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RELIEF WORK AND GRANT DISPLACEMENT IN SWEDEN

by

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INTRODUCTION[1]

Public relief work has been a main-stay of the very active Swedish labor market policy. As early as 1965, when expenditures on labor market policy were still less than one percent of GNP, 10 thousand workers were employed under the relief work program. By 1979, when labor market policy expenditures had risen to more than three percent of GNP, 48 thousand workers were employed. Under the very strong assumption that all or most of these workers would have been unemployed without the program, the relief work program could have single-handely reduced the overall unemployment rate for Sweden by one and a half percentage points.

The program could have had an even stronger impact on unemployment rates for certain subgroups of the labor force. In 1979, 30 thousand youths were employed by the program - implying that the program could have lowered youth unemployment rates by as much as three percentage points. Regionally, 19 thousand jobs were located in the seven forest

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[1] We have benefitted from discussions with Richard Murray from the help in finding and interpreting data of Charles Öberg and Stefan Goés of the Labor Board. Erik Mellander has provided first class research assistance both in data collection and computation. Our FIML-estimations were made possible by the generous collaboration of Leif Jansson, the originator of the program used.

countries, lowering the unemployment rate by as much as two and a half percentage points in those regions.[1]

These calculations assume that the reliefworkers would have been unemployed the relief work jobs. There are several reasons why such an assumption could overstate, perhaps dramatically, the unemployment impact of the program:

a) relief workers may be performing jobs "normally" done by regular state or local government employees, hence reducing normal public sector employment demands. This is the possibility commonly known as the grant displacement effect.

b) relief workers may be performing jobs that would "normally" have been done by regular government employees at some later time, say as part of an effort to induce a counter-cyclical timing of government expenditure and employment. We could call this special kind of grant displacement "intertemporal" displacement.[2] It might be offset by the fact that the presence of relief workers in a recession creates pressure to make the positions permanent later on.

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[1] Handicapped workers also used to be heavily overrepresented in relief work. In recent years, however, the relative importance of relief work for this group has diminished, partly due to the setting up more permanent workshops, specially adjusted to their needs.

[2] To effect this kind of displacement has indeed been the explicit aim of Swedish labor market policy in the post-war period. Expansion of public capacities in times of recession should be matched by moderation during the up-swing, relieving some of inflationary pressure in the private labor market.

c) the relief work program could push up lower wage rates in the private market, forcing private employers to lay off some low wage workers.

d) the relief work program could, by pushing up low wage rates and/or providing employment guarantees, expand the supply of labor and not generate a one- for-one reduction in unemployment. The latter two possibilities might be termed wage displacement effects.

Should any of these displacement effects occur, one does not necessarily become less enamored of relief work as a labor market policy option. The supposed benefits of the program as a way to reduce overall unemployment are a good deal less than might be imagined, however, and the evaluation of the program becomes a good deal more complex.

The same displacement questions - although often perhaps more conveniently couched in terms of expenditure-arise also with other kinds of grants. Measuring displacement is one way of indicating the allocative effectiveness of a grant policy. The effectiveness of grants to local governments - the receiving group we have here chosen to study - is indeed a question of strategic importance for Swedish economic development today. Real expenditures by local governments have during the last two decades increased twice as fast as GNP, raising their share to a quarter. During the same period the part financed by state grants has increased from about a fifth to a fourth with a growing emphasis on categorical grants. In the perspective of an expected slow growth of the

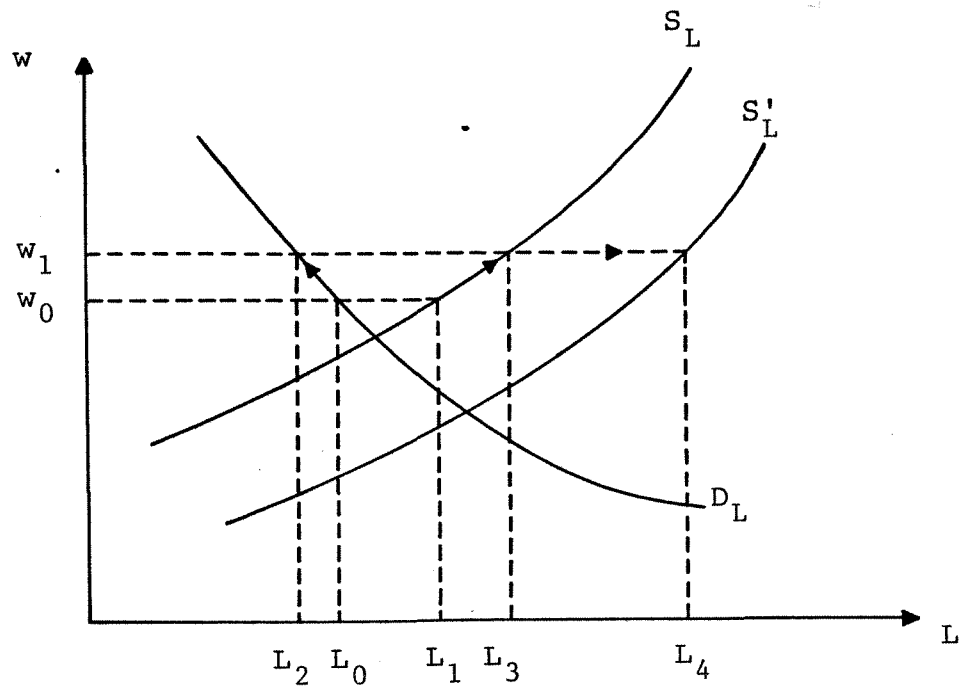
total economy in the eighties much interest is focussed on the possibilities of controlling the colume and pattern of local government expenditures by grant policy.

In this paper we try to examine the displacement effects for the Swedish relief work (Beredskapsarbeten) program and to compare its impact on local government expenditure and employment with that of ordinary state grants. We begin with a simple theoretical demonstration of how the displacement processes might work and ways in which their presence or absence can be identified. We then proceed to outline a model by which the strength of the grant displacement process can be estimated, a model which draws on both of our own previous work. (Gramlich - Galper, 1973, Ysander, 1980). We go on to describe how the Swedish program fits the model, and try to estimate the model using Swedish data for the period 1964-77. Although such empirical examinations have been conducted a few times in the United States (Johnson - Tomola, 1977, Borus - Hamermesh, 1978) to our knowledge nobody has yet done any econometric estimations of grant displacement for Sweden.

WAGE DISPLACEMENT

Taking up first the wage displacement phenomenon, the process can be depicted by the elementary demand and supply diagram shown in Figure 1. The curves D_L and S_L represent the normally-sloped private demand and supply curves for low wage labor. For any of a number of well-known and much-discussed reasons

Figure 1. Public employment and Wage Displacement



(turn-over unemployment, minimum wages, etc), we assume that this labor market does not clear initially, leaving a wage of w_0 and initial unemployment of the amount L_0L_1. Policy-makers respond by passing a public employment program which offers, say, a higher wage of w_1 to all who are willing to work. Private employers must also pay w_1 or risk losing all of their work force: then they do so, private employment falls by L_0L_2. The higher wage brings L_1L_3 workers into public employment. In addition some "discouraged workers" will be indu-

ced to supply labor by the job guarantee - this shifts the supply curve to the right and adds to public employment by the L_3L_4. The total public employment work force of L_4L_2 is then composed of some workers who were formerly unemployed (L_1L_0), some who were formerly employed privately (L_2L_0), and some who were formerly out of the labor force (L_1L_4).

It should be pointed out immediately that even though only a share of the public employment job gains actually reduce unemployment, such an outcome is not necessarily socially unsirable. For one thing, all low wage workers gain wage income, and if wages are at least somewhat correlated with family income, a public employment program operating in this manner will redistribute income. Secondly, the expansion of supply may consist of workers who really should have been counted as unemployed already - they just were not in the labor force because of perceived difficulties in finding a job - and so the social gain represented by the increased wage income may be almost as great as that for unemployed workers.

In the United States, where public employment wage levels are set as part of the program and are normally slightly above prevailing minimum wages, the wage displacement issue is a very important one - many more likely entrants to a public employment program come from existing low wage private employment or supply expansion than from existing unemployment. (See Betson-Greenberg-Kasten (1979) or Gramlich-Wolkoff (1979).) For Sweden, generalizations are risky but the phenomenon does not

appear to be so important. One indication that it may not be so important lies in the newly-emerging studies of the Swedish labor market; supply wage elasticities appear e.g. to be very small in Sweden.[1] If these results hold at low wages, wage displacement for the relief work program should be much more modest. Moreover, the Swedish program appears to be much more confined to workers likely to be unemployed initially - youth, handicapped, and workers in unemployment pockets in the forest counties - than the U.S. program.

But even though wage displacement may not be as large as in the U.S. program, it may not be entirely absent either. The relief work program is supposed to pay "going wages" for a particular task, but these wages are probably above what relief workers could have commanded from the private sector (hence a quality-corrected w_1 would exceed w_0). It has also been asserted that inexperienced youths prefer relief work to ordinary employment at the same wage, and indeed will shun private sector vacancies to take the relief work jobs. If true, this phenomenon could either have the same implications as the outward shift in supply described by Figure 1 or exert a certain upward pressure on private wages, hence implying that there may be some wage displacement.

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[1] See the conference paper by Axelsson, Jacobsson, and Löfgren for the supply results. A precise interpretation is that the amount represented by L_1L_3 is negative.

GRANT DISPLACEMENT

The other type of displacement is that working through the grant system. Both in the U.S. and Sweden, public employment programs are actually carried out through grants to recipient agencies to hire eligible workers. In the U.S. these grants go from the Labor Department to local governments and a few quasi-governmental bodies called Community Based Organizations. In Sweden they go from the Labor Board to some state agencies, local governments, and a small number of private employers. While it may be necessary to conduct public employment through grants to agencies that are producing normal government services, this does lead to the possibility of grant displacement. Estimates of the phenomenon are very large for the U.S. To suspect that the possibility is relevant for Sweden, one need go no further than the law itself. For public investment activities it is required that relief workers be used to build projects already in the long term plans of state and local governments.[1]

In studying the employment effect of grants to local governments, the first thing one has to do

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[1] The details or both the relief work system and other Swedish categorized grants are summarized in three recent Royal Commission reports (SOU 1973:45, SOU 1975:39, SOU 1977-78). These reports contain a good deal of discussion on grant displacement in general but no attempts at measurement.

is to differentiate between types of grants.[1] Three types can be distinguished:

1) Close-ended noncategorical grants, which shift upwards the budget-line of the receiver, acting like a straight income subsidy.

2) Open-ended categorical grants, which reduce the relative prices facing the receiver at the margin.

3) Close-ended categorical grants, which reduce prices but only up to a point determined by central government restrictions on the size of the overall grant.

In the first two cases we know directly how the receiver's budget constraint will be affected. From estimated price and income elasticities we can then predict the grant effect on expenditure and employment for a utility-maximizing receiver.

In Sweden, however, most grants are not of either of these types. Most are categorical and all have a limit on the total amount, making them type 3 grants in the above classification. For these hybrid grants, the proper treatment becomes more involved.

The various possibilities can be represented by the indifference curve diagram shown in Figure 2.

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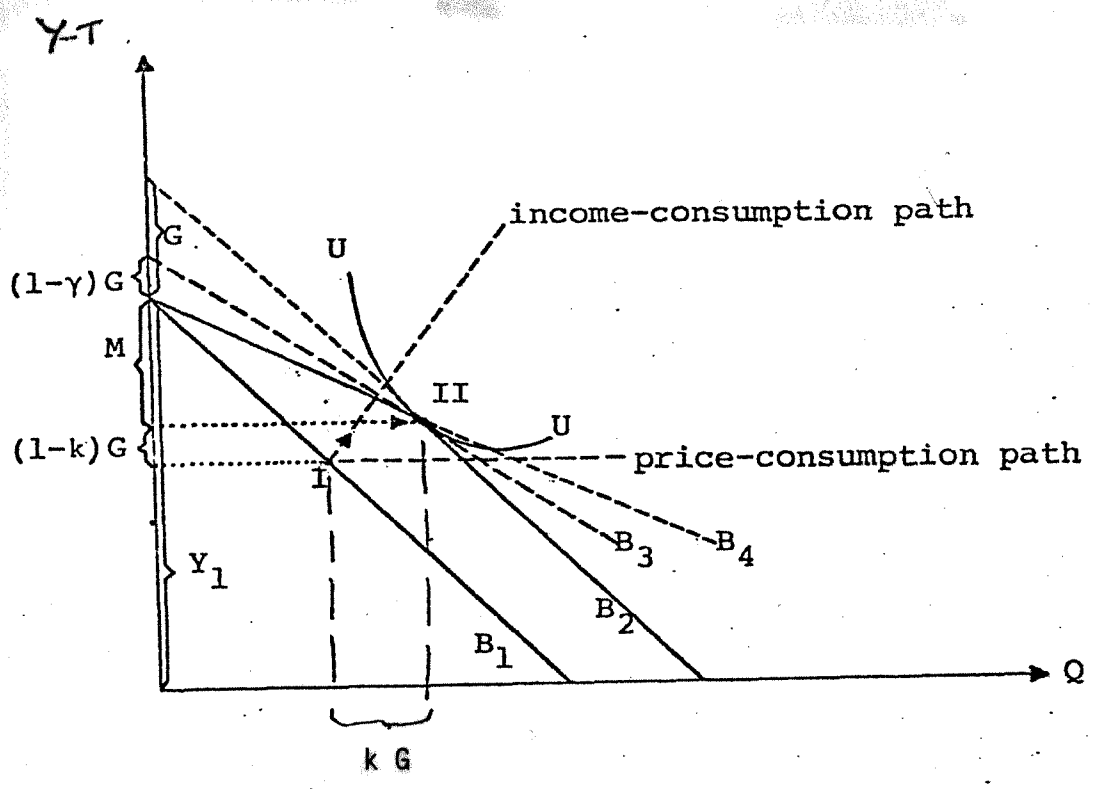
[1] For a more thorough discussion of the various types of grants see Gramlich (1977).

Figure 2. Displacement of close-ended grants - the general case



As applied to governmental decision making, the indifference diagram is supposed to reflect the behavior of some vague amalgam called "the recipient government decision-making body". In certain carefully specified but probably not very realistic models of governmental behavior, that body is the famous median-voter; in less precise but per-

haps more realistic models it is not entirely clear who is behaving -- some weighted average of voters and bureaucrat- politicians, where the latter have a higher per capita weight.

In the diagram the government is choosing between expenditures on public services, Q, and private goods and other income uses, which we call after tax income (Y - T). To simplify the exposition, we assume that initial prices are equal, so that the slope of the initial budget line B_1 is -1. The initial allocation is then at point I.

Taking first type I grants (close-ended noncategorical), these would shift the budget line to B_2, parallel to B_1, and move the community along the income- consumption path. Not all of the grant would go into public expenditures in this case unless the income elasticity of demand for private goods were zero, or the income consumption path horizontal.

Type 2 grants would be treated as a straightforward reduction in the price of public services and move the community along the price-consumption path (drawn horizontally to correspond to the case where the price elasticity of demand is unity). Type 3 grants then kink the budget line at point II and move the recipient unit to this kink point. As the funds limit gets tighter and tighter, or kink point moves leftward, the impact of these grants approaches that of type I grants; as the limit becomes less stringent, the impact approaches that of type 2 grants.

There are two ways of dealing with type 3 grants in empirical work. One approach, used by Gramlich-Galper (1973), is to find point II directly. This is done by assuming the government receives the entire amount of the grant, G, spends its legally-mandated matching amount, M, and then reduces spending on other public goods that are substitutable with the grant-supported goods. The latter reduction is called the grant displacement impact, and it obviously can imply that the overall spending effects of grants are a good deal less than those mandated by law.

A second approach was first used by McGuire (1978). It converts a type 3 grant into an income term (like type I grants) and a price term (like type 2 grants), and finds the appropriate shares. Diagrammatically, this amounts to finding the budget line that passes through point II tangent to the indifference curve, so that γG of the grant works like a price subsidy and $(1 - \gamma)G$ like an income subsidy. Such a budget line is described by B_3 on Figure 2. Were the kink point to the right of the intersection of budget line B_4 and the price-consumption path, the limit is ineffective, the grant is entirely type 2, the tangent to the indifference curve is also line B_4, and $\gamma = 1$. Were the kink point to the left of the intersection of B_4 and the income-consumption path, the tangent to the indifference curve is parallel to B_2, the grant is entirely type 1, and $\gamma = 0$.

Of more interest than γ is a parameter k, by which we denote the impact of the grant on public spend-

ing. This parameter can be shown to be related to γ by the identities

$$\frac{\partial Q}{\partial G} = k = -\gamma e_{\pi} + (1-\gamma)e_{y\ (Y-T)} \qquad (1)$$

where e_{π} and e_{y} denote price and income elasticities of demand respectively. In the diagram kG, the increased public spending due to the grant, is the horizontal distance between points I and II; and 1-k)G, the increased private spending, is the vertical distance. Returning to our original issue, 1-k)G is also called the displacement amount because it shows how much of the grant "trickles down" to private spending.

In our empirical work we have chosen to use both approaches. For non-relief work categorical grants the central government share of total expenditures g(=G/(M+G) is relatively small and there is a good deal of negotiating its exact size and other grant conditions between the granting authority and recipient governments. Given this bargaining, and the large number of such grants, we have found it more convenient to deal with these grants using the McGuire approach and simply estimate γ from the data.

For relief work grants the situation is much different. The central government share, g, is very high and indeed very close to one. It is constant across communities, and relief work grants, and employment, is a small share of normal employment in the projects the relief workers participate in.

In view of this, it makes sense to constrain $\gamma = 0$, assuming that relief work grants have no marginal impact on relative prices, and estimate the displacement coefficient (1-k) directly.

As with wage displacement, it should be pointed out that a strong degree of grant displacement does not necessarily imply that the relief work program is failing as a device to raise the demand for certain types of labor. Indeed, if the conditions of the grant are enforced adequately, the relief work program will stimulate demand for unemployed or otherwise disadvantaged workers. In this regard, data supplied by the Labor Board do indicate that the overwhelming majority of workers have been referred from the labor exchanges, and hence were not employed before entering the program. The fact of grant displacement then, could merely imply less demand for higher wage regular public sector workers, perhaps not an unfavorable result if these regular workers can get other jobs. Hence, if grant displacement is of this employment - switching type, the program is altering the composition of overall labor demand in favor of disadvantaged workers or workers in regional pockets of unemployment and simultaneously allowing the work of the public sector to be performed at lower wage rates -- no mean feat.

AN EMPIRICAL MODEL OF GRANT DISPLACEMENT

An empirical model of grant displacement can be developed from orthodox utility maximization principles. The procedure, as applied in the following

to local government, involves assuming that our governmental decision-making body is motivated by a utility function consisting of argument in:

a) currently produced governmental goods and services
b) private consumption
c) government capital stock
d) the change in the net value of assets, reflecting fiscal independence and flexibility of the community

Mathematically, the utility function -- assumed to be quadratic -- can be expressed as:

$$U = U(Q, Y - T, K, F), \qquad (2)$$

where Q stands for public services, Y-T is income (Y) less local taxes and charges (T), a measure of private consumption, K is the measure of capital stock and F is the change of net value of assets, with all variables being defined in real terms.[1] All arguments are assumed to have positive first and negative second derivatives. This utility function involves directly flows of current income and expenditure, Q, (Y-T) and F, and one stock, K. This yields a stock adjustment behavior in the

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[1] One could argue for including either the level or the change in F in the utility function. In some sense the community is better off the higher is the level of F, regardless of how much this level has grown recently. In another sense, however, local governments face a legal constraint on F -- it cannot go below a certain level (penalizing governments more the closer is F to this legal constraint).

government's response to income or price changes -- a rise, say, in income will raise public consumption and private consumption directly, and also generate a desire for increased capacity or stocks of capital. Once construction and internal saving have increased these stocks to the proper level, no further accumulation is necessary and public and private consumption can rise yet again.[1]

The Q variable needs however to be further specified, due to the interpretation we have chosen to give relief work grants. We are assuming that there is a constant value, p, attached to relief work output compared to that of regular employment. The utility function can therefore be written as:

$$U = U(Q'+p\,\frac{R}{g_r},\ Y-T,\ K,\ F) \qquad (3)$$

where R is the real value of relief work grants, g_r denotes the grant share of total relief work costs, $\frac{R}{g_r}$ is the total real cost of relief work, and Q' stands for the regularly produced services.

The utility function is then maximized subject to the government's budget constraint. This yields public goods demand functions of the form:

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[1] The precise details of all this are worked out in Ysander (1981). The Gramlich-Galper model (1973) deviates slightly in using stocks of financial assets directly in the utility function.

$$Q' = a_0 + a_1\theta + a_2 p - a_2(\gamma g \pi) + a_3 (Y-T) + a_4 \frac{R}{g_r} \quad (4)$$

where θ is some socio-economic shift variable representing service needs, π is the relative price of regular services, $\gamma g \pi$ is the effective reduction in this relative price due to regular categorical grants, with central government matching share g and with the γ value estimated from the data. The terms represented by the parameter a_2 give the effective marginal price for public services, while the a_3 coefficient shows the marginal public spending propensity as community income changes. The parameter a_4 measures relief work displacement; if a_4 is close to zero, there is little displacement; if it is close to minus one, a great deal.[1]

It is also possible to estimate (5) for public employment by making use of the following approximations

$Q' \rightarrow E$ = regular employment

$\frac{R}{g_r} \rightarrow E_R$ = relief work employment
$\pi r \rightarrow w$ = real wage (gross of subsidies but net of the cost percentage paid by user charges).

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[1] Note that $a_4 = -p$ from the utility function (3). When $a_4 = 0$, the lack of displacement results from the fact that R and Q' are not substitutes in the utility function.

Expression (5) then becomes:

$$E = a_0 + a_1\theta + a_2 w - a_2\,\gamma g w + a_3(Y-T) + a_4 E_R \qquad (5)$$

The model was meant to be used for the study of grants to local governments. There are several reasons for not trying to use the same explanatory framework for state agencies, the other main recipient of relief work grants from the Labor Board. For one thing, state agencies do not usually think of themselves as allocating resources between private and public users the way local governments do. Also in Sweden projects suitable for relief work are usually earmarked years in advance within the agencies' revolving five-year plans. Total displacement is then virtually guaranteed. Defense is, however, a notable exemption, since up till recently, relief work grants -- although used for purposes laid out in long-term plans -- were not included in the financial four-year (usually) expenditure limits set out by parliament. In this case we would therefore expect little displacement in terms of production, although there could still be a considerable employment displacement because of the changing product mix within the financial limits.

THE DATA

Within local governments in Sweden relief work is very unevenly distributed between different categories of service. The distribution has also changed dramatically in the seventies, with the tradi-

tional construction work being more and more superseded by jobs within health and welfare. Relief work grants to local governments have tended to increase in relative importance over the last two decades and at the end of the seventies paid for around one percent of all service expenditure. It is hard to estimate reliable relief work displacement coefficients for health and welfare, however, because the program only got started in the early seventies and its expansion coincided with the expansion (for other reasons) of overall health and welfare spending.

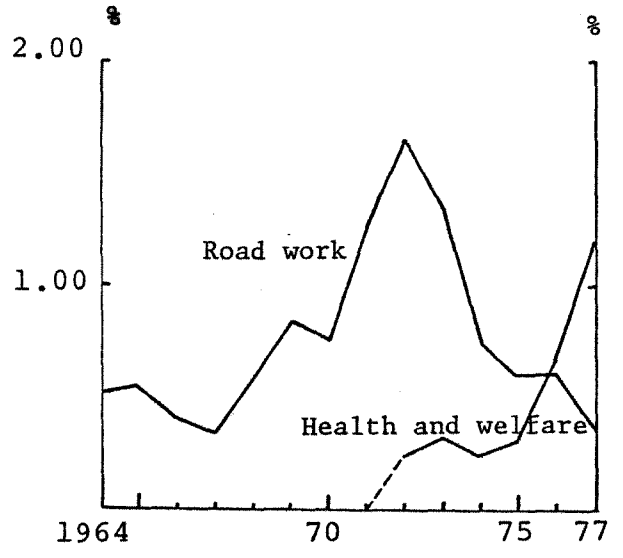
For our empirical study of grant impact we have chosen two categories, health and welfare and road work. The official relief work statistics are such that a further separation within the category health and welfare cannot be made with any confidence. We have picked road work, although it by no means dominates the traditional relief construction work, because the classification of relief work statistics and other financial statistics here agrees better than with other construction works. In defining road work, we have lumped together maintenance and new construction to avoid being misled by the possible shifting of regular employees into new construction occasioned by an increased relief work on maintenance.

Within the local government sector one could fit the model described here either to time series or cross section data. Cross section data for local governments are in general very good in Sweden, with numerous observations and a reasonable amount

of variance in most independent variables (Murray (1977, 1981)). These general advantages may, however, not hold unreservedly when dealing with relief work grants. Since provisions of the grants are essentially constant across counties, there is very little variation in these critical independent variables. In any case, for this paper we have not had a chance to use cross-section data, but have confined our attention to the more limited time series data. Hence we study annual time series data on employment and expenditures for the period 1964-77.

Figure 3 shows the percentage of total work within the categories that has been done as relief work in the period studied. As noted above, the share of total expenditures comprised by relief work is very small, one or two percent. This is why we constrain $\gamma = 0$ in our estimation. The figure also high-lights the fact that the recession in the early seventies was the last time road work was used as a major form of relief work, while later relief work endeavors have tended to be more and more directed towards the health and welfare area.

Figure 3. The share of relief work in total expenditure, (R/gr)/(Q' + R/gr)



ESTIMATION RESULTS

In fitting the equation (5) and (6) above we were trying to estimate the price-subsidy effect of ordinary grants and the displacement of relief work respectively. From these estimates we can derive and compare the net impact on expenditures of these two kinds of grants.

The main econometric difficulty involves the parameter, γ, determining the price and income components of non-relief work categorical grants. There is no reason why (5) could not be estimated directly, with γ being determined by comparing a_2 and $-a_2\gamma$, the coefficients of π and πg respectively. However this approach would not give a standard error for γ, and to fill that gap we have therefore estimated the model with a FIML program.

On a more practical level, as a shift or needs variable for health and welfare we have used a population index, where the various age groups are weighted by their earlier relative per capita share of total expenditure in this area. The corresponding shift variable for road work is an index of the number of heavy trucks in traffic, meant to reflect the changing demands made by heavy road transport.

HEALTH AND WELFARE

The results for the health and welfare category are shown in Table 1. All equations explain normal expenditures, Q', because the results for employment were not reliable. In the first equation the income term is omitted because of its collinarity with relative prices, and γ is estimated to be 1.32, outside of its theoretical band. Hence in equations (2) and (3) γ is just set at one -- implying that categorical grants are treated like open-end price subsidies -- and the equation reestimated with and without the income term. The

price elasticity is computed to be slightly in excess of one in all equations, and the income elasticity is 0.41 in the one equation where it could be estimated. In comparison with other studies, these estimated price elasticities are on the high side, but the estimated income elasticity is standard.

Regarding displacement, all equations showed relief work to have a positive effect on normal eployment. Relief work employment is not a substitute but a complement to normal employment in the health and welfare area. The coefficients are not statistically significant, but are nevertheless fairly large. The only explanation for the result we can see is that relief work employment necessitates more regular employees in supervisory positions. We are inclined to view our precise estimates skeptically, but we should stress that there is no evidence of displacement as far as health and welfare spending go. Indeed, if anything grant displacement is negative.

ROAD WORK

Table 2 shows the results for road work, this time estimated both for normal expenditures, Q', and regular employment, E. As before the intial estimate of γ was high and we constrained $\gamma = 1$, again indicating that grants appear to be treated mainly as price subsidies. This time both the price and income elasticities are less than one in absolute value, as is usually found for public expenditure functions. But this time the estimates indicate relatively complete displacement for the two normal expenditures equations, and more than com-

plete displacement in the employment variant. Whether we should believe the precise estimates is again questionable, but the evidence suggests pretty strongly that there is a great deal of displacement in this area. Although the estimate is statistically insignificant an inspection of the time series shows that the high figure is no mere trick played by multicollinearity etc. When, e.g., the relief work multiplied during the recession in the early seventies, the stagnation of regular road expenditure turned into an outright fall, which was even more accentuated in terms of employment. The aggregate figures seem to suggest that total local road work during the period has tended to move with the business cycles. The effort to comply at the same time with the requirement of concentrating road investment to periods of high unemployment has resulted in a downturn in the labor intensity of regular road work during these periods. While complying with all formal requirements the local governments thus seemed to have managed to make a negative total contribution to the labor market efforts. This is probably what shows up in the large displacement coefficients estimated for relief work. Whether the percentagewise rather small number of relief workers affect this situation significantly is, however, difficult to know and impossible to ascertain from the aggregated series available.

In many ways these estimates leave a lot to be desired, but at lest within functional categories the results are reasonably consistent on the displacement issue -- there is not much for health

and welfare, and there is a great deal for road work. To go beyond these conclusions one would appear to need a more detailed analysis -- perhaps utility functions elaborated to allow complements as well as substitutes, certainly longer time series, and perhaps more use of cross section data.

There is a further statistical distinction that would be interesting to pursue. Above all it would be interesting to see whether the omission of handicapped workers would alter the estimated grant effects. The share of positions for handicapped workers -- defined as positions that are tailor-made for the needs of people with physical or psychic handicaps or locally-tied elderly workers -- has fluctuated from about one-third in the early days to two-thirds in the early seventies and back to one- fourth recently.One might expect displacement to be less for these workers.

CONCLUSIONS

The estimation results unfortunately do not permit any far-going or general conclusions to be drawn. As for ordinary grants, the results would seem to indicate that grant policy within the categories studied is a rather effective way of controlling local government expenditure. The estimations suggest the existence of considerable price effects and do not make it possible to reject the hypotheses that all categorical grants, which cannot a priori be viewd as bloc grants, work as if they were open-ended.

Displacement of relief work could only be identified in one of the categories -- road work. There, the aggregate data do undoubtedly indicate a very considerable displacement effect -- the regular work-force becoming reduced by more than the number of relief workers. But the evidence is just as strong that there is no displacement in the other category -- health and welfare. The explanation appears to be related to the fact that in Sweden health and welfare relief workers are complementary with normal workers, and hence the employment-inducing impact of grants in this area is very strong.

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Table 1. Equations Explaining Local Government Regular Expenditures for Health and Welfare, Q', 1964-77

Absolute T value below coefficients

Eqn.	a_0	a_1					R^2	DW
(1)	-374.4	5,68 (6.2)	-1.23 (2.6)	1.32 (1.4)	0	1.5 (1.3)	0.98	1.39
(2)	-383.8	5.87 (6.6)	-1.06 (2.4)	1.0	0	1.7 (1.3)	0.98	1.35
(3)	-383.1	5.60 (6.4)	-1.13 (3.0)	1.0	0.33 (1.3)	1.7 (1.4)	0.98	1.68

a. Implies price elasticities (e) of -1.36, -1.17, and -1.25 respectively.

b. In equations (2) and (3) constrained to equal 1.0.

c. In equations (1) and (2) a_3 constrained to equal zero. the implied income elasticity (e)= 0.41 in equation 3).

d. Implies negative values of p in text equation (3), or that relief work services and regular services are complements.

Table 2. Equations Explaining Local Government Regular Expenditures for road Work, Q´ and E, 1964-77

Absolute t values below coefficients

Eqn.	a_0	a_1					R^2	DW
(1) with Q´	-97.9	1.27 (9.1)	-0.41 2.1)	2.20 (1.5)	0.98 (4.0)	-0.98 (0.9)	0.95	1.86
(2) with Q´	-71.6	1.18 (7.4)	-0.41 (2.1)	1.0	0.98 (4.0)	-0.78 (4.0)	0.95 (0.5)	2.09
(3) with W	-11.3		-0.56 (3.2)	1.0	0.56 (1.4)	-5.48 (2.1)	0.89	1.87

a. Implies price elasticities (e) of -0.37, and -0.51 respectively.

b. Constrained to 1.0 in equations (2) and (3).

c. Implies e = 0.88, 0.88, and 0.50 respectively.

d. Implies values of close to 1.0 in equations (1) and (2) and close to 5.0 in equation (3).