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PUBLIC SECTOR INEFFICIENCY AND TRANSITIVITY OF
CHOICE BETWEEN LEVELS OF EXPENDITURE AND TAXATION

by

Moore McDowell

Working Paper No. WP89/13

December 1989
INTRODUCTION

There is a widespread opinion that public sector production is inherently inefficient. The basis in reality for this view has been the subject of considerable debate among public sector economists. A reasonable summary of the conclusions of this debate is that while public sector production may not be organised in such a way as to conform to conventional micro-economic efficiency norms in all cases, the output foregone is not necessarily a pure loss, nor is it entirely the result of rent-seeking behaviour. Instead, it can frequently be presented as a cost of acquiring some vector of characteristics of the output or of achieving some distributional target of government decision-makers.

Nevertheless, it seems fair to observe that current public opinion is biased towards considering the public sector as basically inefficient. This is not necessarily a case of voter myopia. To various groups among the voters the price/quality/distribution characteristics of public sector outputs will appear as public sector inefficiency to the degree that voters do not support the objectives of the government which produce these characteristics. Further, in addition to the considerations just noted, there are undoubtedly cases where public sector production is indeed inefficient. Bureaucratic production can impose excess costs.

In this short paper a theoretical implication of this perception for the stucture of revealed preferences is offered as an explanation of some results of a survey on preferences for taxation and public expenditure carried out in Ireland in the Summer of 1989. It provides a rational explanation of revealed preferences which at first sight suggest that there is either very bounded rationality in making choices or straightforward irrationality in the sense of intransitivity of individual preferences.

Support for the opinion survey from which the results quoted in this paper were derived was provided by a research grant from the Foundation for Fiscal Studies, which is gratefully acknowledged by the author.
TAXATION-SPENDING SOCIAL CHOICE AND VOTER SATISFACTION

It is conceivable that a majority-based electoral system will succeed in producing a Pareto optimal decision on the level of public spending and necessary taxes. Indeed, there are those like Riker who take the view that politics involves only redistributive questions and therefore believe that any observed level of public sector output and tax finance will have the properties of a Pareto equilibrium. If this is the case, it must be true that for all voters the marginal rate of substitution between some composite output indicator for tax financed outputs and tax rates will be the same. Whether or not this is true, it may be taken as an extremely restricting assumption about the outcome of the political process. What holds true despite such an assumption can be assumed a fortiori to hold true if this restriction is relaxed.

Following Mueller (1979, pp 19 - 24) we describe an output-tax combination such as that just outlined as a Wicksell equilibrium, of which an infinite number exist, each corresponding to a different distribution of real income between the voters, given the real output potential of the economy. There exists a more restricted definition of the public choice equilibrium, the Lindahl equilibrium, which is a particular case of the Wicksell equilibrium, in which not only are the voters’ MRS the same, but no voter would choose a different value for public outputs given the tax rates he faces. The Lindahl equilibrium, if it exists, is unique for a given set of spending programmes and tax instruments.

Under a Lindahl equilibrium no voter would wish to see any change in the tax-spending mix, given his real income level and given the tax instruments and expenditure programmes. In a Wicksell equilibrium, however, some (most?) voters would prefer to see more or less government spending even if their tax bills changed by amounts determined by the tax rates they face and the cost of the change in government spending. Higher or lower levels of public spending, with corresponding changes in tax liabilities, would improve the utility level of those voters, given their real incomes.
The point of this is that even if we assume that the democratic system can and in general does produce a collective choice outcome which has the properties of a Wicksell equilibrium we should still expect to see voters being prepared to express a preference for a higher or lower level of spending and/or a change in the spending composition.

**TAXATION CUTS OR EXPENDITURE INCREASES - THE OPTIONS**

There are two plausible sets of circumstances in which a voter, presented with a choice, could opt for a change in the level of tax financed government spending. In the first place, a voter could feel that the tax-spending combination was not what he would choose in any case. This could be either because he (like many in a Wicksell equilibrium) was to some extent coerced in that for a given set of tax rates he would prefer a different level of spending and a consequent change in his tax liability. A variant on this would be where the social decision on tax and spending did not correspond to any conventional public choice equilibrium, but represented the outcome of some exploitative process, a Hobbesian result. The second would be where the voter felt that the public sector was not delivering the quality of output he desired for his tax payments: put another way, because he felt that the public sector was inefficient.

We use a conventional indifference map to analyse the choice facing the voter. For simplicity we assume that the good being produced collectively is a pure public good. In figure 1 the level of public output in standardised units is given by $G$ on the vertical axis. For the voter at any given set of tax shares a rise in $G$ implies a fall in consumption of private goods if his income is held constant. This consumption is measured as $P$ on the horizontal axis. His indifference curves in $P,G$ space have the usual properties.

Two sets of indifference curves are shown in figure 1. These represent the preferences of (a) a voter for whom the Marginal Rate of Substitution between $G$ and $P$ is high and (b) a voter with a low MRS between $G$ and $P$. The voter is then presented with two choices. In
the first, having already expressed the opinion that there is slack or inefficiency in public production, he is asked to choose between the options of having his tax bill reduced by any saving achieved through increased efficiency in the public sector or having the saving used to increase the output of the public good. In the second, he is asked to choose between a higher level of G at the expense of a lower level of P and the reverse. It will be seen that for a voter who has a high MRS (indifference curve (a) with a slope greater than 45 degrees at his initial position) a choice of a higher value for G, given P, implies a choice of a higher level of G and P than that represented by his initial position. Similarly, a choice of a tax reduction as an outcome in the first place (a voter with a low MRS, indifference curve(b)) is associated with a preference for lower values for both P and G. Formally, \( xPy \rightarrow nPm \) and \( mPo \), while \( yPx \rightarrow oPm \) and \( mPn \). Given the assumed constants in these choices, this can be described as weak transitivity in individual choice between P and G.

**REVEALED PREFERENCE FOR TAXATION AND SPENDING**

In a survey of opinion on public spending and tax reform in Ireland in Summer, 1989, respondents were asked (among other questions) the following: (i) to choose between tax reduction and improved output in public production if increased efficiency were achieved in the public sector; (ii) whether they would be prepared to pay higher taxes for increased public sector output; (iii) whether they would prefer lower public sector output with lower taxes.[1] The survey results are contained in Table 1 and (qualitatively) in Figure 2.

These suggest that the respondents did not display weak transitivity of preference in terms of the discussion so far. Allowing for a measure of randomised response, it is hard to reconcile a 74% response favouring \( x \) over \( y \) with a 45% response favouring \( o \) over \( n \), and 74% rejecting an increase in tax financed spending with 74% preferring tax savings to be used to increase spending. Clearly, a substantial number of voters are registering
Figure 1

\[ x \, P \, y \rightarrow n \, P \, m \quad \text{or} \quad n \, I \, m \]

\[ y \, P \, x \rightarrow o \, P \, m \quad \text{or} \quad o \, I \, m \]

Figure 2

\[ x \, P \, y \quad 74\% \]

\[ n \, P \, m \quad 23\% \]

\[ y \, P \, x \quad 24\% \]

\[ o \, P \, m \quad 45\% \]
<table>
<thead>
<tr>
<th>Table 1 Survey Results, Sample of 814 Adults</th>
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<tbody>
<tr>
<td>Is there inefficiency in the Public Sector?</td>
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<tr>
<td>Yes</td>
</tr>
<tr>
<td>86%</td>
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<tr>
<td>Should savings from increased efficiency be used to reduce tax or improve output?</td>
</tr>
<tr>
<td>Reduce</td>
</tr>
<tr>
<td>24%</td>
</tr>
<tr>
<td>Willing to pay higher tax to finance higher spending?</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>20%</td>
</tr>
<tr>
<td>Willing to see spending reduced to lower taxes?</td>
</tr>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>45%</td>
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preferences between x and y which do not appear to be transitively reconcilable with their preferences between m, n and c.

THE IMPACT OF PERCEIVED INEFFICIENCY ON TAX/SPENDING PREFERENCES

One reaction to the above observations would be to conclude that voter choice can reflect seriously bounded rationality, and that it is therefore dangerous to draw conclusions as to majority preference on an inference basis. Only direct responses can be relied on to give an indication of collective choice. A second would be to conclude that the responses reflected imperfectly framed questions. This is always a danger with survey management dealing with complicated and hypothetical questions. While it would be hard to argue that the questions as put contained no bias whatsoever which might result in the contradictory answers, it has to be said that the poll was conducted by an experienced professional firm used to dealing with this problem, and was preceded by pilot surveying designed to eliminate response confusion before settling on the final form of the questionnaire.
A third is to accept that the responses are indeed economically rational, but that the
conventional analysis of voter choice underlying figures 1 and 2 is incomplete. It is to
this line of argument we now turn.

Consider, first of all the tradeoff the voter is faced with in the choices he is offered.
When he is asked to choose between increased public good production and increased pri-
vate consumption, then, provided we standardise units of output he is facing a 45 degree
constraint. When, however, he has indicated that he believes that the public sector is
inefficient, he is effectively saying that at the margin it will cost him more than one
standard unit of private consumption to obtain an increase in his consumption of the pub-
licly produced good by one unit. The slope of the tradeoff is less than 45 degrees,
reflecting a marginal rate of transformation between public and private consumption
exceeding unity.

This situation is illustrated in figure 3. In each panel two constraints are drawn through
the voter’s initial position, m. One, aa’, has a slope of 45 degrees; the second, bb’, has a
slope of less than 45 degrees. The aa’ constraint and any displacement of it outwards
from m is the tradeoff facing the voter asked to choose between allocations of fiscal
savings from increased public sector efficiency. The bb’ constraint through m is the trade-
off the voter faces between tax and public expenditure, private and public good consump-
tion, given his perceived inefficiency of public sector production.

In panel (i), a voter with a preference ordering which yields indifference curves of type j
can logically choose x rather than y when asked to allocate fiscal efficiency gains
between tax cuts and increased public sector production while simultaneously expressing a
preference for spending cuts to accommodate tax reductions over either the status quo or a
tax financed public spending increase. Other voters with preferences indicated by indif-
ference maps k and l in panels (ii) and (iii) will opt for either x and n or y and o.
The key to this result is the relative slopes of the indifference curve at m and the "efficiency adjusted" public-private consumption tradeoff. This can be formally stated as follows:

The slope of the efficient public-private MRT line is unity; denoting the slope of the inefficient MRT as d, \( (d - 1)/1 \) is the coefficient of perceived public sector inefficiency at the margin. It is the relative slopes of the voter's MRS and the relevant tradeoff which determines his choice between spending and tax cuts.

\[ \text{MRS} < 1 : \text{tax cuts are always preferred to expenditure increases, no matter which choice is offered}. \]

\[ \text{MRS} = 1 : \text{present position is preferred to any point on the efficient tradeoff through it}. \]

If public sector production is inefficient \( (d > 1) \), a spending cut to reduce taxes will be preferred to the initial position. Offered a choice of use of an efficiency gain, he will opt for a combination of both tax cuts and spending increases. If forced to choose between \( x \) and \( y \), the outcome is uncertain.

\[ d > \text{MRS} > 1 : \text{the voter will choose to increase public consumption rather than cut taxes when an efficiency gain is offered; simultaneously, he will reveal a preference for lower taxes and lower spending}. \]

\[ \text{MRS} > d > 1 : \text{he will opt for increased public spending in either case}. \]
CONCLUSION

Opinion surveys are a useful method of establishing voter preferences between political options at a point of time and of tracking changes in these preferences over time. From an economic viewpoint there are limits to the number and complexity of questions that can be included in surveys to evaluate preferences. This means that it is important to be able to derive conclusions by inference, which in turn presumes a rational and predictable structure for individual preferences. Evidence of intransitivity in preferences undermines any such assumption.

In terms of collective choice evidence of intransitivity makes it unlikely, to say the least, that we can rely on voting mechanisms to produce Pareto efficient outcomes in levels and financing of public sector production.

Prima facie evidence of intransitivity is, therefore, disturbing. Equally, it is reassuring to find that what appears to be irrational response can on more careful examination be plausibly shown to be consistent with economic rationality.

This paper has provided a reconciliation of apparently contradictory expressions of preferences with a rational choice structure. It has done so by drawing attention to the importance of proper identification of the nature and type of constraint which individuals face in making choices which we presume to be rational. Specifically, it demonstrates the importance of perceptions of the efficiency of the public sector for public preference for "rolling back the frontiers of the state". The results studied in this paper suggest that in Ireland, at least, such support is more an expression of dissatisfaction with the efficiency with which the public sector delivers the goods than a desire to alter the relative weights of public and private sector outputs in GNP.
REFERENCE

. [1] The text of the questions put to respondents was as follows:

1. (a) Do you think the government often wastes money through bad management OR do you think it generally gets good value for the money it spends?

(b) If, through better management, the Government could save 5 pounds out of every 100 pounds it now spends, do you think it should give this back by reducing taxes OR do you think it should spend it on improving existing services?

In the context of choices related to the composition of public spending and the level of public spending respondents were asked:

2. Suppose that the Government is unable to increase spending in any (programme) areas. Therefore if any more spending is needed by you in any area the Government must raise taxes. Would you or your spouse be willing to pay more taxes if it meant that the Government could spend more money in some of these areas?

3. If the government could find a way to spend less money in any of these areas then any taxes you or your spouse now pay could be reduced. Would you be willing to see the Government spending less in some areas if it meant that you or your spouse would pay less in taxes?

The responses to the questions were as follows: 86% felt that the government did not get good value for money, while 6% felt it did. 7% didn't know; 74% felt that any savings achieved through increased efficiency should be used to improve existing output; 24% opted for lower taxes and 2% didn't know; 20% were willing to pay more in tax if public sector output increased while 74% were not willing to pay more and 6% didn't know. 45% wanted to cut spending to lower taxes, 38% did not and 17% didn't know.