimensional since there are only two groups.

The intuition for Proposition 1 is strong. When voting each individual’s most preferred point is the one that maximizes the policy preference function, which we recognize as a Bergson-Samuelson social welfare function. But we know from welfare economics that a maximum of such a social welfare function is necessarily a Pareto optimum. When all individuals have a preferred policy which is efficient, it would indeed be surprising if the voting equilibrium were not also efficient.

Returning to the tax and public provision model of Section 2, we can state:

**Corollary 1.** At the voting equilibrium of the tax and public provision model Results 1 and 2 are valid.

According to Proposition 1 the median voter’s preferred policy will be a Condorcet winner, that is, it will win in majority voting against any other proposed policy. Since the median voter’s preferred policy is Pareto efficient, public provision will be part of the policy if the median voter’s preferred policy is in a certain range of the Pareto frontier. We note that in the present setting optimal nonlinear income taxes are available. Still, the voting equilibrium will be such that public provision is part of the policy. The reason is that by using public provision of a private good the efficiency of the income redistribution is increased. It also

14Since $z_a$ is Pareto efficient, there is of course no case where it is Pareto dominated by the alternative policy.
means that the characterization of private goods suitable for public provision that is given in Blomquist and Christiansen (1995) and reproduced in Section 2 above would be valid in the present context.

In Section 2 we noted that the solution to Eqs. (1)–(5) may fail to be unique. However, this does not create any serious difficulties. The reason for this is that what determines how individuals vote is the solution in utility space. Suppose, for example, that the optimization problem solved by the median voter has two solutions \( z_1^m \) and \( z_2^m \) that both yield the utility allocation \( \{V^{1*}, V^{2*}\} \). To obtain uniqueness in policy space we must add a mechanism whereby the median voter chooses one of the two policies. The median voter, as all other voters, is indifferent between the two policies. Hence adding a simple random mechanism would do.

In the model above the electorate have been endowed with social preferences. In a companion paper (Blomquist and Christiansen (1998c)) we have also analyzed within a simple majority voting model the situation in which all voters are indeed entirely selfish. Assuming that the low-skill class is the larger it will exploit its majority position to maximize the utility of the class members subject to the relevant constraints. The preferred policy of the low-skill individuals will then be a Condorcet winner, and it is trivial that this policy is Pareto efficient. Obviously Results 1 and 2 are valid in the tax and public provision version of the model.

4. Representative democracy with two political parties

We shall consider a voting model of two political parties. The model is established by first making assumptions about the political parties and then about the voters. The competition between the parties is perceived as a non-cooperative game which is shown to have a Nash equilibrium. The properties of this equilibrium are examined in some detail.

4.1. The parties

Our model is inspired by Hansson and Stuart (1984), Lindbeck and Weibull (1993) and Dixit and Londregan (1998). There are two parties denoted by \( L \) (leftist party) and \( R \) (rightist party). The nature of the policy set \( Z \) is the same as before. Prior to the election each party chooses a policy \( z_p \in Z; \, p = L, R \).

We assume that the policy that is actually implemented is the policy of the party that wins the election. The underlying presumption is that each party is able to

\[ \text{The utility level of the high-skill class may be bounded from below by a subsistence level or a reservation utility in the case of mobility or it may be lowered to the point where further taxation of the high-skilled fails to generate additional transfers to the low-skilled because of disincentives.} \]
credibly commit to a certain policy. Thus we rule out the possibility that a party does not keep its promises from the election campaign\(^{16}\). It is common in the literature to make some kind of assumption to the effect that the parties implement their promised policies if winning. Sometimes it is just imposed as an assumption that the parties implement their promised policies (e.g. Dixit and Londregan (1998)), sometimes the assumption is implicit (e.g. Lindbeck and Weibull (1987) or Hansson and Stuart (1984)), and sometimes there is an appeal to underlying assumptions. Lindbeck and Weibull (1993) assume that at least all voters believe that the winning party will implement its announced policy. For a theory of what happens at the election this may be a sufficient assumption. For a theory of actual policy one obviously needs to know also how the parties actually behave. Lindbeck and Weibull also appeal to the existence of future elections (otherwise not appearing in the model) to suggest that cheating may be prohibitively costly in terms of future loss of credibility. Besley and Coate (1997) point out that it is natural to assume that the citizen who wins the election implements his preferred policy (i.e. the policy he would choose as a dictator), while commitment to other policies is more problematic due to lack of credibility.\(^{17}\)

At the pre-election stage the outcome of the election is perceived as random. Once the outcome of the election is known, each party evaluates the winning policy according to its social welfare function. We assume there is no benefit from winning the election as such. There is no so-called ‘ego-rent’. It follows that prior to the election the objective function of a party is the expected welfare according to the preferences of the party.

For party \(L\) the expected welfare is given by:

\[
\pi(z_L, z_R)W^L(z_L) + (1 - \pi(z_L, z_R))W^L(z_R)
\]

where \(\pi(z_L, z_R)\) is the probability that party \(L\) will win the election. This probability depends on the policy choices of the two parties. Below we describe how this probability is determined. The social welfare function \(W^L(z_p)\) is given by

\[
W^L(z_p) = \alpha_L N^1 V^1(z_p) + (1 - \alpha_L)N^2 V^2(z_p) \quad p = L, R.
\]

The expected welfare from the perspective of party \(R\) is defined in a symmetric way. We assume the leftist party assigns a higher weight to the welfare of the low skill group, \(\alpha_L > \alpha_R\). Party \(L\) maximizes the expected welfare w.r.t. \(z_L\) for a given \(z_R\) and vice versa.

\(^{16}\)A complication in practice may be that at the time the policy is designed the state of the world that will materialise in the period of office is not known with certainty. Since there is limited scope for state contingent election manifestos, it may be a matter of interpretation whether the actual policy is according to the pre-election platform when allowing for the need to adjust to the circumstances that arise. We abstract from uncertainty of this kind.

\(^{17}\)See Alesina (1988).
4.2. Individuals’ voting behavior

The voters are assumed to have exactly the sort of preferences as in the median voter model above. They may be more or less myopically selfish, altruistic or concerned with social insurance. An individual’s political preferences are represented by a policy preference function:

\[ W^p = \alpha N^1V^1_p + (1 - \alpha)N^2V^2_p \]  

which is identical to (6) above.

In our model it is optimal to vote sincerely. To understand why this is so it is worthwhile to consider a number of the assumptions that have been made. First, a voter cannot influence a party’s choice of programme by threatening to vote for the other party under certain contingencies. This is because there is no way a voter can credibly commit to do so. Everybody knows that when election day comes along it is in the interest of a citizen to cast his vote in favour of the policy which is more in line with his preferences. Doing otherwise will only increase the probability that a policy he likes less is going to win. Secondly, it is assumed that the policy of the winning party is fully implemented. If the actual policy were to be determined as some sort of weighted compromise between the policies of the two parties with the weights affected by vote shares, strategic voting behaviour might creep in as a voter might then hope to draw the actual policy a bit closer to his preferred policy by voting for a policy he would not like to see fully implemented. (But even then sincere voting is not necessarily ruled out; see Dixit and Londregan, 1998). Thirdly, there is only one election period and thus no incentive to try and influence a party’s future choice of platform.

Our assumptions imply that an individual votes for party L if

\[ \alpha N^1V^1_L + (1 - \alpha)N^2V^2_L \geq \alpha N^1V^1_R + (1 - \alpha)N^2V^2_R \]  

We rewrite this as

\[ \alpha \geq \frac{N^2(V^2_R - V^2_L)}{N^1(V^1_L - V^1_R) + N^2(V^2_R - V^2_L)} = \hat{\alpha} \]  

Let \( \alpha \) be distributed as \( f^1(\alpha) \) and \( f^2(\alpha) \), 0 \( \leq \alpha \leq 1 \), for the low and high skill class, respectively. The number of individuals preferring party L’s policy is then given by

\[ m = m(z_L, z_R) = \int_{\hat{\alpha}}^1 N^1 f^1(\alpha) \, d\alpha + \int_{\hat{\alpha}}^1 N^2 f^2(\alpha) \, d\alpha \]  

If the voting behaviour is entirely deterministic each party can calculate for any configuration of policies whether it is going to win the election. The policies will then converge as from the perspective of any party a winning policy is always better than a losing policy as long as the winning policy is considered at least
slightly preferable to the policy of the opponent. This scenario is not very realistic. In practice there are numerous elements which are beyond the control of the parties and which they will treat as random. In the literature several approaches have been adopted to model random voting behaviour. But it seems that the exact way to model random voting behaviour is of less importance. What is central is that the parties can only affect the probabilities of winning and the expected outcome in terms of policy and welfare according to a party’s preference scale. Accepting this premise we may as well choose a simple random element.

We know that in most elections not everyone will vote and that an important aspect of winning an election is to motivate the individuals supporting the party to actually vote. We do not intend to go into this in any depth, but use a quite stylized model to capture the fact that many people do not vote. Without lack of generality we assume that individuals supporting party R will always vote. However, only a fraction of the individuals supporting party L will actually vote. This fraction is a random variable \( \theta \) assumed to follow a uniform distribution with support \( 0 < \theta < \theta < b < 1 \). Let \( N = N^1 + N^2 \) and \( \gamma = (N - m)/m \). If \( \gamma < a \) the probability that party L will win is 1. If \( \gamma \geq b \) the probability that party L will win is zero. For \( a < \gamma < b \) the probability that part L will win is given by:

\[
Pr(\text{party L wins}) = Pr(\theta m(z_L, z_R) > N - m(z_L, z_R))
\]

\[
= Pr(\theta > (N - m(z_L, z_R))/m(z_L, z_R)) = \int_{\gamma}^{b} \frac{1}{b - a} \, d\theta
\]

\[
= \frac{b - \gamma}{b - a}
\]

Rewriting this probability we obtain:

\[
Pr(\text{party L wins}) = \pi(z_L, z_R) = \frac{1 + b}{b - a} - \frac{N}{m(b - a)}.
\]

An important feature of this expression is that \( \partial \pi/\partial m > 0 \).

---

\(^{18}\)Sometimes it is just postulated that probabilities depend on policy choices. Sometimes more specific assumptions are made. For instance Dixit and Londregan (1998) assume that there are groups of extremist voters supporting their respective parties irrespective of election manifestos, but the size of each group is unknown to and is treated as random by the parties.

\(^{19}\)The inclination to go and vote may depend on weather conditions, whether there is an influenza epidemic, the encouragement offered by the mass media, etc. One may argue that it is a bit special to link voting propensity to party adherence as such. The important assumption is that the probability of voting differs between groups otherwise the stochastic element would just be similar to having an electorate of random size but with deterministic shares of party support. We have opted for the simplest way to model a systematic difference between classes. Our approach may even have a claim for realism as it is known from several countries that conditions inducing a high turn-out tend to favour certain parties.
4.3. Nash equilibrium

To study the Nash equilibria for this model we need to study the reaction functions $z_L(z_R)$ and $z_R(z_L)$. This is complicated since $z_p$ is multidimensional. However, we can reduce the dimensionality of the problem and instead study the reaction functions $V^p_1(V^L_2)$ and $V^L_2(V^p_1)$. The reason why it is sufficient to study these functions is that each party will always respond with a Pareto efficient policy. This means that we can summarize the policy of party $P$ by a single number $V^p_1$. Since only Pareto efficient points are relevant $V^p_1$ is then uniquely determined.\(^{20}\) Let us establish that all chosen policies are Pareto efficient.

**Proposition 2.** The optimal strategy for a party is to propose a Pareto efficient policy.

**Proof.** Recall that the expected welfare from the point of view of a party $p$ is $\pi_p(z_p, z_o)(W^p(z_p) - W^o(z_o)) + W^p(z_o)$, where $z_p$ is the party’s own policy, $z_o$ is the policy of the opponent and $W^p$ is the welfare level according to the preferences of the party. Also recall that the welfare function of any party and voter is of the form $a_N^V + (1 - a)N^2V^2$. We assume that for both parties $0 < a < 1$, and there is a continuous distribution of voters from those with $a = a_o \geq 0$ to those with $a = a \leq 1$. Assume that the party is going to make a choice between a policy $z^p_o$, which is not Pareto efficient, and a Pareto superior policy $z^p_o$, while taking the policy proposal of the opponent as fixed. The choice will have two effects. It will affect the welfare that the party obtains if it wins, and it will affect the probability of winning. Since the party adheres to the Pareto principle (i.e., it always considers a Pareto improvement to be desirable), the welfare it obtains if winning must increase if it picks the Pareto superior policy. Since the voters also adhere to the Pareto principle, all voters will find the party (at least weakly) more attractive if it selects the Pareto superior policy. Becoming a more attractive party to vote for the party cannot lose support. In fact, since there is a continuum of voters, some who would otherwise be marginal supporters of the opponent will now vote for the party under consideration. Choosing a Pareto superior policy is the way to increase

\(^{20}\)In Section 2 we noted that there might exist multiple solutions to Eqs. (1)–(5). However, we have pursued the analysis as if the solutions were unique. This is not restrictive. Since parties and individuals evaluate policies in terms of the utility implications the analysis will remain unaffected if a certain utility allocation can be implemented by more than one policy. If one party proposes a utility allocation that can be implemented by two or more policies one could add a mechanism whereby the party chooses a unique policy. Since it is of no consequence which policy that is actually chosen a simple random mechanism would do.

\(^{21}\)The only caveat is that as a special case the Pareto superior policy may only benefit one group, and there may be voters who assign a zero weight to that group. These voters will then be indifferent, while the others strictly prefer the Pareto superior policy.
welfare if the party wins and the way to increase the probability of winning. QED

Recalling from Section 2 the properties of a Pareto optimum in the tax and public provision model it is trivial to state:

**Corollary 2.** At the political equilibrium of the tax and public provision model Results 1 and 2 are valid.

When discussing further the political equilibrium it is useful to consider as benchmarks the (hypothetical) cases in which each party is not exposed to political competition.

**Definition.** If the parties could act as dictators they would choose policies that maximize their respective welfare functions, i.e., objective functions of type (9). We will denote these policies as the *dictator policies*. We denote the corresponding values of \( V^2 \) as \( \hat{V}^2_1 \) and \( \hat{V}^2_2 \). The implied points on the Pareto frontier are indicated by \( R \) and \( L \) in Fig. 2.

Depending on their value of \( \alpha \) different individuals prefer different points on the Pareto frontier. For an individual with \( \alpha = 0 \) the preferred point will be the one where \( V^2 \) achieves its maximum. We denote this \( V^2_{\text{max}} \). As \( \alpha \) increases the preferred point will move down towards the right along the Pareto frontier. If

![Fig. 2. The Pareto frontier and dictator policies.](image-url)
\(\alpha = 1\) the point where \(V^1\) is maximized will be the preferred one. We denote this point \(V_{\min}^2\).

To guarantee that the voting problem is non-degenerate, i.e. that no party wins with certainty, we have to make assumptions on the distribution of \(\alpha\). We assume the distribution of \(\alpha\) is such that more than 50% of the individuals prefer a value of \(V^1\) that is less than \(V_R^2\). Otherwise the policy corresponding to \(R\) would win with certainty. We also assume that more than a fraction \((1-0.5/\alpha)\) of the individuals prefer a value of \(V^2\) that is larger than \(V_L^2\). Otherwise the policy corresponding to \(L\) would win with certainty.

**Proposition 3.** There exists a Nash equilibrium.

We want to study crucial properties of the reaction functions \(V_R^2(V_L^2)\) and \(V_L^2(V_R^2)\) and show that the response curves cross at least once. First, suppose that one party proposes to set \(V^2 = V_{\max}^2\). Then there exists a value of \(V^2 = \tilde{V} < V_{\max}^2\) which the opponent prefers to \(V_{\max}^2\), and which the opponent can adopt and be sure of winning the election. To see this it suffices to note that by picking \(\tilde{V}\) arbitrarily close to \(V_{\max}^2\) the share of the electorate favouring the \(V_{\max}^2\) can be made infinitesimally small. It obviously follows that the best response of the opponent is also some value of \(V^2 < V_{\max}^2\). We can conclude that \(V_R^2(V_{\max}^2) < V_{\max}^2\) and \(V_L^2(V_{\max}^2) < V_{\max}^2\). By analogous reasoning we can show that \(V_R^2(V_{\min}^2) > V_{\min}^2\) and \(V_L^2(V_{\min}^2) > V_{\min}^2\). These features of the response functions are reflected in Fig. 3. \(V_R^2(V_L^2)\) will start below the 45° line and end up above the 45° line on the horizontal axis indicating \(V_{\max}^2\). \(V_L^2(V_R^2)\) will start above the 45° line and end up below the 45° line on the vertical line indicating \(V_{\max}^2\). Hence the response curves will cross and there will be a Nash equilibrium. QED

**Corollary.** A Nash equilibrium is Pareto efficient and the Results 1 and 2 apply.

**Proof.** The corollary follows from Proposition 2 and the Results 1 and 2. QED

The corollary implies that there will be public provision of a private good at a political equilibrium provided that consumer preferences satisfy the assumption in Result 2 and the redistributional ambitions are sufficiently large.

**Definition.** We denote a Nash equilibrium as \(\tilde{V}_L^2, \tilde{V}_R^2\).

Having established the existence of a Nash equilibrium we next proceed to characterize further such an equilibrium. In the lemma and proposition below we narrow down the set of possible Nash equilibria.

\(^{22}\)The Pareto frontier is the part of the curve in Fig. 2 where the curve is downward sloping.
Lemma. A party $p$ will always propose a policy which it according to its welfare function of type (9) considers to be strictly better than that of its opponent $o$, in the sense that $W^p(z_p) > W^p(z_o)$.

Proof. A party will never choose a policy which it according to its welfare function of type (9) perceives as strictly worse than the policy of the opponent. If the opponent’s policy is better, it is rational for the party to adopt that policy because then a better policy will win with certainty. Suppose next that the parties consider selecting the same policy. That policy must differ from the dictator policy of at least one party since the parties have distinctly different preferences. Then a party with a different dictator policy will gain by switching to a policy which it prefers to the common policy. Then there is a lower probability that the initial policy will win and a positive probability that a better policy will win, so the outcome can only get better from that party’s perspective. QED

Proposition 4. A Nash equilibrium will be such that $\tilde{V}^2_L < \tilde{V}^2_L < \tilde{V}^2_R < \tilde{V}^2_R$.

Proof. The lemma implies that $\tilde{V}^2_L < \tilde{V}^2_R$. The assumption that $\alpha_L > \alpha_R$ implies that $\tilde{V}^2_L < \tilde{V}^2_R$. Party $L$ will never choose a $V^2$-level below $\tilde{V}^2_L$ and party $R$ will never
choose a $V^2$-level above $\bar{V}_L^2$. By picking a value of $V^2$ that is less than $\bar{V}_L^2$, party $L$ would switch to an inferior policy without getting any more votes. The reason is that those who prefer a value of $V^2$ that is less than $\bar{V}_L^2$ will already vote for party $L$. By choosing a $V^2$-level slightly above $\bar{V}_L^2$ party $L$ may gain votes from those who would otherwise be indifferent between the parties’ policies. However, if the departure from $\bar{V}_L^2$ is sufficiently small the party will only suffer a negligible loss of welfare, were it to win in any case. Thus party $L$ will choose a policy such that a small decrease in $V^2$ would be preferable as such, but would scare away some voters. Similarly, party $R$ will choose a policy such that a further decrease in $V^2$ would be considered welfare decreasing according to its welfare objective while attracting more voters. QED

The proposition implies: (i). Both parties deviate from the dictator policies. (ii). Each party will trade off the quality of the policy from its own perspective and the chance of winning the election. (iii). The policies converge to some extent without coinciding.

This characterisation has some important features in common with Dixit and Londregan (1998), Hansson and Stuart (1984) and Lindbeck and Weibull (1993), while it differs from some other analyses such as for instance Lindbeck and Weibull (1987) where there is complete convergence to a single policy.

It can also be of interest to consider the analytics of the discussion above by investigating the first order conditions. The objective functions of the respective parties are given by:

\[
\pi(V_L^2, V_R^2)W^L(V_L^2) + (1 - \pi(V_L^2, V_R^2))W^R(V_R^2) \quad \text{for party } L
\]  

(14)  

and

\[
\pi(V_L^2, V_R^2)W^R(V_R^2) + (1 - \pi(V_L^2, V_R^2))W^L(V_L^2) \quad \text{for party } R
\]  

(15)

where $W^p(V^2)$ denotes party $p$'s evaluation of the other party's policy proposal expressed in terms of the implied utility level for type two individuals. The first order conditions for maximizing these objective functions are given by:

\[
(W^L(V_L^2) - W^L(V_R^2)) \frac{\partial \pi}{\partial V_L^2} + \pi \frac{dW^L}{dV_L^2} = 0
\]  

(16)

and

\[
-(W^R(V_R^2) - W^R(V_L^2)) \frac{\partial \pi}{\partial V_R^2} + (1 - \pi) \frac{dW^R}{dV_R^2} = 0
\]  

(17)

Each condition consists of two main terms. The former term of (16) expresses the expected welfare gain party $L$ can obtain by giving a slightly higher utility to class two, and thus increasing the probability of winning the election by gaining the support of some voters who would otherwise vote $R$. The latter term reflects that
there is a cost because in order to obtain the additional votes the party has to adopt a policy which is less satisfactory according to its own preferences. The party will trade off the probability of winning and its satisfaction with the policy it proposes. Up to a point ideological purity is sacrificed in order to reduce the likelihood of losing to a policy which is ideologically even less acceptable. The similar trade-off for party R is expressed in (17).

5. Concluding remarks

Public provision of private goods is a phenomenon which has to a large extent been neglected by textbooks in normative public economics. The conventional view has been that it is public goods, and possibly the closely related private goods provided under decreasing average costs, that should be publicly provided. It should be the task of private markets to provide private goods. This observation is not easily reconciled with the fact that in many countries private goods provision constitutes a large share of public expenditure. Two explanations seem possible. One is that normative public economics does not capture what is actually going on on the arena of economic policy. Policy making is motivated not by the efficiency criteria of welfare theory, but rather by the desire to design a policy which can obtain a majority in the voting process. The other possibility is that the conventional normative theory has missed out considerations that may be important for understanding the potential role of public provision in promoting economic efficiency.

In recent years both approaches have appeared in the literature. Political economy models have explained public provision of private goods as a political phenomenon. Modern public economics models have explained how there may be an efficiency case for public provision of private goods under plausible information constraints. However, the two approaches have been quite disparate, and have been based on quite different assumptions. This paper has integrated the welfare approach and the political economy approach by investigating whether the mechanisms appearing in the welfare models may be sustained by the political processes studied in political economy. We have presented two political economy models in which this is the case.

We have studied both a median voter model and a two-party model of representative democracy. The common central feature of the models is that it is desirable from the perspective of the decision makers to achieve a (second best) Pareto optimal allocation. The adherence to the Pareto principle by voters and parties, and the ability to commit to the announced policies account for the efficiency of the policies that are selected. As we know from the normative models, the role of public provision is to soften the self-selection constraint and thus to relax a major restriction on the attainable Pareto efficiency. Since Pareto optimality is desirable, it is not surprising that the agents of the political economy would like to take advantage of the same mechanism to promote efficiency. It is
the case for efficiency along with the basic information constraint that drive the public provision results. This is different from the conventional political economy case for public provision that lean on severely restricted policy options.

Implicit in our models is the argument that efficiency according to the normative theories is not necessarily in conflict with the political objectives that are at the heart of political economy models. How robust this coexistence of economic efficiency and political objectives is, can only be answered by considering a wider range of political economy models with different assumptions. This will have to be the topic of future research. The main distinction between the normative and the political models that we have considered is that the latter also explain which Pareto optimum that is going to be chosen by the political process (even if not necessarily in a deterministic way).

It is the central result of the present study that under plausible information constraints economically efficient public provision of private goods will be part of political rational decisions within the context of majority voting. There is no need to appeal to political concerns that are at odds with economic efficiency to explain the sizable public provision of private goods.

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