Direct displacement effects of labour market programmes: the case of Sweden

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Abstract

Using a panel of 260 Swedish municipalities over the period 1987-1996, this paper investigates the direct displacement effects of active labour market programmes (*ALMPs*). Compared to earlier studies on this topic, we have more and better data. From our GMM estimations, we find that (i) there are direct displacement effects from those *ALMPs* that generate subsidised labour (in the order of approximately 65 percent), but there seems to be no (significant) displacement effects from training, (ii) most *ALMPs* seem to increase labour force participation, and (iii) the adjustment to the optimal level of employment seems to be sluggish. A consequence of (ii) is that the earlier studies have overstated the displacement effects (since they normalised with the labour force).

Key words: Labour market programmes, Displacement effects, GMM estimation.

JEL Classification: J3

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1 Introduction

Much of the literature dealing with the evaluation of social programmes is primarily concerned with the programme impacts for participants. Thus, most evaluations of active labour market programmes (*ALMPs*) have focused on the effects on participants' income or employment prospects. While certainly of interest, these impacts at best only provide partial information on total programme effects. The obvious point in question is that many (if not most) public programmes are likely to affect also non-participants: taxes have to be raised in order to finance the programmes, wages for non-participants as well as for participants may be affected, and improved employment prospects for participants may come at the cost of increased joblessness among non-participants, so called displacement or crowding out.[1] This latter effect is the subject of the present study.

During the recent Swedish recession, the number of participants in different labour market programmes has reached an all times high.[2] Roughly, these programmes can be divided into training and subsidised employment. Despite the scale of the programmes, relatively little effort has been put down on programme evaluation. Consequently, relatively little is known about the effects even of major programmes.[3] Regarding training programmes, displacement effects for non-participants probably is a minor issue. The few previous studies dealing with displacement effects of Swedish programmes involving subsidised employment (Calmfors and Skedinger, 1995; Edin, Forslund, and Holmlund, forthcoming 1999; Forslund, 1996; Forslund and Krueger, 1997; Gramlich and Ysander, 1981; Ohlsson, 1995; Skedinger, 1995), however, indicate that programme participants may indeed crowd out a substantial fraction of regular jobs.[4] These studies, though, with the exception of Forslund (1996) and Edin, Forslund, and Holmlund (forthcoming 1999), either consider measures which today are of smaller importance (typically relief work) or cover time periods basically ending before or in the beginning of the recent recession.

In this paper we endeavour to fill out some of this lacuna by estimating dis-

[1] The general issue of programme evaluation is discussed in Heckman and Smith (1998); evaluation of labour market programmes is surveyed in Calmfors (1994) and Heckman, LaLonde, and Smith (1998).

[2] In 1997, on average 191000 persons (4.5% of the labour force) participated in *ALMPs*, excluding measures for the disabled. The part of the direct costs for this financed over the budget of the central government amounted to 1.2% of GDP. See also *Section* 2.3 below.

[3] See, for example, the surveys in Björklund (1990) and Forslund and Krueger (1997).

[4] Similar results are found in a number of studies for other countries (Johnson and Tomola, 1977; Nathan, Cook, and Rawlins, 1981; Adams, Cook, and Maurice, 1983; Kopits, 1978; Schmid, 1979). Casey and Bruche (1985) survey a number of studies and reach similar conclusions.

placement effects of some Swedish *ALMPs* (relief work, training and "other programmes") using a panel of 260 Swedish municipalities for the period 1987–1996.

Our main findings are that (i) there are direct displacement effects from those *ALMPs* that generates subsidised labour (in the order of approximately 65 percent), but there seems to be no (significant) displacement effects from training, (ii) most *ALMPs* seem to increase labour force participation, and (iii) adjustment to the optimal level of employment seems to be sluggish.

2 A brief overview of Swedish labour market policy measures and the Swedish labour market

The labour market policy measures considered in this study fall into two broad categories: training and subsidised employment.[5] Common to all measures is that they are administered at local labour offices and that job search through these offices is a necessary condition for eligibility. The number of different measures used over the years is vast, and here we limit ourselves to a discussion of the measures of interest for this study.

2.1 Subsidised employment

Relief work, which has been part of Swedish *ALMPs* since at least the 1930s, aims at counteracting cyclical and seasonal unemployment fluctuations. Only tasks increasing employment in excess of the employer's (central government, municipality or private sector) regular budget are supposed to be subsidised. The main part of the jobs is in the local public service sector. Relief jobs normally last at most for six months and are paid according to collective agreements. The subsidy amounts to at most 50% of wage costs or SEK 7000 per month.

Work experience schemes were introduced in the beginning of 1993 and participants are, in order to avoid displacement, supposed to perform tasks that would otherwise not have been performed. The measure is primarily targeted at unemployed persons whose unemployment benefits are about to expire. Compensation equals the unemployment benefit and the duration is normally capped at six months. A large fraction of the programmes takes place in the non-profit private sector.

Special youth measures, introduced in 1984, have taken a number of different forms. In 1989 contracted and special induction places replaced the earlier so called youth teams. Both were targeted at youths at age 18-19. Contracted induction places meant at most 60% wage subsidies for the private employer hiring

[5]Due to limitations in data availability, we are not able to study all major programs. The most notable example are recruitment subsidies and subsidised self employment.

youths under the programme. Special induction places meant guaranteed temporary employment in the public sector for unemployed youth. Induction places were in 1992 replaced by youth practice, targeted at youth below age 25. The main idea of this programme was to provide the participants with work experience and practice. The wage subsidy received by the employer was well approximated by 100%; the participants received the equivalent of the unemployment benefit. As was the case with the work experience schemes, there was explicit mention of the need to avoid crowding out of regular employment.

Practice for immigrants and *practice for college graduates* were used during a short period in the mid 1990s. The number of participants was rather limited in both programmes, and the construction was similar to that in youth practice.

2.2 Training measures

The objectives of *labour market training* are to improve the position in the labour market for workers with a short or obsolete education and to facilitate for employers to find labour with the appropriate qualifications. The level of compensation received during training roughly coincides with the level of unemployment benefits. Courses normally last for about 5 months. It is worth noting that since the second half of the 1980s, participation in labour market training can be used to acquire entitlement to a new period with unemployment compensation.[6]

Trainee replacement schemes were introduced in 1991. This measure on the one hand helps the employer to raise the qualification of the employees and on the other hand helps the employment offices to find temporary jobs for the unemployed. Employers who use the measure get a reduction in the payroll tax if they hire an unemployed worker as a replacement for an employee undergoing training during her working time. The payroll tax reduction was in 1997 less than or equal to SEK 350 a day or 50% of wage costs. In addition, the employer receives assistance to finance the training (in 1997 at most SEK 40 per working hour and not more than SEK 20 000 per trainee).

2.3 The Swedish labour market and labour market programmes

The Swedish rate of unemployment stayed virtually unchanged at around 2% of the labour force between 1960 and 1990 with only rather modest cyclical swings. This all changed in the early 1990s, when the unemployment rate rapidly rose by more than six percentage points to almost 8% in 1993, see *Figure 1*.[7] From this

[6] Unemployment compensation lasts for 14 months.

[7] This number is slightly lower than the "official" unemployment rate. The difference is due to the inclusion of *ALMP* participants in the labour force in the numbers plotted in *Figure 1*. The sources are the following: *Unemployment*: Statistics Sweden, Labour Force Surveys; The *Labour force* is generated as the sum of *employment* (Source: Statistics Sweden, National

perspective, our data, ranging between 1987 and 1996, cover an exceptional period in the post-war Swedish labour market. This is true also from the perspective of the development of *ALMPs*.

First, as is clearly visible in *Figure 1*, *ALMP* participation rose rapidly to previously unmatched levels in the wake of the rise in unemployment. Second, the programme mix was different than during previous recessions, partly due to heavier reliance on training, partly because participation in some of the "new" measures (work experience schemes and youth practice) rose rapidly.[8] These features are clearly borne out by the panels in *Figure 2*, which illustrate the monthly development of unemployment and labour market programmes since the mid 1980s.[9]

To the extent that the displacement effects of different programmes are different, and to the extent that the effects depend on labour market tightness, there is, thus, a good case for studying displacement of *ALMPs* in the 1990s.

3 Theoretical framework

To identify displacement effects of *ALMPs*, a suitable counterfactual has to be constructed to indicate how (regular) employment would have developed absent the programmes or at other levels of programme participation. A natural point of departure for this analysis is a version of the Layard-Nickell model of the labour market (Layard and Nickell, 1986; Layard, Nickell, and Jackman, 1991). In this model, both product- and labour markets are characterised by imperfect competition.

The basic building blocs of the model are price- and wage-setting schedules relating price setters' mark-ups on wage costs and wage setters' real-wage decisions to (un)employment and other relevant variables. The original model does not explicitly account for labour market programmes, but Calmfors (1994) demonstrates how the model can be used to analyse the effects of *ALMPs*. The addition of *ALMPs* warrants some modifications of the model: first, as some participants are included among the employed[10], a distinction has to be made between employment and regular employment, excluding programme participants. Second, both price setting and wage setting will generally depend on *ALMPs*.

Accounts), *unemployment*, *training*, *youth programmes*, *work experience schemes* and *workplace induction*. *Labour market programmes*: National Labour Market Board. The measures include *relief work, training, youth programmes, recruitment subsidies, work experience schemes, trainee replacement schemes* and *workplace induction*.

[8] In earlier recessions, relief work was the measure of first resort to counteract downturns in the Swedish labour market, see e.g. Ohlsson (1992).

[9] The unemployment series plotted is register data from the National Labour Market Board and not based on the labour force surveys performed by Statistics Sweden. Participation in youth programmes is not available at the municipality level prior to January 1987.

[10] Relief workers and persons on trainee replacement schemes.

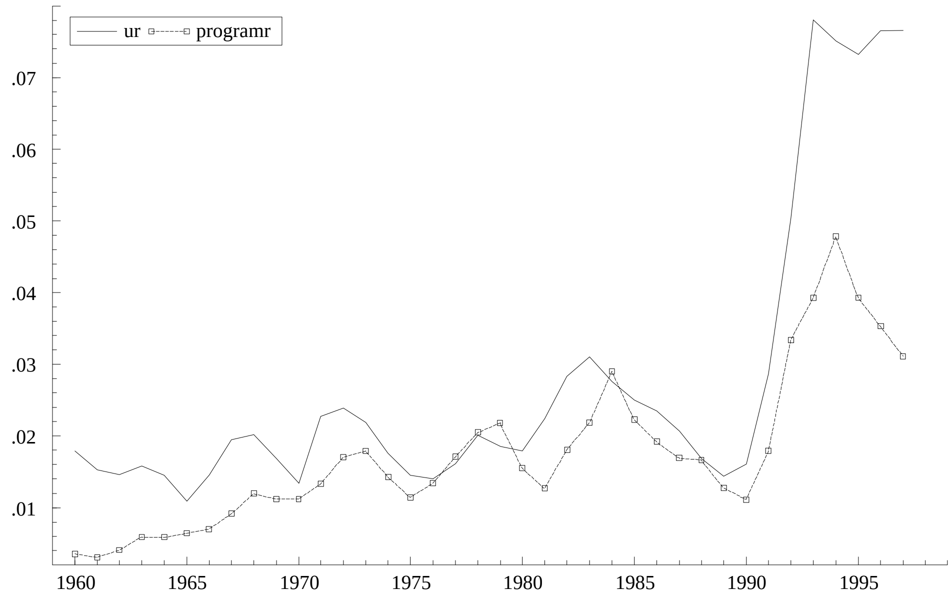

Figure 1: Unemployment (ur) and *ALMPs* (programr) 1960–1997 (share of labour force)

3.1 The model

3.1.1 Wage setting

The general idea behind the wage-setting schedule can be derived from both bargaining and efficiency-wage models. In this presentation we stick to a bargaining framework. A positive relation between the probability of finding a new job for a laid-off union member and the real wage follows in this framework because the value of being laid off increases in the probability of finding a new job.

In terms of observables, this line of reasoning under certain conditions leads to a positive relation between the real wage rate and the employment rate (Calmfors and Lang, 1995; Calmfors, 1994). To fix ideas, we can derive a wage-setting relation such as the following:

$$w = f(n, u + r, \gamma, X_1) \tag{1}$$

where w is the product real wage rate, u unemployment-population ratio, r the programme participation-population ratio, $\gamma \equiv \frac{r}{r+u}$ the fraction of jobless in *ALMPs* and X_1 a vector of other factors influencing wage setting.[11] We expect

[11] This vector will typically include some measure of labour productivity and a tax-price wedge between product and consumption wages. The wage-setting relation presented in *equa-*

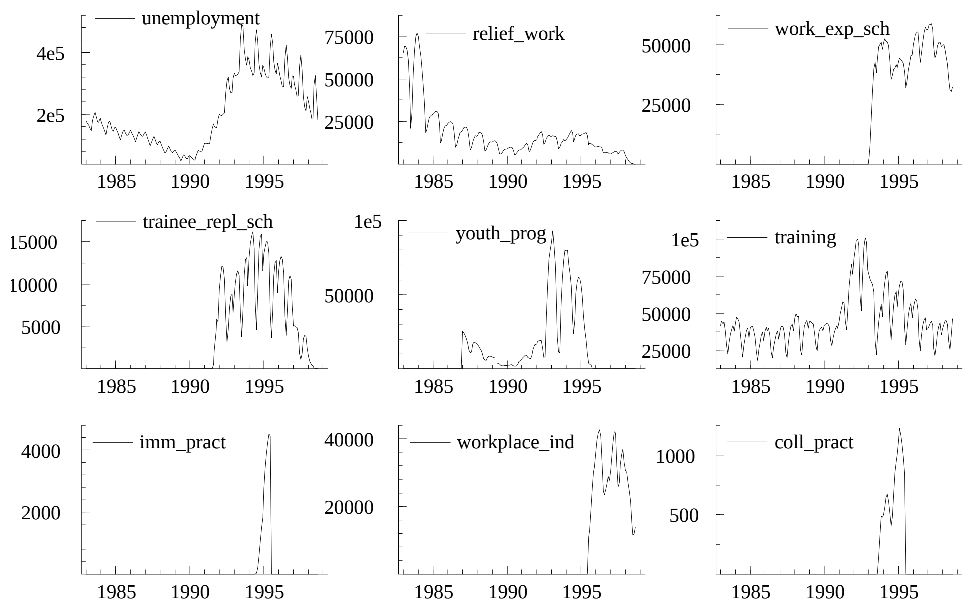

Figure 2: Unemployment and studied *ALMPs* 1983:1–1998:9

the effects to have the following signs:

$$\frac{\partial w}{\partial n} > 0; \; \frac{\partial w}{\partial (u+r)} < 0; \; \frac{\partial w}{\partial \gamma} \lesseqqgtr 0. \tag{2}$$

A higher employment rate, *ceteris paribus*, means a higher probability for a laid-off worker to find a job, which in turn makes high wage demands less costly for the union. The opposite is true for the sum of unemployment and programme participation: more job seekers implies harder competition for available jobs and a lower probability of re-employment for laid-off union members. Finally, the ambiguous sign on the effect of the fraction of programme participants of the jobless reflects two opposing forces. *First*, to the extent that the value of being in a programme is greater than that of being openly unemployed, we would expect the union to push for higher wages as a result. *Second*, to the extent that programme participation contributes to higher search efficiency among the jobless, this would imply harder job competition for laid-off workers and, thus, produce wage moderation.[12]

In our empirical analysis we use data for the Swedish municipalities. We will assume that wage setting at this level is governed by something like *equation (1)*,

tion (1) is slightly non-standard in the sense that employment, unemployment and programme participation are related to the population rather than to the labour force.

[12] See, for example, Calmfors and Lang (1995) or Forslund and Kolm (1999).

with the proviso that a distinction has to be made between local and aggregate labour market variables and that an "outside wage" is one of the determinants of the value for a laid-off worker.

3.2 Labour demand

In our measures of employment we could in principle make a distinction between private sector employment and public sector employment. On the other hand, we cannot observe the sectors of programme participants. Thus, we will look at total employment at the municipality level. The determinants of labour demand in the private and the public sectors are potentially different, so we discuss them separately.

3.2.1 Private sector demand

To simplify the exposition, we derive a labour demand schedule for the private sector under the assumption of perfect competition in the product market.[13] Consider a competitive firm producing a single homogeneous output (y) using capital (K) and two categories of labour (N_1 and N_2) under constant returns to scale. We let N_1 denote employment of unsubsidised labour, whereas N_2 represents subsidised employment.

We are first interested in finding the response of labour demand to a change in the price of subsidised labour.[14] Analytically, this can be decomposed into two steps: *first*, we derive the optimal labour input at a given level of output. *Second*, the optimal output level will generally depend on factor prices. Thus, the response of optimal labour input to a change in the subsidy of subsidised labour will be the sum of a substitution effect at a given output level and a scale effect,

$$\frac{\partial N_1}{\partial w_2} = \left.\frac{\partial N_1}{\partial w_2}\right]_{y=const} + \frac{\partial N_1}{\partial y}\frac{\partial y}{\partial w_2}, \qquad (3)$$

where w_2 is the price of subsidised labour.

To be more specific, we assume that the firm's technology can be represented

[13] Qualitatively, little is changed if instead we assume imperfect product market competition and constant-elastic product demand.

[14] Unless the pre-subsidy compensation to subsidised labour changes proportionately to the subsidy and in the opposite direction, increased subsidisation will give rise to a lower cost per unit of subsidised labour to the firm.

by a generalised Leontief cost function[15] exhibiting constant returns to scale,

$$C(\mathbf{w}, y) = c(\mathbf{w})y = y\left[\sum_{i=1}^{3}\sum_{j=1}^{3} b_{ij}(w_i w_j)^{1/2}\right], \tag{4}$$

where $b_{ij} = b_{ji}$ and w_1 and w_3 denote the price of unsubsidised labour and capital, respectively. Using Shephard's lemma, labour input is obtained by differentiating *equation (4)* with respect to w_1:

$$N_1 = y\left[b_{11} + b_{12}(w_2/w_1)^{1/2} + b_{13}(w_3/w_1)^{1/2}\right]. \tag{5}$$

Thus, for given output, the demand for labour depends on the parameters of the technology (b_{ij}) and relative factor prices. The cross-price elasticity for the two types of labour, holding output constant, is consequently given by

$$\varepsilon_{12} = \frac{1}{2}\frac{b_{12}(w_1/w_2)^{-1/2}}{b_{11} + b_{12}(w_2/w_1)^{1/2} + b_{13}(w_3/w_1)^{1/2}}. \tag{6}$$

As the denominator is non-negative, the sign of the elasticity depends on the sign of b_{12}. For substitutes, this entity is positive. Furthermore, the closer substitutes the two types of labour are, the larger the absolute value of the elasticity is. For close substitutes at a given level of output, we would consequently expect quite a large decline in the demand for unsubsidised labour following a drop in the price of subsidised labour. Thus, for example, to the extent that subsidised and unsubsidised youth labour are close substitutes, we would expect that youth programmes are likely to be associated with substantial displacement of regular youth employment.

The Hicks-Allen (partial) elasticity of substitution for the generalised Leontief technology can be written

$$\sigma_{12} = \frac{b_{12}(w_1 w_2)^{1/2}}{2 s_1 s_2}, \tag{7}$$

where s_1 and s_2 are the factor shares of gross output of factor 1 and factor 2 respectively.

We now consider the scale effect by looking at an industry of identical firms, each equipped with the same constant-returns technology. For the whole industry, cost is given by

$$\sum y^j c(\mathbf{w}) \equiv Y c(\mathbf{w}), \tag{8}$$

[15] The generalised Leontief cost function is a flexible functional form that can be seen as a local second-order approximation to an arbitrary cost function, see Diewert (1974). One of its characteristics is that it, in contrast to the CES function, does not impose any restrictions on elasticities of substitution. The function can be generalised to include an arbitrary number of inputs. Textbook treatments of labour demand using a generalised Leontief specification can be found in Berndt (1990) and Hamermesh (1993).

where $\mathbf{w}$ is the vector of factor prices, $\mathbf{w} = (w_1, w_2, w_3)$. Using Shephard's lemma, industry demand for unsubsidised labour is given by

$$N_1 = c_{w_1}(\mathbf{w})Y. \tag{9}$$

In equilibrium, a zero-profit condition implies

$$p = c(\mathbf{w}), \tag{10}$$

where p is the industry's output price. Furthermore, in equilibrium demand equals supply,

$$Y = Y^d(p), \tag{11}$$

where the demand for industry output, $Y^d(p)$, (for simplicity) is assumed to depend on the industry price only. Substituting *equations (10)* and *(11)* into *equation (9)* gives aggregate demand for unsubsidised labour as

$$N_1 = Y^d(c(\mathbf{w}))c_{w_1}(\mathbf{w}). \tag{12}$$

To find the labour demand response to increased subsidisation, we differentiate *equation (12)* with respect to w_2:

$$\frac{\partial N_1}{\partial w_2} = \frac{\partial Y^d}{\partial p} c_{w_2} c_{w_1} + Y^d c_{w_2 w_1}. \tag{13}$$

Multiplying this expression by w_2/N_1, we get an expression for the total cross-price elasticity:

$$\varepsilon_{12}^* = \eta \frac{w_2 N_2}{pY} + Y \frac{\partial N_1}{\partial w_2 Y} \frac{w_2}{N_1} = \eta \frac{w_2 N_2}{pY} + \varepsilon_{12}, \tag{14}$$

where ε_{12}^* denotes the total cross-price elasticity, including the scale effect; η the price elasticity of demand and ε_{12} the cross-price elasticity at constant output. Defining factor shares in the natural way, *equation (14)* can be rewritten as

$$\varepsilon_{12}^* = s_2(\eta + \sigma_{12}), \tag{15}$$

where σ_{12} is the Hicks-Allen partial elasticity of substitution. Thus, the greater the share in output of subsidised labour, the greater the elasticity of product demand and the greater the elasticity of substitution, the more sensitive demand for unsubsidised labour is for subsidies to the subsidised labour input.[16] One implication of the first of these implications is that we would, *ceteris paribus*,

[16] It is straightforward (but somewhat messy) to substitute the expressions for the factor share and the elasticity of substitution obtained from the generalised Leontief function into *equation (15)*.

expect more displacement from expanding an already large programme by a certain number of persons than from launching a new programme involving the same number of persons.

In our data, we are not given the price of subsidised labour, but rather the number of participants in different *ALMPs*.[17] The question, then, is how applicable the results regarding the effects of changes in the rate of subsidisation are for the analysis in terms of the effects of the number of programme participants on regular employment. One way of analysing this would be to repeat the analysis above under an assumption that firms are forced to accept an exogenously given number of programme participants. Without going through all steps, it can be shown that the cost function for a generalised Leontief cost function with subsidised labour fixed can be written[18]

$$C(\mathbf{w},y,N_2) = \left[\sum_i \sum_j b_{ij}(w_i w_j)^{1/2}\right] y + b_{N_2}\left(\sum_i w_i\right) N_2. \tag{16}$$

Hence, Shephard's lemma immediately gives cost minimising demand for unsubsidised labour as

$$N_1 = \left[\sum_j b_{1j}(w_j/w_1)^{1/2}\right] y + b_{N_2} N_2. \tag{17}$$

To be well-behaved, the cost function must be decreasing in N_2, which means that b_{N_2} must be negative and hence regular employment decreasing in the volume of subsidised labour. Generally speaking, the message from *equation (17)* is that demand for regular labour will depend on all relative factor prices of variable factors and (negatively) on the amount of subsidised labour at a given level of output. On top of this, there will also be a scale effect of the kind discussed above.

Dynamics The framework outlined above is static. For a number of standard reasons we may expect employment to adjust sluggishly to its equilibrium level, in which case the previous analysis at most would be valid in steady state equilibrium. Although it is straightforward to extend the analysis in such a direction by introducing various types of adjustment costs, we will not do so.[19] We will instead point to another extension that may be more important in an analysis of the effects of *ALMPs*. Consider an equilibrium matching model of the Pissarides (1990) type. In such a framework "labour demand" will manifest itself through

[17] In addition, we observe neither output nor capital stocks.

[18] See Hansson (1991), where a version of the Generalised Leontief cost function including quasi-fixed inputs, generalising Diewert and Wales (1987), is presented.

[19] See, for example, Hansson (1991) or the analysis in Morrison (1988).

firms' posting of vacancies. Vacancies will be posted as long as they are associated with a non-negative profit. In the presence of vacancy costs, the shorter the expected time to fill a vacancy is, the more vacancies it is profitable to post. If one effect of *ALMPs* is to "lock in" potential job searchers, this will contribute to a longer expected duration of vacancies, and hence to fewer vacancies. This, in turn, is equivalent to an inward shift of labour demand.[20]

3.2.2 Municipal labour demand

If one sets out to investigate the displacement effects of *ALMPs* on total employment, it might be important to recognise that most local governments in the western world are large employers and hence constitute a large share of total employment. This pattern is especially pronounced in the Scandinavian countries. In Sweden, for example, the total local government sector[21] accounts for about 30% of total employment in the economy. The corresponding figure for the municipalities is about 20%, and wages and payroll taxes constitute approximately 50% of municipal expenditures. This makes the local governments in Sweden the largest single employer in the economy.

The fact that the local governments are such large employers constitutes no problem as long as private and local government labour demand are governed by the same decision-making process. There are, however, reasons to believe that other factors govern local government labour demand than private sector labour demand. While a private company typically maximises a profit function, the local government outcome is typically determined through a political process.[22]

Theoretical framework: Median voter model When studying the behaviour of local governments, individual preferences must somehow be translated into a single choice at the municipality level. Ever since Arrow formulated the Impossibility Theorem, public finance economists have been aware of the fact that aggregating preferences is a tricky business. However, under certain assumptions (e.g. single-peaked preferences, a single majority voting system and a one-dimensional policy question (a single public service)) these problems can be overcome. It turns out that, if these assumptions hold, the winning proposal in a majority vote will be the proposal made by the voter with the median position in preferences. This was first stated by Hotelling (1929) and later developed by Bowen (1943) and Black (1958). The median voter model has become the most common behavioural specification used when modelling the decision making pro-

[20]See Calmfors and Lang (1995) and Calmfors (1994).

[21]The total local government sector in Sweden is made up of the municipalities and the counties. In this paper we focus our interest on the municipalities, whose main responsibilities are day care, elderly care and schooling.

[22]So is, of course, also central government labour demand. It is, however, of such a small magnitude that we do not analyse it here.

cess at the local government level, and, to fix ideas, we will in this paper follow this tradition and base our discussion on the median voter model.

Let us investigate the median voter's optimisation problem in municipality $i = 1, ..., M$ in time period $t = 1, ..., T$. The preferences of the median voter are assumed to be captured by the function

$$U_{it} = U\left(X_{it}, e_{it}; Z_{it}\right), \tag{18}$$

where $U(\cdot)$ is a quasi-concave utility function, X_{it} a composite private good (with a price normalised to one), $e_{it} = E_{it}/N_{it}$ per capita local public provision of a private good, and Z_{it} is a vector of socio-economic characteristics. The median voter maximises the utility function subject to two budget constraints (his or her individual budget constraint as well as the municipality's budget constraint) and the municipality's production function. First, the level of private consumption cannot exceed the median voter's disposable income

$$X_{it} = \left(1 - t_{it}\right) y_{it}^{m}, \tag{19}$$

where t_{it} is the local tax rate and y_{it}^{m} the median voter's (before tax) income. Furthermore, maximisation is constrained by the municipality's budget constraint

$$t_{it} N_{it} \bar{y}_{it} + G_{it} = w_{it} N_{it}^{d}, \tag{20}$$

where N_{it} is the number of inhabitants in municipality i in period t, $\bar{y}_{it}$ the mean individual (before tax) income, G_{it} intergovernmental grants received by the municipality, w_{it} the wage rate received by individuals employed by the municipality, and N_{it}^{d} municipal employment needed in order to supply E_{it}.[23] Solving *equation (20)* for the local tax rate, and substituting into *equation (19)* yields the median voter's budget constraint as

$$X_{it} = y_{it}^{m} - \tau_{it}\left(w_{it} n_{it}^{d} - g_{it}\right), \tag{21}$$

where g_{it} is intergovernmental grants per capita and $\tau_{it} = \frac{y_{it}^{m}}{\bar{y}_{it}}$ is the tax price paid by each median voter.[24] The tax-price is to be interpreted as the marginal cost, in terms of increased tax payments, facing the individuals for an additional unit of

[23] Here we abstract from capital inputs and simply assume that the only input needed in the supply of E is labour, that is, we assume that the production function takes the form $e_{it} = f(n_{it}^{d})$ in per capita terms. This assumption is perhaps not too unrealistic having the types of services municipalities supply in mind.

[24] There is a literature which claims that people employed by the municipality to a larger extent vote for higher municipal expenditures than people not employed by the municipality (see, e.g., Courant, Gramlich, and Rubinfeld (1979)). In relation to this it might be noted that we assume that the median voter is not employed by the municipality, an assumption which probably is fulfilled.

the publicly provided good. Substituting *equation (21)* and the production function $e_{it} = f\left(n_{it}^d\right)$ into the utility function *(18)* yields the following maximisation problem

$$\max_{n^d} U = U\left[y_{it}^m + \tau_{it}\left(g_{it} - w_{it}n_{it}^d\right), f\left(n_{it}^d\right)\right]. \tag{22}$$

The maximisation problem *(22)* yields a demand function for municipal employment given by

$$n_{it}^{d*} = h\left(y_{it}^m, g_{it}, \tau_{it}, w_{it}; z_{it}\right). \tag{23}$$

Dynamics Earlier studies in the literature on local public expenditures indicate some kind of dynamic behaviour of local governments (see, e.g., Holtz-Eakin and Rosen (1991) on US data, Dahlberg and Johansson (1997; 1998) on Swedish data, and Borge and Rattsø (1993; 1996) and Borge, Rattsø, and Sørensen (1996) on Norwegian data). Incorporating dynamics into the median voter model is by no means easy, since the identity of the median voter might change over time. An alternative is to introduce dynamics by combining the static median voter model with a partial adjustment rule. Since it is likely that municipalities may not adjust labour freely, due to labour market regulations and hiring costs, we would expect actual employment to deviate from the one optimal in a static framework. Our dynamic formulation separates the desired amount of employment $\left(n_{it}^{d*}\right)$ from actual employment $\left(n_{it}^d\right)$ for each year. The desired level of employment is determined by *equation (23)*, whereas the relationship between the desired and the actual level of employment is formulated as a partial adjustment process. The actual change between periods t and $t-1$ is a fraction, λ, of the desired change

$$n_{it}^d - n_{it-1}^d = \lambda\left(n_{it}^{d*} - n_{it-1}^d\right). \tag{24}$$

The adjustment coefficient λ, hence, measures the sluggishness of local government responses to changing desired demand: the smaller the value of λ, the stronger the sluggishness.

Substituting *(23)* into *(24)* yields actual employment as

$$n_{it}^d = \lambda f\left(y_{it}^m, g_{it}, \tau_{it}, w_{it}; z_{it}\right) + (1-\lambda)\, n_{t-1}^d. \tag{25}$$

3.2.3 Bergström, Dahlberg, and Johansson (1998)

In their study on municipal labour demand, Bergström, Dahlberg, and Johansson (1998) used the number of employed[25] by the municipalities. Apart from the key regressors given by the theoretical model (median income, intergovernmental grants from the central government, the tax price (median income over

[25]Employed in terms of full time equivalents.

mean income), and the wage in the local public sector), they used the following variables to capture the socio-economic structure in the municipalities: Share of inhabitants younger than 16 years of age, share of inhabitants older than 80 years of age, and a dummy variable capturing political preferences (taking the value of 1 whenever a municipality is governed by a socialist local government, i.e. $S+V$ constituting a majority, and zero otherwise). It turned out that the demographic structure was an important determinant of municipal labour demand, which is not surprising given the types of services provided by the municipalities. Furthermore, they found that the adjustment process was quite sluggish: only 60% of the desired change in municipal employment was implemented during the first year.

3.3 Direct displacement

Let us now return to the issue of direct displacement effects of *ALMPs*. We have discussed the wage-setting relation as well as labour demand. We have not, however, clarified the issue of what should be considered direct displacement and how, in principle, it could be measured. To achieve this, we use a figure from Calmfors (1994), which is a graphical illustration of the ALMP-adapted Layard-Nickell model discussed above.

In *Figure 3,* the real wage is measured along the vertical axis and the regular employment rate (share of the working age population) is measured along the horizontal axis. In accordance with the discussion in *Section 3.1.1* we expect the wage rate to increase in the regular employment rate, illustrated by the positively sloped *WS* (Wage Setting) schedule. The vertical *FE* line corresponds to full employment, here for simplicity assumed to be independent of the wage rate. The distance between the *FE* line and the *RR* line corresponds to the proportion of the working age population participating in *ALMPs* (the distance r). The negatively sloped line (*RES*) is the regular employment schedule, indicating the demand for unsubsidised labour. Equilibrium obtains at the intersection of the *WS* and *RES* schedules, where wage-setting and employment decisions are consistent. In the absence of *ALMPs*, the fraction $u+r$ would be openly unemployed in equilibrium, but *ALMPs* take the fraction r out of open unemployment.

The volume of regular employment is the outcome of decisions in both the private and the public sector. One of the upshots of the discussion in *Sections 3.2.1* and *3.2.2* is a prediction that both private and public sector demand in terms of the *number* of persons will depend negatively on the real wage rate. In principle, there is no complication involved in expressing labour demand in *per capita* form instead, as in *Figure 3,* as long as all "numbers" of persons are turned into the same per capita form.[26]

[26]There is, however, a complication related to the empirical analysis. Our prime interest is in the number of persons crowded out of regular employment by *ALMP* participants. We

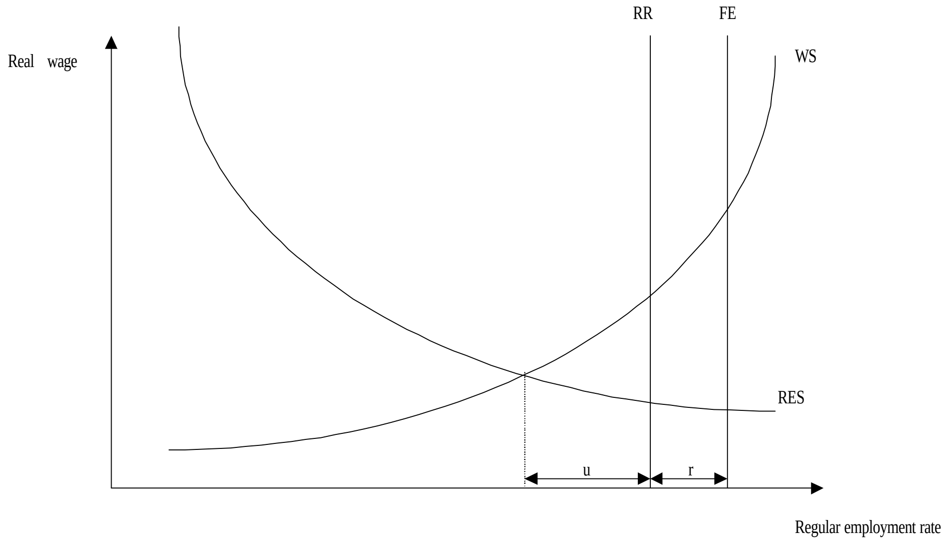

Figure 3: Modified Layard-Nickell model

We want to make a distinction between direct and indirect displacement, where the latter is displacement resulting from any wage-raising effects *ALMPs* may have. Thus, direct displacement is here defined as any displacement that takes place at a given real wage. Our approach in the empirical work is to condition on our wage measure, and interpret estimated employment changes conditional on the real wage as shifts in the *RES* schedule. Consequently, estimated employment effects of *ALMPs* at a given real wage will be our empirical measure of direct displacement.

employ data for the Swedish municipalities. To the extent that *ALMPs* affect inter-municipality migration, relating employment and programme participation to the municipality population may produce biased estimates of the number of persons displaced. These considerations lead us to use the lagged population instead of the current as our main alternative in the estimations.

3.3.1 Expected employment effects of different *ALMP* measures

What, if anything, do we expect about the *ALMP* effects on regular employment against the background of the description of the different labour market programmes and labour demand in the private and the public sector? We look at this issue by programme. First, however, there is one important caveat to notice. Ideally, given information on participation by sector, we could estimate sector-specific displacement for the different programmes. Such information is, however, available only on an *ad hoc* basis. Due to this, we are obliged to estimate aggregate employment relations.

Relief work Since relief workers perform ordinary work and are paid according to collective agreement, and the wage subsidy is at most 50%, we would expect this set-up to generate crowding out. Displacement effects are also found in previous empirical work by Gramlich and Ysander (1981), Forslund and Krueger (1997) and Forslund (1996), where the two former studies find significant displacement in building and construction (but not in health care, day care and care for the elderly) and the latter finds overall crowding out.

Training Persons undergoing training are not supposed to work, so we would not expect (significant) displacement. There are, however, some indications that trainees actually have been performing regular work.[27] In addition, to the extent that training locks in potential job seekers, we would expect fewer vacancies to be announced, and hence employment to be lower, see *Section 3.2.1.* Forslund (1996) finds some indication of crowding out effects of training.

Youth programmes Most types of youth programmes have given employers access to free or cheap young workers. Although, if one goes by the book, the programme rules have stipulated some training content, survey results seem to imply that the programmes to some extent have been viewed as "free labour" with little training content (Hallström, 1994; Schröder, 1995). Skedinger (1995), Forslund (1996) and Edin, Forslund, and Holmlund (forthcoming 1999) find strong evidence that youth measures crowd out regular employment, especially regular youth employment.

Work experience schemes Participants in work experience schemes are supposed to perform tasks that would otherwise not have been performed, and a

[27] This seems to have been the case with training in newly established firms or in training in connection with the expansion of firms, where an analysis by the National Labour Market Board (AMS, 1996) indicates that trainees have performed regular duties. One might speculate that this kind of abuse became more likely in connection with the very rapid expansion of training programmes in the early 1990s.

large fraction of the programmes have taken place in the private non-profit sector. Taken at face value, these properties of the programme would point to limited displacement effects. On the other hand, the programme expanded very rapidly and there may be some doubts about the possibilities for employment officers to implement the programme as planned against this background (Hallström, 1995). Forslund (1996) found some displacement effects of the programme, although smaller than the ones found for relief work and youth programmes.

Trainee replacement schemes Trainee replacement schemes may give rise to displacement effects to the extent that the employers (mainly municipalities) using the programme have let the "replacing" worker perform duties that would otherwise have been performed by somebody else than the person replaced (the trainee). This could be the case if, for instance, the trainee is training to become a nurse because of risk of losing a job as a nurse's assistant. The point estimate in Forslund (1996) indicated 40% displacement, but the effect was very imprecisely estimated.

Workplace induction Workplace induction resembles both relief work and youth programmes (which the programme replaced in 1996) a lot, and, consequently, we expect this measure to be associated with similar effects as those programmes.

Practice for immigrants, practice for college graduates The set-up of practice for immigrants and practice for college graduates is very similar to that of youth practice, and, hence, we expect them to be similar with respect to displacement effects.

In the empirical analysis we use relief work and training separately and combine the other five programme groups into one group (which we label "other programmes").

4 Regional allocation of *ALMP* expenditures

As a background to the econometric specification of displacement models, a brief discussion of the allocation of grants for *ALMPs* is useful. The discussion here is based on the principles during the fiscal year 1994/95 (AMS, 1994). First, a discretionary decision about the total size of spending on *ALMPs* is taken by the central government, which also lays down the legal framework for the different policy measures. This has meant that the menu of available policy measures has been decided at the central level, although the system has become more decentralised in this respect over the past few years. Occasionally, targets for the total volumes of different programmes are also specified by the central government.[28]

Given total spending, the National Labour Market Board decides how to allocate grants over regional labour market authorities at the county level. This is done according to a number of principles. *First*, total expenditure is split into two equally sized parts, "*basic grants*" and "*market determined grants*". In a *second* stage these two categories of grants are further allocated in the following way: 10% of the basic grants is distributed equally over the 24 counties and another 10% between 111 local labour markets. The rest of the basic grants is distributed according to population in ages 16–64. The market determined grants are allocated by county mainly according to the number of job seekers in the county in the previous fiscal year (openly unemployed and *ALMP* participants), but also according to a summary measure of the service level of the employment service.[29]

If we translate this into *ALMP* spending per capita in ages 16–64, the principles above imply that such spending will be increasing both in past unemployment and past *ALMP* participation. Thus, given the level of total spending on *ALMPs*, past unemployment and past total *ALMP* participation in a county would be suitable instruments for total county spending on *ALMPs*. What we have in our model is, however, the number of persons in different policy programmes at the municipality level. We are not aware of formalised rules determining spending within counties of the same kind as between counties. We would, however, suspect that similar factors determine allocation over municipalities as over counties.

5 The data

5.1 Data sources and sample selection

Our data derive from two basic sources: A register from Statistics Sweden (ÅRSYS) provides information on employment by industry, age group and municipality, associated annual labour incomes, also by industry, age group and municipality and population by age group and municipality. This register is available from 1985 and the employment and population figures refer to November each year. Information on *ALMP* participation and unemployment has been collected from sources at the National Labour Market Board, where it has been made available on a monthly basis. For relief work and labour market training, data go back to before 1985. For the rest of the programmes, with the exception of youth pro-

[28]This has, for example, been the case over the past few years, when a central policy objective of the government has been to reduce open unemployment to half its mid 1990s level.

[29]To be precise, the weights are the following: Population share: .4; County share: .05; Local labour markets: .05; Inflow of job seekers*(inflow of unemployed persons as a fraction of the labour force): .4; Inflow of job seekers*service level factor: .1.

grammes, subsidised self employment and recruitment subsidies, we have data from the point in time at which they have been introduced. For recruitment subsidies, which were introduced in 1983(?), and for subsidised self employment, we have no information before 1995. Thus, these programmes are excluded from our analysis.[30] For youth programmes, our information goes back to 1987. This defines the starting point for our analysis.

Due to the creation of new municipalities during the period under study, a number of municipalities have been dropped.[31] Furthermore, some municipalities that had missing observations on relief work were dropped.[32] This leaves us with a balanced panel of 260 municipalities per year for a ten-year period, from 1987 to 1996.[33] We see no *a priori* reason to believe that this attrition is systematic with respect to the displacement effects of *ALMPs* and, thus, no reason to expect selection bias.

5.2 Definitions of variables

The basic measure of employment is the number of employed persons less the number of those employed in such *ALMPs* that are recorded as employed in the employment statistics (relief workers and participants in trainee replacement schemes). The natural variable to use is the *number* of persons. The municipalities are, however, very far from equally sized, so we have decided to normalise the number of employed persons by the municipal working-age population (ages 18 – 65) in our baseline estimates. The same normalisation is applied to participation in *ALMPs*. An alternative would be to instead normalise by the municipal labour force. The drawback with this latter normalisation is that, to the extent *ALMPs* increase labour force participation, we would get an upward biased estimate of the number of persons crowded out by the programmes. The same problem is present to some extent also regarding the working-age population to the extent that programme participation affects migration. However, we judge this problem to be less serious. Nevertheless, we use the one year lagged population rather than the current level in our baseline estimations.

From the exposition in *Section 3.2* it is clear that we need a measure of the wage rate for unsubsidised labour. Unfortunately, there is no wage rate available at the municipal level, so we have had to settle for the average annual labour income among those employed by municipality instead. As we will (primarily)

[30] Of course, we would have liked to include these programmes. On the other hand, their quantitative importance has been limited.

[31] The municipalities dropped for this reason are 461 (Gnesta), 488 (Trosa), 480 (Nyköping), 1535 (Bollebygd), and 1814 (Lekeberg). Gnesta and Trosa were created in 1992. They were earlier parts of Nyköping. Bollebygd and Lekeberg were created in 1994.

[32] The municipalities dropped for this reason are 128, 184, 187, 486, 512, 563, 582, 686, 1137, 1162, 1163, 1484, 1527, 1561, 1562, 1622, 1643, 1760, 2029, 2403, 2409, 2462, and 2463.

[33] This is five more years than in the studies by Forslund (1996) and Sjöstrand (1997). They used data for the time period 1990-1994.

exploit the time series variation in the data by estimating fixed effects models, our main concern is that there may be systematic variations over time and municipalities in working time.[34]

Data on programme participation is available on a monthly basis, whereas employment is measured in November each year. The measures of *ALMPs* used in the estimations are computed as 12-month averages running from November the year before until October the current year. We have done so to remedy (at least partially) the obvious simultaneity problem arising because the volume of programmes depends on the labour market situation and, hence, on employment.

In the baseline estimations we have put the *ALMP* measures in three categories: *relief work*, *training* and *other programmes*. Basically, this categorisation is based upon the fundamental distinction between subsidised employment and training. The reason to single out relief work from other kinds of subsidised employment is that it, among the programmes we consider, is most similar to regular employment. Participants are not supposed to undergo training or receive practice: they are supposed to work and receive compensation according to collective wage agreements. It is also interesting to compare the estimated effects of relief work to those found in earlier studies.

Although it would be preferable to study the impact of every single programme, there are compelling reasons not to do so. *First,* the number of programmes is vast, especially in the 1990s, and many programmes have been used for quite a short while. *Second*, we see no natural way to find instruments for the allocation of persons between a large number of programmes. We may even have gone too far in this respect by looking at three categories of programmes.

As another measure to remedy simultaneity problems, we have constructed a proxy for municipality-specific demand shocks. This measure is constructed using a two-digit industry breakdown of employment by municipality. Given this information about the structure of employment, we construct the *demand index* as the change in employment that would obtain between two years given that a municipality had the same employment development by industry as the national change in employment by industry.[35]

We summarise the definitions of the variables used in the empirical analysis in *Table 1.* Descriptive statistics are presented in *Table 9* in the appendix.[36]

[34]Trends in working hours that are common across municipalities is no problem, because such variation is caught by the time dummies we use in the estimations.

[35]The variable corresponds closely to the output term in *equation (17).*

[36]*pop1856* is the population in ages 18–65 in the previous year.

Variable	Definition
n	*(employed-relief work-trainee replacement schemes)/pop1865*
INCOME	*average labour income among those employed* (proxy for wages)
RELIEF WORK	*average number of persons in relief work/pop1865*
TRAINING	*average number of persons in training/pop1865*
OTHER PROGR.	*(workplace induction+practice for immigrants*
	+practice for college graduates
	+work experience schemes
	+trainee replacement schemes+youth programmes)/pop1865
DEMAND	*labour demand proxy/pop1865*

Table 1: Variable definitions

6 Results

6.1 Dynamic model

As we have reasons to suspect both simultaneity problems and measurement errors, we will estimate the model by instrumental variables (IV) methods. Furthermore, time aggregation and sluggish adjustment to the optimal level of employment (due to, e.g., hiring and firing costs) call for some dynamic specification. Therefore, following the discussions in *sections 3.2 and 3.3*, our starting point for an empirical specification is a dynamic model given by

$$n_{it} = \alpha_t + \lambda n_{it-1} + \beta' P_{it} + \gamma' X_{it} + f_i + \varepsilon_{it}, \tag{26}$$

where i denotes municipalities, t years, n_{it} employment, α_t is a time dummy, P_{it} a vector of labour market programmes (i.e.,*RELIEF WORK, TRAINING,* and *OTHER PROGR.*), X a vector of independent variables other than the labour market programmes (i.e., *INCOME*[37] and *DEMAND*), f_i a municipality-specific effect that does not vary over time, ε_{it} is a white noise error term, and λ, β and γ are parameters to be estimated.

When estimating *equation (26)*, we will use the generalised method of moments (GMM) estimator developed by Arellano and Bond (1991).[38] For the results we present in the main analysis, we use variables in levels (i.e. not logged) and normalised with the population aged 18-65, lagged one year, for the years 1987-1996.

[37] To be as consistent with the theory laid out in *Section 3.2.1* as possible, we will use the square root of the income variable.

[38] In addition to simultaneity problems and measurement errors, the use of an IV estimator is needed as OLS in the presence of a lagged dependent variable on the right hand side produces biased estimates (Nickell, 1981).

6.1.1 GMM

The results from the GMM estimation of *equation(26)* are presented in *Table 2*.[39] In addition to lags of the variables included in *equation (26)*, we use three additional variables as instruments. First, we use the unemployment rate, here measured as the average number of unemployed persons during the last 12 months normalised with the working-age population, in earlier periods. This follows from the details of the allocation of spending on ALMPs in *Section 4*: against this background it seems reasonable to assume that today's level of programme participation is a function of yesterday's unemployment rates. Second, we use a variable characterising the political majority in the municipal council (*POLITICAL MAJORITY*).[40] The idea is that parties with different ideological preferences push for the use of active labour market programmes to different extents. Third, we use tax equalising grants that the municipality receives from the central government. The level of these grants is a function of a municipality's tax base in the current and in earlier periods, and since the municipalities' tax base in Sweden is almost entirely made up of labour income[41], it seems reasonable to assume that today's level of program participation is a function of today's and yesterday's tax base.[42]

Turning to the estimation results, we can first note that the Sargan test rejects

[39] Notes to *Table 2*: i) The GMM estimates were obtained using DPD for Ox 2.00. For a description of the programs, see Doornik (1998) and Doornik, Arellano, and Bond (1999); ii) Standard errors are computed using the asymptotic standard errors, which are obtained using a heteroscedasticity-robust estimator of the variance-covariance matrix; iii) The AR(1) - AR(2) tests are reported as the test statistics for first- and second order serial correlation in the residuals in first differences in the GMM2 estimation. These statistics are each supposed to be asymptotically standard normal under the null of no serial correlation; iv) A constant and time dummies are included in all regressions; v) Sargan(1) (Sargan(2)) gives the p-value of the Sargan test of the over-identifying restrictions (validity of instruments) in the GMM1 (GMM2) estimation. Under the null of valid instruments, the Sargan statistic is asymptotically distributed as chi-squared with (p-k) degrees of freedom, where p is the number of moment conditions and k is the number of coefficients estimated; vi) The set of instruments includes; political majority and tax equalising grants (both in first-difference form), n (in levels, lags 3-6); INCOME, UNEMPLOYED, RELIEF WORK, TRAINING, OTHER PROGR., and DEMAND (in levels, lags 1-6); the constant and the time dummies.

[40] *POLITICAL MAJORITY* = 1 if the municipal council is run by a socialist majority, 0 otherwise. The use of this kind of instrument is suggested by Calmfors and Skedinger (1995).

[41] In Sweden, approximately 99% of the taxes raised at the municipal level derive from income taxation.

[42] For the results presented in the paper, we have used a maximum of six lags on the instrumental variables. We have estimated models where we have had everything from a maximum of five lags to all available lags. The results are very stable over these different specifications (both in terms of specification tests and in terms of coefficient estimates). The most notable exception is that the Sargan test rejects the model specification when we have a maximum of four lags. In accordance with theory, the AR(1) tests always rejects the null while we with the AR(2) tests never can reject the null at a five percent significance level. The estimation results for these different specifications are available upon request.

instrument validity/model specification in first step (Sargan(1)) but that instrument validity/model specification cannot be rejected in second step (Sargan(2)). Further note that we reject absence of first order serial correlation in the residuals (AR(1) is significant), but that we cannot reject the absence of second order serial correlation (AR(2) is not significant). This is in accordance with theory.[43] The test results thus indicate that we shall rely on the second step estimates.

All independent variables are significant, even though some care must be taken for *TRAINING* since it is insignificant in the first step and there is evidence that the estimated standard errors are downward biased in the second step.[44] The same goes for *RELIEF WORK*, which is only significant at the ten percent level in the first step. The lagged dependent variable has a point estimate of 0.15 and is statistically significant, indicating that it is important to control for dynamics. The sign of the effect of *INCOME* is opposite of the expected if the variable is interpreted as a proxy for the wage. An alternative interpretation may be that the variable instead serves as a measure of the size of the municipality tax base, in which case the model in *Section 4.2.2* predicts a positive relation between *INCOME* and labour demand by the municipality. The point estimates indicate that the short-run displacement effect from *RELIEF WORK* is 0.64, from *TRAINING* 0.16, and from *OTHER PROGR.* 0.66.

	GMM1			**GMM2**		
Variable	**Coeff**	**SE**	**t-ratio**	**Coeff**	**SE**	**t-ratio**
n_{t-1}	0.151	0.059	2.581	0.151	0.009	17.437
$INCOME_{t-1}$	0.007	0.001	4.919	0.007	2.350e-4	31.461
$RELIEF\ WORK$	-0.661	0.382	-1.728	-0.639	0.043	-15.023
$TRAINING$	-0.188	0.143	-1.312	-0.160	0.022	-7.317
$OTHER\ PROGR.$	-0.647	0.159	-4.072	-0.658	0.018	-37.610
$DEMAND$	0.243	0.049	4.982	0.245	0.007	35.097
	Sargan(1)	AR(1)	AR(2)	Sargan(2)	AR(1)	AR(2)
Test	624.46	-6.914	1.512	228.79	-7.842	1.532
p-value	0.000	0.000	0.131	0.399	0.000	0.126

Table 2: GMM estimation of the dynamic model

The long run displacement effects for the estimates in *Table 2* are given in *Table 3*.[45] From *Table 3* we see that the displacement effects of all three labour market programmes are (significantly) higher in the long run compared with the

[43] The estimator assumes absence of serial correlation in the model in levels form. If this is so, getting rid of the fixed effects by first-differencing will induce an MA(1) error term. This will show up as negative first order serial correlation and absence of second order serial correlation.

[44] See, for example, the analysis in Bergström, Dahlberg, and Johansson (1997).

[45] The long run effects were derived by assuming a steady state where all variables assume constant values. The standard errors for the long run displacement effects were obtained by applying the delta-method and using the second step estimates.

short run. The result that displacement effects are larger (in absolute terms) in the long run contradicts the results in Forslund (1996). He ends up with displacement effects that are smaller in the long run, a phenomenon he finds difficult to explain. One explanation might be that he had too few time periods to properly identify the long run properties.

Variable	**Coefficient**	**SE**
RELIEF WORK	-0.756	0.047
TRAINING	-0.188	0.025
OTHER PROGR	-0.774	0.018

Table 3: Estimated long-run effects

6.2 Static model

To get a broader picture, it can be interesting to see some estimation results for the static model. Following the discussion in *Section 3.3*, our empirical specification of the static model is given by

$$n_{it} = \alpha_t + \beta P_{it} + \gamma X_{it} + f_i + \epsilon_{it} \tag{27}$$

with the same notation as in *equation (26)*.

We estimate *equation (27)* by using ordinary least squares (OLS), the fixed effect estimator (FE), and the GMM estimator proposed by Arellano and Bond (1991). The estimation results are presented in *Table 4*.[46] Let us begin by assuming that the $f's$ in *equation (27)* are equal for all municipalities. Applying OLS on pooled data yields the results in the first column of *Table 4*. The results indicate severe displacement effects; relief work, according to the point estimates crowd out well in excess of 100% and even training is estimated to (significantly) crowd out as much as 48% of regular employment. To investigate to what extent this is a result of imposing equal $f's$, we next turn to fixed-effects estimates.

Estimating *equation (27)* by means of the within estimator (hence assuming that there exists municipality-specific fixed effects), yields the results in the second column of *Table 4*. When allowing for fixed effects, the displacement effect of training is approximately the same, while the displacement effect of relief work is significantly lower and the displacement effect of other programmes is significantly higher.[47]

[46] Time dummies and a constant were included in all regressions in *Table 4*. An asterisk denotes significance at the five percent level. For the GMM results, see the notes to *Table 2*.

[47] The assumption of random effects was rejected by a Hausman test. The χ^2-distributed test statistic was 486.3 with 12 degrees of freedom. Furthermore, when testing the significance of the fixed effects, the null of pooling was clearly rejected (F(259,2048) = 4.628). Time dummies and a constant were included in the regression.

The fixed effects estimator requires that all the independent variables are exogenous. Whether this is the case can be tested by means of a Hausman test, testing the null of exogenous regressors. Under the null, the fixed effect estimator is consistent and efficient, but under the alternative it is inconsistent. A GMM estimator is consistent under both the null and the alternative. Carrying out the test (using the GMM estimator suggested by Arellano and Bond (1991)), we obtained a test statistic of 22978 (with 13 degrees of freedom), which clearly rejects the null. Having rejected exogeneity, it is not possible to use the regular fixed effect estimator. We therefore turn to the GMM technique. The GMM results are presented in the last columns of *Table 4*. The test results indicate that we shall rely on the second step estimates. If we compare with the results in the first two columns, we can note that the point estimates for *RELIEF WORK* and *OTHER PROGR.* lies in between the OLS and fixed effects estimates: taken at face value, the GMM estimates indicate that relief work crowd out 98% and other programmes 75%. The most dramatic change is though for *TRAINING*, where the point estimate drops to -0.17 and is insignificant in the first step.

	OLS	**FE**	**GMM1**	**GMM2**
Variable	Coef. (SE)	Coef. (SE)	Coef. (SE)	Coef(SE)
$INCOME_{t-1}$	-5.08e-04*	-.005*	0.008*	0.008*
	(1.15e-04)	(2.72e-04)	(0.002)	(1.91e-04)
RELIEF WORK	-1.157*	-.696*	-0.981*	-0.966*
	(.136)	(.179)	(0.381)	(0.045)
TRAINING	-.480*	-.450*	-0.198	-0.174*
	(.064)	(.077)	(0.153)	(0.021)
OTHER PROGR	-.642*	-.935*	-0.742	-0.757*
	(.063)	(.073)	(0.159)	(0.013)
DEMAND	.979*	.618*	0.313*	0.315*
	(.009)	(.019)	(0.039)	(0.005)
Sargan (p-value)			685.64	228.68
			(0.000)	(0.419)
AR(1) (p-value)			-7.488	-7.455
			(0.000)	(0.000)
AR(2) (p-value)			0.740	0.730
			(0.459)	(0.466)

Table 4: Estimation results for static model

6.3 Time-varying coefficients

Given the rapid changes in the Swedish labour market between the 1980s and the 1990s briefly described in *Section 2.3*, it would not seem far fetched that the employment responses to *ALMPs* may have changed. This could be so both because the total number of job searchers and programme participants increased dramatically and because the programme mix changed substantially. Hence, we have re-estimated the dynamic model (*equation (26)*), allowing the parameters associated with the effect of programmes to vary between the years to see how the parameter estimates for the labour market programmes evolve over time. These estimates are presented in *Figure 4*.[48]

Looking at *Figure 4*, we see that relief work seems to crowd out in the beginning of the period and crowd in during the later years. Training, on the other hand, seems to have had approximately the same displacement effects during the whole period (which, it seems, is more or less equivalent to no effect). The other programmes, finally, seem to have been crowding out regular employment during the whole studied period, with rather severe displacement effects in the beginning of the period.

6.4 Comparisons with earlier work on Swedish data

Löfgren and Wikström (1997) raise two major concerns with earlier Swedish studies on direct displacement effects of active labour market programmes. First, they point out that there were too few time periods for the estimation of a dynamic model (five years) and, second, they have some worries about the consequences of the normalisation by the labour force used by Forslund (1996) (they suggest normalisation by the population instead). While the first concern might be a real problem, the second one concerns more how to interpret the model. This issue will be further explored below, when we set out to investigate what effects these concerns might have had on the results.

To examine how the first point raised by Löfgren and Wikström (1997) might have affected the earlier results, we re-estimate *equation (26)* using only the years 1990–1994, which is the time period used by Forslund (1996) and Sjöstrand (1997). The normalisation is made by the population in the last period. The results are presented in *Table 5*.[49] The first thing to note is that it is very

[48] In these estimations, the coefficients for *INCOME* and *DEMAND* where assumed to be constant over the years. Since we cannot reject the model specification when restricting the coefficients to have the same effects over time, one shall interpret the point estimates of the time-varying coefficients carefully. The interesting thing to note from *Figure 4* is rather the general time pattern for the different *ALMPs*.

[49] The set of instruments includes political majority and tax equalising grants (both in first-difference form), n (in levels, lags 3-6); *INCOME, UNEMPLOYED, RELIEF WORK, TRAINING, OTHER PROGR.*and *DEMAND* (in levels, lags 1-6); the constant and the time dummies. See further notes to *Table 2*.

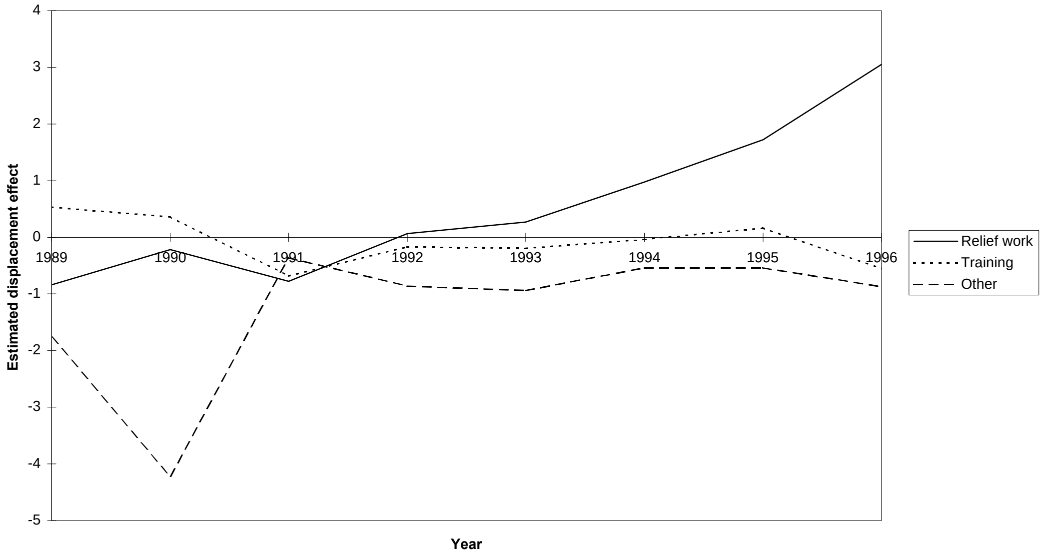

Figure 4: Estimated displacement effects of relief work, training and other programmes 1989–96

difficult to get a well-specified model for this shorter time period. The Sargan statistic rejects the null of valid instruments/correct model specification (which is true for all model specifications we have tried, including, e.g., different lag lengths on the instruments, different combinations of the instruments used in first-differenced and in levels form respectively, and with lags on the other right-hand side variables apart from the lagged dependent variable). This implies that the results are unreliable, and that interpretation must be taken with care. What we see is that most variables are insignificant even in the second step (i.e., even though the standard errors are downward biased in that step). This is, for example, the case for the lagged dependent variable, which it also is in Forslund's (1996) estimation of the dynamic model. A tentative conclusion from these results is hence that it is not suitable to estimate a dynamic labour demand model for such a short time period as five years.

To examine how Löfgren and Wikström's second point might have affected the earlier results presented here, we re-estimate *equation (26)* instead normalised with the labour force. These results are presented in *Table 6*[50]. Before proceeding,

[50] The set of instruments includes: n (in levels, lags 3-7); *INCOME* and *UNEMPLOYED* (in levels, lags 2-7); *RELIEF WORK*, *TRAINING*, *OTHER PROGR.*, and *DEMAND* (in levels, lags 1-7); the constant and the time dummies. See further notes to *Table 2*

		GMM1			GMM2	
Variable	**Coeff**	**SE**	**t-ratio**	**Coeff**	**SE**	**t-ratio**
n_{t-1}	0.151	0.090	1.690	0.085	0.066	1.293
$INCOME_{t-1}$	0.001	0.003	0.423	0.002	0.002	0.899
$RELIEF\ WORK$	0.615	0.838	0.734	0.753	0.552	1.365
$TRAINING$	-0.009	0.218	-0.042	0.080	0.149	0.535
$OTHER\ PROGR.$	-0.196	0.270	-0.725	-0.026	0.187	-0.138
$DEMAND$	0.146	0.087	1.683	0.232	0.069	3.350
	Sargan(1)	AR(1)	AR(2)	Sargan(2)	AR(1)	AR(2)
Test	116.87	-4.135	0.026	74.034	-4.360	-0.134
p-value	0.000	0.000	0.979	0.015	0.000	0.893

Table 5: GMM estimation of the dynamic model for the time period 1990-1994 (effective years of estimation: 1992-1994)

it can be worth stressing that this point is not so much concerned with "right" and "wrong" as with different types of interpretations. If *ALMPs* increase labour force participation *per se*, we would, when normalising with the labour force, by definition get parameter estimates of the *ALMPs* that indicate more crowding out of regular employment than if the normalisation is made with the population. That is, if we get more crowding out when normalising with the labour force than when normalising with the population, this is consistent with *ALMPs* actually increasing labour force participation. However, even though the normalisation was made with the labour force in the earlier studies, this point was never discussed: the parameter estimates were only interpreted in terms of displacement effects. Of course, this also means that if one is only interested in the "pure" displacement effects of *ALMPs*, one shall normalise with the population.

From the results in *Table 6*, it can first be noted that the estimated coefficients for *TRAINING* and *OTHER PROGR.* are significantly larger (in absolute terms) when normalising with the labour force (-0.81 compared to -0.16 for *TRAINING* and -1.25 compared to -0.66 for *OTHER PROGR.*). The parameter estimate for relief work is now positive, but clearly insignificant in the first step. These results indicate that the mere existence of training and other labour market programmes increases labour force participation, while it is less clear what effects relief work has in this respect. It can also be noted that the coefficient for the lagged dependent variable is now insignificant at the five percent significance level in the first step estimates. This is in accordance with Forslund (1996), who also gets an insignificant coefficient for the lagged dependent variable when normalising with the labour force.

The results from the comparisons in this section indicate that the earlier studies on Swedish data might have overstated the displacement effects from labour market programmes (since the normalisation was made by the labour

Variable	GMM1 Coeff	SE	t-ratio	GMM2 Coeff	SE	t-ratio
n_{t-1}	0.044	0.050	0.873	0.043	0.009	5.078
$INCOME_{t-1}$	0.004	0.002	2.284	0.003	3.48e-04	9.993
$RELIEF\ WORK$	0.139	0.270	0.516	0.146	0.023	6.390
$TRAINING$	-0.819	0.118	-6.963	-0.809	0.017	-47.465
$OTHER\ PROGR.$	-1.247	0.151	-8.283	-1.248	0.024	-52.860
$DEMAND$	0.194	0.022	8.837	0.192	0.003	65.270
	Sargan(1)	AR(1)	AR(2)	Sargan(2)	AR(1)	AR(2)
Test	865.27	-6.199	-1.853	240.99	-7.476	-1.887
p-value	0.000	0.000	0.064	0.208	0.000	0.059

Table 6: GMM estimation of the dynamic model. Normalisation made with the labour force

force) and falsely rejected a dynamic model (since they used too few time periods).

6.5 Sensitivity analysis

The main problem with our analysis of displacement, as we have stressed on a number of occasions in this paper, is that we risk capturing the reaction of policies to the labour market situation rather than the effects of *ALMPs* on employment. One way of checking our causal interpretation of the results is to estimate our model in a context where we would not expect any serious displacement effects. More specifically, if there are practically no program participants in a sector, we would not expect any significant crowding out.[51] Thus, we estimate a labour demand equation for a sector where we know that almost no program participants are located— manufacturing of machinery.[52] If our estimates of this alternative model point to severe displacement effects, this would cast serious doubt on our interpretation of the baseline results. The results for manufacturing of machinery are presented in *Table 7*[53].

A comparison between the results in *Table 7* and the baseline results presented in *Table 2* are rather reassuring. Ideally, we would like to see no displacement effects from the *ALMPs* in manufacturing of machinery. This is also in principle what we see. In particular, there is a dramatic change in the estimated coefficient

[51] There may, of course, be indirect effects from programme participants in other sectors, but we expect these to be second-order effects.

[52] This way of strengthening (or weakening) the case for a causal interpretation is discussed in Angrist and Krueger (1998).

[53] The set of instruments includes political majority and tax equalising grants (both in first-difference form), n in manufacturing of machinery (in levels, lags 3-6); *INCOME, UNEMPLOYED, RELIEF WORK, TRAINING, OTHER PROGR.*, and *DEMAND* (in levels, lags 1-6); the constant and the time dummies. See further the notes to *Table 2*

for *OTHER PROGR.*: the point estimate now indicates virtually no crowding out and it is also statistically insignificant in the first step. The coefficient for *RELIEF WORK* indicates some crowding in, but the effect is insignificant. The estimates of the effects of *TRAINING*, on the other hand, indicate significant crowding in (with a point estimate of approximately 0.18). A literal interpretation of this finding could be that training contributes to this sector by training people for it, which creates more jobs by eliminating shortages of workers with certain qualifications.

	GMM1			GMM2		
Variable	**Coeff**	**SE**	**t-ratio**	**Coeff**	**SE**	**t-ratio**
n_{t-1}	0.537	0.072	7.463	0.537	0.002	272.72
$INCOME_{t-1}$	9.762e-04	4.746e-04	2.057	0.001	4.133e-05	23.332
RELIEF WORK	0.092	0.197	0.466	0.098	0.010	10.082
TRAINING	0.177	0.057	3.131	0.175	0.005	34.387
OTHER PROGR.	-0.016	0.048	-0.333	-0.009	0.004	-2.409
DEMAND	0.009	0.014	0.640	0.009	0.001	7.356
	Sargan(1)	AR(1)	AR(2)	Sargan(2)	AR(1)	AR(2)
Test	366.14	-3.305	0.697	227.03	-3.605	0.701
p-value	0.0000	0.001	0.486	0.4309	0.000	0.483

Table 7: GMM estimation of the dynamic model with employment in manufacturing of machinery as dependent variable

While we believe the results in *Table 7* to considerably confirm our interpretation of the baseline estimations, we will do some further sensitivity analysis to investigate how sensitive the estimated displacement effects are to changes in the baseline model specification (as given by *equation (26)*). These results are presented in *Table 8*.[54]

First, it can be interesting to examine what happens if we normalise with contemporaneous population instead of population lagged one period. This is a problem related to inter-municipal migration. If the way people sort themselves among the municipalities is a function of *ALMPs*, the contemporaneous population is endogenous and hence inappropriate to use when normalising the regressors. One way of reducing this problem is to normalise with lagged population,

[54]We could not reject the model specifications in any of the models presented in *Table 8*. The full results are available upon request. Some notes to *Table 8*: (i) The reported estimates are from the second step; (ii) an asterisk denotes a coefficient that is significant in both steps (at the 10% significance level); (iii) The model specifications considered are: I: Normalisation made with contemporaneous population; II: Controlling for the demographic structure (fraction young and fraction old); III: Controlling for the political situation; IV: Controlling for tax equalising grants; V: Controlling for the variables in II-IV simultaneously; VI: Controlling for contemporaneous income; VII: Controlling for lagged right-hand side variables in addition to the lagged dependent variable; (iv) For further notes, see *Table 2*.

thereby making the denominator of the regressors exogenous. When normalising with contemporaneous population, we see from the results, presented in column I, that we get less displacement effects from relief work and more displacement effects from training and the other programmes.

Second, relating to the discussion in *sections 3.2.2* and *3.2.3* about municipal labour demand, it might be worth trying tax equalising grants received by the municipality, the demographic structure and the political situation in the municipality as regressors in addition to the ones used in *Table 2*. These results, presented in columns II-V, are very similar to our baseline estimates.

Third, what happens if we use contemporaneous income? From the results, presented in column VI, we note that not much is changed compared to the baseline analysis.

Finally, what happens if we use lags on the right-hand side variables in addition to the lagged dependent variable? The results, presented in column VII, show displacement effects similar to those in the baseline analysis.[55]

Overall, the sensitivity results in *Table 8* indicate that our baseline results, presented in *Table 2*, are very robust to different model specifications. *OTHER PROGR.* always has a significant effect, and the point estimates indicate a displacement in the order of 50-80 percent (with 66 percent in the baseline case). *RELIEF WORK* displaces to the same extent as *OTHER PROGR.*, but does not always have a significant effect. *TRAINING*, finally, does not seem to (significantly) displace any regular employment.

Variable	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
RELIEF WORK	-0.349	-0.730*	-0.635*	-0.639*	-0.736*	-0.602	-0.523
TRAINING	-0.362*	-0.121	-0.159	-0.161	-0.114	-0.105	-0.184
OTHER PROGR.	-0.759*	-0.502*	-0.657*	-0.659*	-0.493*	-0.661*	-0.822*

Table 8: Estimated displacement effects under different model specifications (comparisons to be made with the results in *Table 2*)

7 Conclusions

In this paper we set out to investigate the direct displacement effects of active labour market programmes (*ALMPs*). We use a panel of 260 Swedish municipalities observed over a ten year period (1987-1996). Compared to earlier studies, we use more years, which facilitates the identification of any potential dynamics, we cover the recession in the Swedish economy during the first half of the 1990s, and we have more instruments (to ease the identification of the parameter estimates) and more explanatory variables (to use in the sensitivity analysis).

[55] The results presented are the short run dynamics.

We have put down a lot of efforts to avoid the potential problems of simultaneity problems, measurement errors, time aggregation, and hiring and firing costs. We have, e.g., done so by using instrumental variables techniques, dated the number of program participants (12-month average) to the year preceding the month in which employment is measured (November), constructed a proxy for municipality-specific demand shocks, and used dynamic specifications.

We extract three main conclusions from the analysis in this paper. *First*, there are direct displacement effects from those *ALMPs* that generates subsidised labour, but there seems to be no (significant) displacement effects from training. The displacement effect from the "other programmes" (which is the sum of persons enrolled in workplace induction, practice for immigrants and for college graduates, work experience schemes, trainee replacement schemes, and youth programmes) is rather severe: 66 per cent according to the baseline estimation. The displacement effect from relief work is 64 per cent in the baseline estimation, but this effect is not as precisely measured as that for the "other programmes". Regarding the estimated displacement effect from relief work, it can be noted that it is smaller than shown in earlier studies. One potential explanation for this is that the number of persons enrolled in relief work is lower in the period under study in this paper than in periods analysed in most earlier studies.

Second, training and other labour market programmes increases labour force participation, while it is less clear what effects relief work has in this respect. The logic behind this conclusion is as follows. If *ALMPs* in themselves increase labour force participation, we would, when normalising with the labour force, by definition get parameter estimates of the *ALMPs* that indicate more crowding out of regular employment than if the normalisation was made with the population. That is, if we get more crowding out when normalising with the labour force than when normalising with the population, this is consistent with *ALMPs* actually increasing labour force participation. And this is precisely what we find for training and other labour market programmes: the estimated coefficients are -0.81 compared to -0.16 for training and -1.25 compared to -0.66 for the "other programmes". The parameter estimate for relief work indicate crowding in, but insignificantly so. Of course, this finding is another possible explanation to why the estimated displacement effect from relief work is smaller than shown in earlier studies since the earlier studies normalised with the labour force.

Even though the earlier studies normalised with the labour force, no discussion was made that a possible implication might be that labour force participation was increased by the *ALMPs*: the parameter estimates were only interpreted in terms of displacement effects, implying that the earlier studies overstated the displacement effects from the programs. In conclusion, if one is interested in the "pure" displacement effects of *ALMPs*, one shall normalise with the population.

Third, our results indicate a sluggish adjustment to the optimal level of employment: the lagged dependent variable has a point estimate of 0.15 in the baseline estimation and is statistically significant. This result differs from the earlier studies, since they found no dynamics. When estimating our baseline model for the period used in Forslund (1996) and Sjöstrand (1997) (i.e., 1990-1994), we found, in addition to a badly specified model, no sign of a dynamic adjustment. A tentative conclusion is hence that five years of observations are not enough to properly identify a (dynamic) labour demand function.

A detailed sensitivity analysis lead us to the impression that our baseline estimates are very robust. In particular, when re-estimating our baseline model with employment in a sector virtually without program participants (manufacturing of machinery) as the dependent variable, we found no displacement effects from subsidised employment (i.e., from relief work and "other programmes"). This result considerably strengthened our belief that the obtained baseline results are reliable.

Does our finding of rather strong displacement effects of subsidised employment imply that such programmes should be abandoned? Not necessarily. Displacement of regular employment definitely is a cost that should be considered when launching large-scale programmes, and care must of course be taken to ensure that a minimum of crowding out takes place. The costs must, however, be traded off against potential benefits. Our results point to one such benefit: to the extent that programme participants are outsiders with a very weak position in the labour market, it may very well be the case that the alternative to programme participation is exit from the labour force and perhaps, eventually, early retirement. To the extent that programmes counteract this, we would definitely count that as a benefit. Our finding that displacement as a fraction of the labour force is larger than as a fraction of the population is consistent with a positive effect of programmes on labour force participation. More research is, however, needed to get a better grip of the effects of *ALMPs* in this respect.

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A Summary statistics for the main variables

In this appendix we present some summary statistics for the main variables in the analysis. We present descriptive statistics for the INCOME variable in levels (and not for the square root of it, which is what is used in the empirical analysis). The overall and within calculations use $260 * 10 = 2600$ observations. The between calculations use 260 observations. A variable x_{it} is decomposed into a between ($\bar{x}_{i\cdot}$) component and a within ($x_{it} - \bar{x}_i + \bar{\bar{x}}$), where $\bar{\bar{x}}$ denotes the overall mean, component.

Variable		**Mean**	**Std.Dev.**	**Min.**	**Max.**
n	Overall	15188.46	27004.1	1236	358393
	Between		26954.5	1439.6	336245.3
	Within		2278.6	-15821.8	37888.7
INCOME	Overall	1341.22	287.8	760.2	2905.7
	Between		135.3	1120.9	2192.6
	Within		254.1	632.4	2054.3
RELIEF WORK	Overall	48.5	86.8	0	1446.4
	Between		79.3	2.7	719.4
	Within		35.7	-337.1	775.5
TRAINING	Overall	188.37	308.5	5.4	5780.7
	Between		282.4	23.3	2739.5
	Within		125.1	-959.3	3229.5
OTHER PROGR.	Overall	175.68	385.7	0	6441.8
	Between		239.6	15.5	2143.0
	Within		301.7	-1925.3	4496.8
DEMAND	Overall	15269.76	27204.9	1260.8	364620.3
	Between		27148.7	1487.7	337922
	Within		2368.2	-17036.2	41968.1
POPULATION	Overall	31920	56059.9	3337	718462
	Between		56133.3	3495.9	687303.7
	Within		1635.7	11426.3	63078.3

Table 9: Summary statistics for the variables presented in *Table 1* (variables not normalised)

Variable		Mean	Std.Dev.	Min.	Max.
n	Overall	.7819	.0801	.4781	.9773
	Between		.0401	.5912	.9021
	Within		.0694	.6531	.9028
RELIEF WORK	Overall	.0030	.0029	0	.0291
	Between		.0025	.0003	.0173
	Within		.0016	-.0098	.0149
TRAINING	Overall	.0112	.0068	.0013	.0620
	Between		.0055	.0021	.0413
	Within		.0041	-.0047	.0356
OTHER PROGR.	Overall	.0102	.0100	0	.0489
	Between		.0031	.0028	.0202
	Within		.0096	-.0090	.0391
DEMAND	Overall	.7864	.0740	.5188	.9752
	Between		.0338	.6102	.8904
	Within		.0658	.6697	.9327

Table 10: Summary statistics for the variables presented in *Table 1* (variables normalised with the lagged population aged 18-65)