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The impact of active labor market programs on municipal services

Eva Mörk

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The impact of active labor market programs on municipal services*

by

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Abstract

Just like any other employer, the municipalities can engage participants in active labor market programs in their activities. Does this possibility affect the output of municipal services? In order to answer this question a measure for output of locally provided schooling is created using factor analysis methods. It turns out that this measure is preferable to the traditionally used variable; spending. The possibility for municipalities to engage participants in active labor market programs in their activities seems to have a negative effect on the price for schooling. Prices, in turn, have a positive impact on output of schooling. Taken together, these results indicate that participants in active labor market programs contribute to production and that these contributions are not neutralized by displacement effects.

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1 Introduction

During the 1990s the Swedish municipalities have taken a more active part in tackling unemployment, which is normally the responsibility of the central government. This is expressed in several ways; the municipal majority in the local employment service committees, and the experiments with unorthodox labor market programs, where some local governments have been given increased discretion with respect to the allocation of labor market policy resources, being only two examples.[1] But the local government sector is also a large employer, accounting for about 30 percent of total employment in the economy.[2] Just like any other employer, the municipalities can engage participants in active labor market programs in their activities. In some of the programs, participants can be used as substitutes for ordinary employment, in which case one might worry about direct displacement effects.[3] For other programs, the regulations clearly state that program participants are not allowed to perform tasks that would otherwise have been performed by ordinary workers. Whether these regulations are actually obeyed is, however, an open question. It is therefore also an open question whether the possibility to engage program participants in municipal activities affect the output of municipal services. Do the participants in the active labor market programs contribute to production? If so, are these contributions neutralized by displacement effects? The purpose of this paper is to answer these questions. The period investigated is 1994–99. This was a period of recovery after the crisis in the early 1990s.

In order to fulfill the outlined task, we must be able to measure output of locally provided services. It is far from obvious how this should be done. Traditionally, per capita spending has been used as a proxy for output. [4] High

[1] For an investigation of the municipal majority in the local employment service committees, see Lundin & Skedinger (2000), and for a description of the experiment with unorthodox labor market programs, see Persson & Johansson (2000) (the latter only available in Swedish).

[2] Bergström, Dahlberg & Johansson (1998) study this aspect of local governments.

[3] Dahlberg & Forslund (1999) investigate direct displacement effects of active labor market programs (ALMP) in Sweden. They find that there are direct displacement effects from those ALMPs that generate subsidized labor (approximately 65 percent), but that there seems to be no (significant) displacement effects from training.

[4] There are some exceptions from this; e.g. Duncombe & Yinger (1993) presents an application to fire protection in New York State. They argue, convincingly, that people do not care about the number of fire companies available, but rather about the savings of lives and properties. They

output is however only one out of at least three potential reasons for high spending. The other two reasons are high costs caused by structural conditions the municipality cannot affect themselves, and/or an inefficient production. Spending is hence not an appropriate variable to use. The variable we would like to have is a measure of municipal output; a mix of quantity and quality. A further purpose of this study is therefore to produce such a measure of output of locally provided services. I do this by using factor analysis methods on a number of indicators such as number of employees and the share of the population taking advantage of the service in question.

The paper is organized as follows: In section 2, I present a theoretical model describing how the number of program participants engaged in municipal activity might influence the output of municipal service. In section 3 variables that measure output of local public services are created and examined. In particular, it is investigated how these variables correspond to the traditionally used variable; spending. In section 4, I discuss how to estimate the structural model put forth in section 2. In section 5, I present the data used when estimating the model. Thereafter, I turn to the results, which I present and discuss in section 6. Finally, in section 7, I will summarize and give some suggestions for future research.

2 A theoretical model of the demand for municipal services

The natural starting point for a theoretical model is a utility function. When discussing municipal services one typically assumes that the individuals receive utility from consumption of both private and municipal goods and services. An individual's preferences can hence be characterized by the following utility function:

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hence measure output as property losses relative to property values in the community. Andersson & Carlsen (1997) point out that variations in quality may only be weakly related to variations in local input factors. By using survey data, they examine how citizen satisfaction is related to municipal spending on different services as well as other variables characterizing the supply of municipal services (percentage of children in daycare institutions and number of physician man-years in the primary health care services). They find that the local input variables correlate positively with users' satisfaction for all variables expect for expenditures per pupil in primary school.

$$U_{ij} = U(c_{ij}, q_j) \tag{1}$$

where c_{ij} denotes private consumption of individual i and q_j the per capita production of the publicly provided good in municipality j where the individual lives. I use per capita values since most services provided by the local governments in Sweden are private goods, such as education, child care, and care for the elderly. Let us study the q_j component closer. What exactly is this variable supposed to capture? Since it enters as a component in the utility function, it ought to be something that the individual receives utility from, and it should hence be a mix of quality and quantity. In this paper I will denote this variable "output of municipal services". Since this variable is hard to observe and measure (but not impossible, as will be shown below), researchers have traditionally assumed that the individual receives utility from per capita municipal spending (see Dahlberg & Jacob, 2000 and Aronsson & Wikström, 1996, for two Swedish studies using this approach). In that case q_j in equation (1) is replaced with per capita spending ($spend_j$) and the municipal budget constraint will be given by

$$G_j + t_j N_j \bar{y}_j = SPEND_j \tag{2}$$

where G_j is total intergovernmental grants received by the municipality j, t_j is the local tax rate[5], $\bar{y}_j$ is mean income in the municipality, N_j is municipal population and $SPEND_j$ is total municipal spending. However, as noted above, high spending might be a result of other things than high municipal output. Spending is thus not an appropriate variable to use. In this paper, I will argue that municipal output (Q_j) is the preferred variable, in which case the municipal budget constraint can be written

$$G_j + t_j N_j \bar{y}_j = p_{qj} Q_j \tag{3}$$

[5] In Sweden local governments use a proportional income tax to finance their activities.

where p_{qj} denotes the price for providing municipal output.[6] Let us assume that we can measure municipal output and therefore assume that the appropriate budget constraint to use is the one in equation (3). In addition to the municipal budget constraint, the individual faces an individual budget constraint given by[7]

$$(1-t_j)y_{ij} = c_{ij} \tag{4}$$

where y_{ij} denotes individual i's pre-tax income in municipality j and c_{ij} his/her private consumption.

Solving (3) for t_j and inserting in (4) yields:

$$c_{ij} = y_{ij} + \tau_{ij} g_j - \tau_{ij} p_{qj} q_j \, , \tag{5}$$

where g_j denotes per capita intergovernmental grants in municipality j where individual i lives, and $\tau_{ij} = \frac{y_{ij}}{\bar{y}_j}$ individual i's tax share. Inserting (5) in (1) yields the following maximization problem:

$$\max_{q_j} = U\left(y_{ij} + \tau_{ij} g_g - \tau_{ij} p_{qj} q_j, q_j\right) \tag{6}$$

Assuming a specific form of the utility function that has been used and discussed by, for example, Hausman (1980) and Blomquist (1983)[8], and solving the maximization problem in (6), I get the following linear demand equation

$$q_{ij} = z_{ij} + \beta_1 \left(y_{ij} + \tau_{ij} g_j\right) + \beta_2 \tau_{ij} p_{qj} \tag{7}$$

where $z = \delta_0 + \delta_1 z_1 + \delta_2 z_2 + \delta_3 z_3 + \ldots$ is a vector of socio-economic characteristics.

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[6] Note that in equation (3) the price term enters, which it does not in equation (2). The reason for this is simply that the price of one SEK higher spending is one SEK.

[7] It is assumed that the individual pays no state-level taxes. This is true for 75-80 percent of the Swedish population.

[8] See Bergström *et al* (1998) for the exact formula.

According to the demand equation in equation (7), it should make no difference whether money is collected through local taxes or through general grants; an increase in one of them should yield the same increase in local public consumption as an increase in the other. However, studies investigating the demand for local public services by means of the median voter model have typically found that an increase in general grants has significantly higher effects on spending than an increase in (median)income, which is taken as an indication of a phenomenon that has been labeled the "flypaper effect". The name refers to the tendency for money to get stuck where it hits. For a recent overview of the flypaper literature and a discussion of possible explanations for the flypaper effect, see Bailey & Connolly (1998). Having this flypaper effect in mind I will allow income and grants (times the tax share) to have different impact on demand, and work with the following linear demand equation

$$q_{ij} = z_{ij} + \beta_1 y_{ij} + \beta_2 \tau_{ij} g_j + \beta_3 \tau_{ij} p_{qj} \tag{8}$$

If there exists a flypaper effect we would observe that $\beta_1 < \beta_2$.

There is still one question left to take into consideration, namely how to aggregate individual preferences into municipal demand. In order to do this we can assume either a representative agent model in which case $y_i = \bar{y}_j$ for all i, and consequently $\tau_{ij} = 1$, or a median voter model (see, e.g., Black, 1958) where the decisive voter is the one with median preferences (identified as the one with median income[9]) yielding $y_{ij} = y_j^m$ and $\tau_{ij} = \tau_j = \frac{y_j^m}{\bar{y}_j}$. In the estimations I will estimate the following two panel data models: A representative agent model given by

$$q_{jt} = \alpha_0 + \alpha_1 \bar{y}_{jt} + \alpha_2 g_{jt} + \alpha_3 p_{qjt} + f_j + \eta_t + \varepsilon_{1jt} \tag{9}$$

and a median voter model specified as

$$q_{jt} = \delta_0 + \delta_1 y_{jt}^m + \delta_2 \tau_{jt} g_{jt} + \delta_3 \tau_{jt} p_{qjt} + f_j + \eta_t + \varepsilon_{2jt} \tag{10}$$

[9] See Theorem 1 in Bergstrom & Goodman (1973).

where t indicates time period. f_j is a municipality-specific fixed effect, η_t a time dummy, and ε_{1jt} and ε_{2jt} random errors. For simplicity, I have chosen to ignore the socio-economic characteristics for now, and assume that the z-vector consists of a constant only.

If we instead follow the traditional route, and assume that the individual receives utility from municipal spending, the demand equations will instead be given by the following equations[10]:

$$spend_{jt} = \gamma_0 + \gamma_1 \bar{y}_{jt} + \gamma_2 g_{jt} + f_j + \eta_t + \varepsilon_{1jt} \tag{11}$$

and

$$spend_{jt} = \varphi_0 + \varphi_1 y^m_{jt} + \varphi_2 \tau_{jt} g_{jt} + \varphi_3 \tau_{jt} + f_j + \eta_t + \varepsilon_{2jt} \tag{12}$$

implying that the price term does not enter in the demand equations.

In order to estimate equations (9) and (10), we must have information about the price on municipal output. This is where the active labor market programs enter. Whether or not program participants are allowed to perform tasks that would otherwise have been performed by ordinary employees differ between programs. Some programs provide employers with subsidized labor. For other programs, the participants are not allowed to perform ordinary tasks. However, even if participants in these programs do not substitute for ordinary employees, they nevertheless perform some kind of work. It is therefore likely that the existence of program participants makes municipal output cheaper and, hence, that the number of program participants has a negative impact on the price for municipal services. In addition to participants in active labor market programs, we assume that the prices of locally provided services will depend on wages to municipal employees. Denoting the number of participants in active labor market programs engaged in municipal activities by $ALMP_j$ and average

[10] Equations (11) and (12) are derived by solving (2) (instead of (3)) for t_j and inserting in (4), and thereafter continue as above.

municipal wages by $\overline{w}_j$ we can formulate an equation for the price on municipal services:

$$p_{qjt} = \theta_0 + \theta_1 ALMP_{jt} + \theta_2 \overline{w}_{jt} + \kappa_{jt} \qquad (13)$$

where κ_{jt} is a random error.

It should be noted that although both q_{jt} and p_{qjt} are unknown, the product of these variables is known since, by definition

$$spend_{jt} = q'_{jt} p_{qjt} \qquad (14)$$

This equality must be accounted for in the formation of the estimates of q_{jt} and p_{qjt}. The estimation of q_{jt} is the topic of the next section.

3 The output of municipal services

What do we mean by the term "output of municipal services"? There is no simple answer to this question. In studies estimating the demand for locally provided services, spending (or expenditures) is typically used as an output measure. This measure is however problematic if costs differ between municipalities. Other measures are, for example, share of elderly receiving home help or living in service flats, number of teachers per student, etc. The large number of potential indicators point to an important feature of public services, namely that they are multidimensional. It is hard to know which dimensions that matter the most. One way to solve this problem is to use some kind of factor analysis methods, and thereby estimate one or several latent variables which will take all the above variables into account. We can then name this latent variable "output of municipal services". In this paper, I will use LISREL in order to estimate the output of local public services.[11]

The idea behind the LISREL regressions is the following: The variable we want to measure is the output of local governments' services. There is however

[11] For a description of LISREL and how to use LISREL in structural equation modeling see Jöreskog & Sörbom (1996a).

no unique available variable describing this. Instead, we have a number of variables (i.e. input variables) all capturing some aspect of output (i.e. the latent variable). Given that all input variables are related to the latent variable, they are likely to be correlated and this fact is used in LISREL and factor analysis.

Assume that the vector of input variables is called x_{jt} and has the dimension $k \times 1$. Following Jöreskog & Sörbom (1996a) we can express the measurement model for x as follows[12]:

$$x_{jt} = \Lambda_x q_{jt} + \rho_{jt} \tag{15}$$

where q_{jt} is a latent random variable – the output of local government services, Λ_x a $k \times 1$ vector of parameters (also called factor loadings) and ρ_{jt} a $k \times 1$ vector of measurement errors (in the variable). The vector Λ_x can be estimated by means of factor analysis.

I have data for the years 1994–99 and will assume that the factor structure is the same across time.[13] *Table 1* presents the variables I use as input variables in the analysis.

Table 1. Input variables used to measure the output to local public services

Variable	Description
S_cost_p	Gross costs for primary schools, per student
S_cost_s	Gross costs for secondary schools, per student
S_share	Share of inhabitants of age 16–19 attending secondary schools
S_labor	Number of inhabitant of age 7–19 per full-time employee in schooling and leisure
AC_cost	Gross costs for care for the elderly, per inhabitant[14]
AC_home	Share of inhabitants of age 65–79, receiving home help
AC_serv	Share of inhabitants of age 80+, living in service flats
AC_labor	Number of inhabitants of age 80+ per full-time employee in care for the elderly

[12] A full LISREL model consists of three systems of equations, equation (15) as well as a structural equation model and a measurement model for y (a vector of observed response variables). In this study we concentrate on the measurement (factor analysis) model for x. The model used in the paper is called "Submodel 1" in Jöreskog & Sörbom (1996a).

[13] When conducting the estimations I treat the data as a multi-sample where each year represents a group. For a description of the method see Jöreskog & Sörbom (1993, chapter 2).

[14] An alternative variable to use would be "Gross costs for care for elderly, per inhabitant of age 65+. This has been tried, but tests reject this specification of the model.

My original intention was to estimate a latent variable for total municipal output. When I tried that, the model did not converge, so I had to abandon this idea. What I managed to do was to estimate latent variables for schooling and care for the elderly.[15] Before running the LISREL estimations I have transformed the variables in *Table 1*, using the command "Normal Scores" in PRELIS, in order to make them normally distributed.[16] This is okay to do when the scale of the variables does not matter in itself, which it doesn't in my setup (what matters is the way the variables correlate). Running LISREL using these normalized variables I create variables for the output of schooling and care for elderly. Below I present the estimated models for the two latent variables in *Figures 1–2*. In the figures the arrows from the latent variable, e.g., "school", to the observed variables, describes the values in the matrix Λ_x . The values to the left in the figures, with arrows pointing at the input variables correspond to ρ_{jt} , the measurement errors in x_{jt}.[17]

[15] Trying to do the same for child care, I fail. Managing to estimate an output variable for schooling is highly interesting since this is the sector that Andersson & Carlsen (1997) have problems with.
[16] PRELIS is a program attached to LISREL created in order to make it easier for the user to become familiar with the data analyzed. For a description of PRELIS, see Jöreskog & Sörbom (1996b). The command "Normal Scores" has been run on the data one year at the time. Doing the same for the pooled data yields almost identical results.
[17] The estimations have been performed using the correlation matrices rather than the covariance matrices, due to calculation problems connected with the latter. In the case that several models work, I have let the Chi-Square statistics, which is a good measure of the fit of the model, decide which model to present. From the figures we see that we cannot reject the models by the Chi-Square test. RMSEA stands for Steiger's (1990) "Root Mean Square Error of Approximation". A value of 0.05 or lower suggests a good fit, and we can hence not reject the models for schooling and care for the elderly using this test either.

Figure 1. A LISREL model for the output of schooling[18]

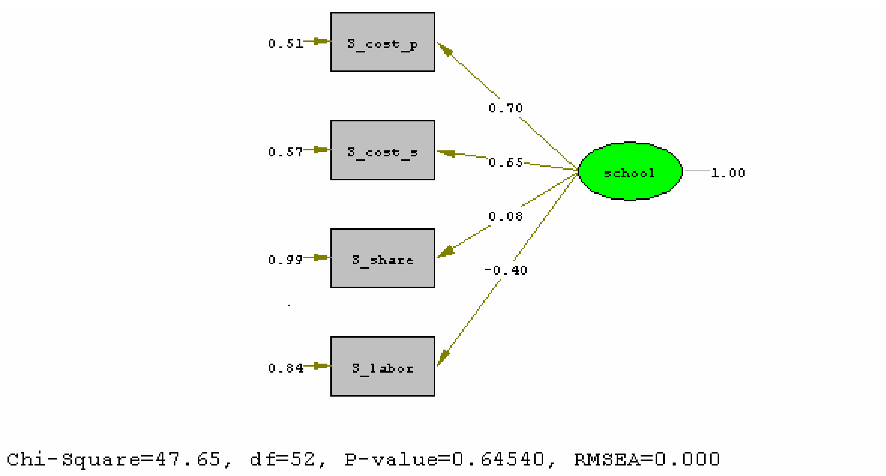
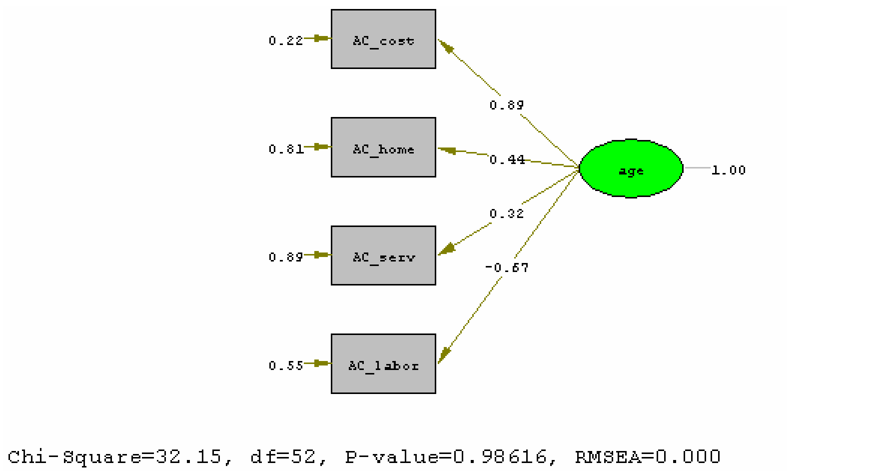


Figure 2. A LISREL model for the output of care for the elderly[19]



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[18] The standard errors are 0.05, 0.04, 0.04, 0.03. Hence, all estimates are significantly different from zero.

What we need in the next step of the paper is a value for each municipality and year, for each of the two latent variables. In order to do this we need the factor scores, which are given by $\Lambda_x \Omega^{-1}$ in equation (16) below, where Ω denotes the variance/covariance matrix of x_{jt}.[20] The factor scores are presented in *Table 2*.

$$\hat{q}_{jt} = \hat{\Lambda}_x^{'} \Omega^{-1} x_{jt} \qquad (16)$$

Table 2. Factor Scores

Latent variable	Input variables			
Output, schooling	S_cost_p 0.46980	S_cost_s 0.39475	S_share 0.02926	S_labor -0.16469
Output, care for the elderly	AC_cost 0.70588	AC_home 0.09359	AC_serv 0.06233	AC_labor -0.21071

Multiplying each factor score with the corresponding input variable and summarizing (see equation (16)) yields two variables, ”Output schooling” and ”Output care for the elderly”. In *Figures 3* and *4*, I illustrate the evolution of these variables with the help of Box-Whisker plots.[21]. One can notice from the figures that the variation is larger in output variable for schooling than in the output variable for care for the elderly, but that the evolution over time is similar.

[19] The standard errors are 0.04, 0.03, 0.03, 0.03. Hence, all estimates are significantly different from zero.

[20] See Lawley & Maxwell (1963) for derivations of the factor scores and the common factors.

[21] The line in the middle of the box represents the median of data. The box itself constitutes the interquartile range (IQR), that is, it extends from the 25th percentile of the data to the 75th. The lines emerging from the box are called the whiskers and they extend to the upper and lower adjacent values. The upper adjacent value is defined as the largest data point less than or equal to the 75th percentile + 1.5*IQR and the lower adjacent value is defined as the smallest data point greater than or equal to the 25th percentile - 1.5*IQR. Observed data points more extreme than the adjacent values are individually plotted.

Figure 3. The evolution of output of schooling over time

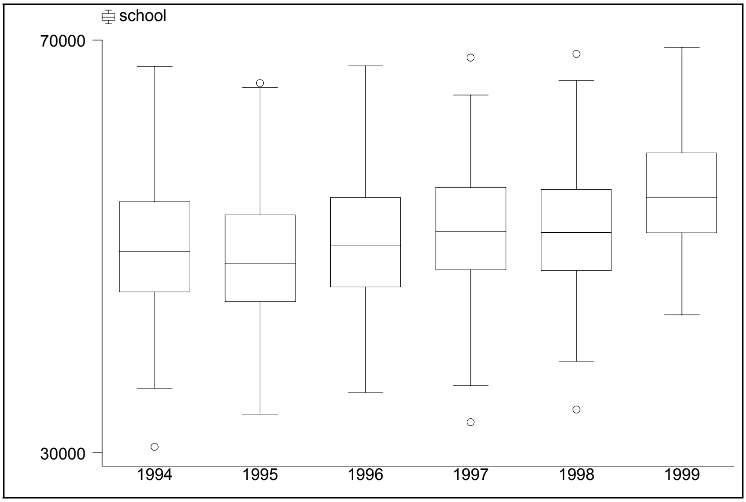
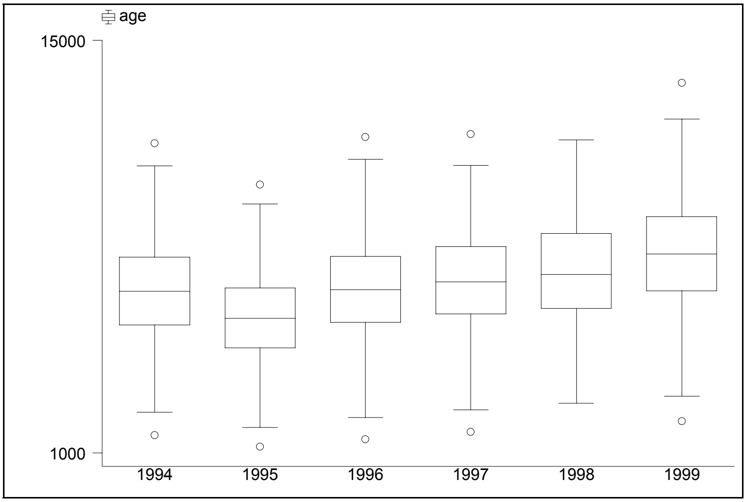


Figure 4. The evolution of output of care for the elderly over time



How do these two output-measures correlate with each other, and how do they compare with the spending variable that is typically used to measure output of municipal services? In *Table 3*, the correlations between these variables are given. We see from the table that both output measures estimated by LISREL are positively correlated with per capita spending. The correlation between output of schooling and spending on schooling is somewhat higher than the correlation between the output of schooling and total spending, but still as weak as 0.67. This indicates that the output variable actually captures something more than the spending proxy. For care for the elderly on the other hand, the correlation between the two different measures is very high (0.996) and we should therefore not expect the results to differ depending on which of the two possible variables (spending or output) we use. The high correlation can be explained by the model setup for care for elderly; as one of the input variables we use gross costs per inhabitant (rather than per inhabitant of age 65+, see footnote 14). Looking at *Figure 2*, we see that gross costs is the variable that has the largest impact on the latent variable. But gross costs per capita are the same as spending on care for elderly per capita. The high correlation is thus easily explained. In the empirical analysis I have therefore chosen not to analyze the care for the elderly-sector but to concentrate on schooling.

Table 3. Correlation matrix, 1994–99

	Spending	**Output, schooling**	**Output, elderly**	**Spending, schooling**	**Spending, elderly**
Spending	1.0000				
Output, schooling	0.6374	1.0000			
Output, elderly	0.6952	0.5524	1.0000		
Spending, schooling	0.7160	0.6685	0.4326	1.0000	
Spending, elderly	0.7024	0.5590	0.9958	0.4363	1.0000

Notes: Spending is expressed in per capita values.

A further way to analyze whether the output variable captures something else than spending, is to compare results obtained using the two variables. Therefore, I will also use spending on schools as the dependent variable. This is interesting, not at least since many earlier studies have focused on spending as a proxy for output.

4 Estimation of the structural equations

By equation (14), the LISREL estimate of the latent output variable yields an estimate of the price of public services, according to

$$\hat{p}_{qjt} = \frac{spend_{jt}}{\hat{q}_{jt}} \tag{17}$$

Substitution of $\hat{p}_{qjt}$ for p_{qjt} in (13) yields an estimable equation for the price of local public services.

$$\hat{p}_{qjt} = \theta_0 + \theta_1 ALMP_{jt} + \theta_2 \overline{w}_{jt} + \nu_{jt} \tag{18}$$

where θ_1, θ_2 and θ_3 are parameters to be estimated and v_{jt} a random error. As the price and the quantity equations form a recursive system, the appropriate procedure is to first estimate equation (18) and then use the predicted value of the price in the equation (9) and (10). The predicted price variable corresponding to (18) can be written

$$\hat{\hat{p}}_{qjt} = \hat{\theta}_0 + \hat{\theta}_1 ALMP_{jt} + \hat{\theta}_2 \overline{w}_{jt} \tag{19}$$

Substitution of $\hat{q}_{jt}$ and $\hat{\hat{p}}_{qjt}$ for q_{jt} and $\hat{p}_{qjt}$, respectively, in equations (9) and (10) yields the following regression equations

$$\hat{q}_{jt} = \alpha_0 + \alpha_1 \overline{y}_{jt} + \alpha_2 g_{jt} + \alpha_3 \hat{\hat{p}}_{qjt} + f_j + \eta_t + u_{1jt} \tag{20}$$

$$\hat{q}_{jt} = \delta_0 + \delta_1 y^m_{jt} + \delta_2 \tau_{jt} g_{jt} + \delta_3 \tau_{jt} \hat{\hat{p}}_{qjt} + f_j + \eta_t + u_{2jt} \tag{21}$$

Note that the effect of active labor market programs on municipal services is given by

$$\frac{\partial \hat{q}_{jt}}{\partial ALMP_{jt}} = \frac{\partial \hat{q}_{jt}}{\partial \hat{\hat{p}}_{qjt}} \frac{\partial \hat{\hat{p}}_{qjt}}{\partial ALMP_{jt}} \tag{22}$$

5 The data

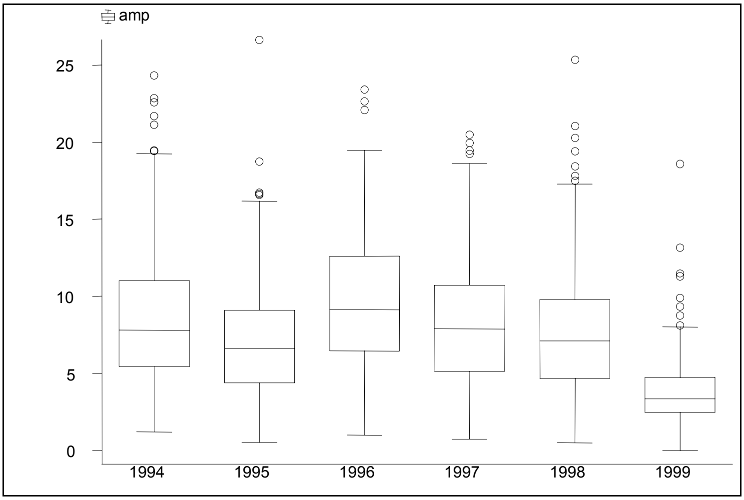
Unfortunately, there is no register data on the number of people in active labor market programs engaged by the municipalities. Instead, I have to rely on surveys conducted in the Swedish local municipalities by the Swedish Association of Local Authorities.[22] This, of course, has some shortcomings: First, I have to let do with self-reported figures which might be untruly reported, and second, this means that there are missing values for the municipalities that have not answered the survey and that these missing values might be non-random. A reason for that things might not be so serious after all is that the municipalities have been informed that their answers will be dealt with caution and that they will not be published in such a way that each figure can be connected with a single municipality. There are eight surveys performed between April 1994 and November 1999. For 1994 and 1997, two surveys are performed, one in April and one in November/December. For the other years, the survey is performed either in April or in November. There might be a problem that the surveys are collected in different months if the number of people employed in active labor market programs differs between months. However, when there are two figures reported for a year, they are highly correlated[23].

In the surveys, the municipalities are asked to state the number of persons that have taken part in active labor market programs connected to municipal activities. When creating the variable ALMP I have excluded some of the programs from the analysis. First, I have excluded pure training programs.[24] Second, I have excluded programs that are financed by the local governments and not by the central state.[25] In addition, it is not obvious how to treat project for youths, since they consist of a mixture of training and labor market practice. In addition, for some years of the studied period, the municipalities have taken over the responsibility for some groups of youths. I have therefore, in the estimations, used two variables for the number of program participants engaged in municipal activities, one including youth programs and one excluding youth programs. The correlation between these two variables is high (0.9449). The

[22] The Swedish speaking reader might want to check Svenska Kommunförbundet (1999) for a discussion of the survey data.
[23] For these years I will use the means.
[24] An example of programs of this type is "Datortek".
[25] An example of programs of this type is special projects for social assistance receivers.

ALMP variables are divided by the number of inhabitants in the municipality in order to get a per capita measure.[26] In *Figure 5*, I have plotted the resulting variable (the version including youth programs) against time. The figure shows that the median value grew until 1996, but dropped thereafter, reaching its lowest value in 1999. This downward trend in the end of the studied period might be due to the improved situation at the labor market after the mid 1990s.

Figure 5. The evolution of ALMP per capita, 1994–99



5.1 Summary statistics[27]

Besides the ALMP-variable described above and the dependent variables described in section 3, the theoretical models state that the following variables shall enter in the estimations: median income, mean income, tax share, inter-governmental grants, and municipal wages. As a sensitivity analysis I will also include some demographic and political variables in the regressions. These are the share of inhabitants younger than 7 (Children), they share of the populations between 7–19 (Young), the share of the population older than 79 (Old), the population density (measured as the number of inhabitants per square meter), and a political dummy variable (Soc majority) taking the value one if

[26] Actually, the figures I will use are per 1000 inhabitants.
[27] See the appendix for the exact definitions of the variables and their sources.

the Social democrats and the Leftist party have majority in the municipal council.[28] The inclusion of socioeconomic variables is supported by the classical paper by Bergstrom & Goodman (1973). In *Table 4* summary statistics are given for the variables that will be used in the analysis.[29]

Table 4. Summary statistics, 1994–99

Variable	Mean	St dev	Min	Max
Mean income	120473.9	19598.8	72699	257688
Median income	117226.7	23114.07	19100	189700
Tax share	0.97	0.09	0.24	1.14
Grants	5752.0	3330.0	-5940	18728
Wages	284914.5	21404.3	227668.7	370903.7
ALMP, incl youth	7.53	4.37	0	26.64
ALMP, excl youth	6.79	4.10	0	23.40
Output, schooling	51285.2	6424.9	30556.64	69266.5
Spending, schooling	9694.7	1547.0	5036	16787
Children	8.01	0.94	5.69	11.33
Young	16.32	1.47	9.69	21.77
Old	4.97	1.31	1.16	7.73
Density	1.22	3.97	0.003	38.83
Soc majority	0.48	0.50	0	1

Note: Spending, grants and ALMP are measured in per capita terms. The panel used in the analysis is unbalanced, that is there are not observations for all municipalities the whole time period. In particular, survey data is lacking for some municipalities. 1274 observations, 280 municipalities over, on average, 4.5 years.

[28] Including a political variable in the median voter model is not harmless. The median voter model assumes that people differ in income and that it is this difference that leads to people demanding different levels of public services. If we include a political variable we are saying that the demand might differ for two persons with identical income but with different political identification. We can hence no longer be certain that we can identify the median voter as the one with median income. Fortunately, the political variable enters insignificant in all estimations in the paper.

[29] From the Min value for grants we see that some municipalities in fact receive negative grants. This is a consequence of the tax-equalization system that is used in Sweden.

6 Results

6.1 Estimating the price equation

Before being able to estimate equations (20) and (21), we need an estimate of the price of municipal services. This can be done by estimating equation (18) and the predicting according to equation (19). I will do this, using two different specifications of equation (18), one basic model that is given by equation (18), and one extended model allowing for time effects.[30] Further, we have two measures of $ALMP_{jt}$, one including youth programs and one excluding them. All together this gives four models to estimate. The results from these estimations are given in *Table 5* below.

Table 5. Results from estimation of the price equation

	Basic Model		Model with time effects	
ALMP inc y	-0.00074 ***		-0.00037 ***	
	(5.82)		(-2.76)	
ALMP excl y		-.000070 ***		-0.00035 ***
		(-5.24)		(-2.42)
Wages	4.75e-07 ***	5.01e-07 ***	9.41e-08 **	9.44e-08 **
	(8.34)	(19.58)	(1.99)	(1.99)

Notes: A constant is included in the estimations. T-ratios within parentheses. ***, ** and * denotes significance at the 10, 5 and 1-percent level respectively. 1274 observations, 280 municipalities over, on average, 4.5 years.

Looking at the results, we see that active labor market programs and average municipal wages enter with expected sign in all four models; the more people in active labor market programs engaged in municipal activities the lower is the price of municipal services, and the higher average wages are, the higher is the price of municipal services. In addition, these effects are significantly different from zero in the all models. Summary statistics of the resulting predicted prices are given in *Table 6*.

[30] One could also think about a model controlling for municipality specific fixed effects. The problem is however that we cannot estimate the fixed effects consistent, since, as the sample size goes to infinity, so does the number of fixed effects (we have a model with fixed *T* and a large *n*). We can therefore not calculate consistent predictions of price controlling for fixed effects.

Table 6. Summary statistics of the predicted prices

	Mean	St dev	Min	Max
Price given by equation (18)	0.1895	0.0225	0.1019	0.2712
Basic Model, ALMP inc y	0.1895	0.0111	0.1576	0.2331
Basic Model, ALMP excl y	0.1895	0.0111	0.1596	0.2348
Model with time effects, ALMP inc y	0.1895	0.0127	0.1664	0.2135
Model with time effects, ALMP excl y	0.1895	0.0127	0.1666	0.2135

How well do the estimations in *Table 5* predict prices? In *Table 7* below I present the correlations between $\hat{p}_{qjt}$ and $\hat{\hat{p}}_{qjt}$. We see from the table that adding time dummies improves prediction some; the correlation increases from 0.49 to 0.56.

Table 7. Correlation of predicted prices ($\hat{\hat{p}}_{qjt}$) with estimated prices ($\hat{p}_{qjt}$)

	Correlation
Basic Model, ALMP inc y	0.4967
Basic Model, ALMP excl y	0.4929
Model with time effects, ALMP inc y	0.5653
Model with time effects, ALMP excl y	0.5645

6.2 Estimating the structural model

Having obtained estimates of the price on municipal services, I can proceed and estimate the structural model in equations (20) (the representative agent model) and (21) (the median voter model). For both models I will estimate a parsimonious model including only the variables from the theoretical model, as well as an extended model including a larger set of regressors. The results from fixed effects regressions are presented in *Tables 8–11*.[31]

[31] The estimations are conducted in Stata 7. I have conducted tests for poolability as well as for random effects and rejected both.

Table 8. Results from fixed effect regression of output of schooling, 1994–99. Representative agent model (equation (20)), parsimonious model.

	a)	b)	c)	d)
Mean income	0.1358 ***	0.1369 ***	0.1354 ***	0.1364 ***
	(3.65)	(3.68)	(3.65)	(3.68)
Grants	0.1932	0.1960	0.1897	0.1914
	(0.99)	(1.01)	(0.98)	(0.98)
Price	-14791.6	-4184.9	-124037.1	-87906.8
	(-0.60)	(-0.17)	(-1.25)	(-0.90)
R^2 within	0.34	0.34	0.34	0.34
R^2 between	0.047	0.045	0.047	0.047
R^2 overall	0.0065	0.0067	0.0075	0.0069

Notes: a) predicted prices from the basic model using ALMP including youth programs, b) predicted prices from the basic model using ALMP excluding youth programs, c) predicted prices from the model with time effects and using ALMP including youth programs, and d) predicted prices from the model with time effects and using ALMP excluding youth programs. Time dummies and a constant are included in the estimations. T-ratios within parentheses. The t-ratios for the estimates on the price variable are calculated using standard errors corrected according to Murphy & Topel (1985). ***, ** and * denotes significance at the 10, 5 and 1-percent level respectively. 1274 observations, 280 municipalities over, in average, 4.5 years.

Table 9. Results from fixed effect regression of output of schooling, 1994–99. Representative agent model (equation (20)), extended model.

	a)	b)	c)	d)
Mean income	0.1614***	0.1627 ***	0.1618 ***	0.1622 ***
	(3.85)	(3.88)	(3.88)	(3.88)
Grants	0.3987 **	0.4013 **	0.3955 **	0.3969 **
	(1.97)	(1.98)	(1.96)	(1.96)
Price	-18215.2	-7521.4	-140252.3	-107682
	(-0.74)	(-0.31)	(-1.35)	(-1.54)
Children	-2808.1 ***	-2797.4 ***	-2852.8 ***	-2831.8 ***
	(-5.33)	(-5.31)	(-5.41)	(-5.37)
Young	-2263.5 ***	-2268.7 ***	-2256.4 ***	-2263.6 ***
	(-4.94)	(-4.95)	(-4.94)	(-4.95)
Old	-985.7	-999.1	-972.1	-986.9
	(-1.31)	(-1.32)	(-1.29)	(-1.31)
Density	2859.8 **	2793.8 *	2926.3 **	2915.9 **
	(2.01)	(1.96)	(2.07)	(2.05)
Soc majority	-596.34	-611.01	-563.26	-575.94
	(-1.07)	(-1.10)	(-1.01)	(-1.04)
R^2 within	0.37	0.37	0.37	0.37
R^2 between	0.0003	0.0002	0.0003	0.0003
R^2 overall	0.0006	0.0007	0.0006	0.0006

Notes: See notes under *Table 8*.

Table 10. Results from fixed effect regression of output of schooling, 1994–99. Median voter model (equation (21)), parsimonious model.

	a)	b)	c)	d)
Median income	0.0996 ***	0.0933 ***	0.1536 ***	01489 ***
	(3.45)	(3.24)	(4.12)	(3.93)
Grants * Tax share	-0.0035	-0.0232	0.1462	01303
	(-0.02)	(-0.12)	(0.73)	(0.65)
Price * Tax share	-31833.4	-23078.4	99577.7 **	-93426.0 **
	(-1.47)	(-1.07)	(-2.71)	(-2.48)
R^2 within	0.34	0.34	0.34	0.34
R^2 between	0.12	0.13	0.068	0.073
R^2 overall	0.0004	0.0002	0.0021	0.0018

Notes: See notes under *Table 8*.

Table 11. Results from fixed effect regression of output of schooling, 1994–99. Median voter model (equation (21)), basic model.

	a)	b)	c)	d)
Median income	0.0990 ***	0.0921 **	0.1705 ***	0.1642 ***
	(3.33)	(3.12)	(4.08)	(3.87)
Grants * Tax share	0.2183	0.2014	0.3718 *	0.3565 *
	(1.10)	(1.02)	(1.79)	(1.71)
Price * Tax share	-33350.6	-24408.2	-117053 **	-109741 **
	(-1.51)	(-1.11)	(-2.86)	(-2.61)
Children	-2491.6 ***	-2455.7 ***	-2756.4 ***	-2726.5 ***
	(-4.84)	(-4.77)	(-5.25)	(-5.18)
Young	-2177.7 ***	-2179.0 ***	-2206.0 ***	-2206.8 ***
	(-4.71)	(-4.71)	(-4.78)	(-4.78)
Old	-1082.6	-1113.9	-963.5	-986.9
	(-1.43)	(-1.47)	(-1.28)	(-1.31)
Density	4061.8 **	4145.0 **	2922.4 **	3040.4 **
	(3.01)	(3.07)	(2.06)	(2.14)
Soc majority	-563.8	-571.8	-567.2	-567.7
	(-1.01)	(-1.03)	(-1.02)	(-1.02)
R^2 within	0.36	0.36	0.37	0.37
R^2 between	0.0033	0.0037	0.000	0.0009
R^2 overall	0.0003	0.0004	0.000	0.0002

Notes: See notes under *Table 8*.

Comparing the results in *Tables 8* and *9* with those in *Tables 10* and *11*, we see that it does not seem to matter whether we use a median voter model or a representative agent model, which is reassuring. The results can be summarized as follows

- Individual income enters positively and significantly so. This is according to theory: Given that schooling is a normal good, the higher income the individual has, the more schooling does he/she want to consume.

- Intergovernmental grants have no significant effect. This result thus contradicts the flypaper model. But, on the other hand, the flypaper effect talks about public spending, not output! Furthermore, given that grants to a large extent are income equalizing, they ought not to have any effect on output.
- Prices have a negative effect on output, as expected. This effect is however only statistically significant in the median voter model and when prices are estimated controlling for time effects.
- Looking at the demographic variables we see that the share of children younger than 7 enters negatively. This is also true for the share inhabitants in school age (7–19). Given that there are many school-children in a municipality, there will probably be, e.g., larger classes, and hence lower teacher density. Since teacher density is a component of the output variable, this result can be expected. The population density enters positively.
- The political variable is insignificant. Given that we only observe two elections during the investigated time period, the political variable is not likely to vary a lot over time and it entering insignificantly hence comes as no surprise.

So what about the effect of program participants in active labor market programs engaged in municipal services? As described by equation (22), this effect depends on both the effect of ALMP on price of municipal services and the effect of prices on municipal output. In *Table 12*, the elasticity of school output with respect to the number of participants in active labor market programs are presented. The elasticities show how many percent municipal school output changes if ALMP changes one percent.

We see that the elasticities are statistically significant in the median voter model where price is estimated controlling for time-effects (models *c* and *d*). In the other cases, the elasticities are not significantly different from zero. However, we see that the elasticities are all positive. Our results hence indicate that the effect of ALMP on municipal output, if any, is positive.

Table 12. The elasticity of school output with respect to ALMP

		Representative agent model	Median voter model
Parsimonious model	**a)**	0.00160	0.00334
		(0.60)	(1.43)
	b)	0.00039	0.00207
		(0.17)	(1.05)
	c)	0.00669	0.00520 *
		(1.14)	(1.94)
	d)	0.00409	0.00421 *
		(0.84)	(1.73)
Extended model	**a)**	0.00197	0.00350
		(0.74)	(1.47)
	b)	0.00070	0.00219
		(0.31)	(1.09)
	c)	0.00756	0.0061 **
		(1.21)	(1.99)
	d)	0.00501	0.00494 *
		(1.30)	(1.77)

Notes: a) predicted prices from the basic model using ALMP including youth programs, b) predicted prices from the basic model using ALMP excluding youth programs, c) predicted prices from the model with time effects and using ALMP including youth programs, and d) predicted prices from the model with time effects and using ALMP excluding youth programs. T-ratios within parentheses. ***, ** and * denotes significance at the 10, 5 and 1-percent level respectively.

6.3 Using spending as a proxy for municipal output

In earlier studies, researchers have typically proxied municipal output with municipal per capita spending. Given this, it is of interest to see whether the results differ if we use per capita spending on schooling as the dependent variable instead of the output variable used in the above section. Doing this, we see from equations (11) and (12) that the only price-variable that enters the demand equation is the individual's tax share. Hence, we cannot investigate the effect of active labor market programs on municipal spending.

Table 13. Results from fixed effect regression of per capita spending on schooling, 1994–99.

	Representative agent model		Median voter model	
Mean income	-0.011 *	0.0034		
	(-1.66)	(0.48)		
Median income			-0.0163 **	-0.0061
			(-2.59)	(-0.86)
Grants	0.1215 ***	0.1004 **		
	(3.65)	(2.90)		
Grants * Tax share			0.1098 **	0.0879 **
			(3.13)	(2.38)
Tax share			4031.06 **	2151.50
			(2.97)	(1.41)
Children		-325.77 ***		-291.10 ***
		(-3.61)		(-3.26)
Young		182.10 **		171.03 **
		(2.32)		(2.16)
Old		45.71		12.15
		(0.35)		(0.09)
Density		-261.91		-76.11
		(-1.08)		(-0.31)
Soc majority		5.19		8.27
		0.05		(0.09)
R^2 within	0.81	0.82	0.81	0.82
R^2 between	0.39	0.30	0.26	0.33
R^2 overall	0.57	0.45	0.50	0.54

Notes: Time-dummies and a constant are included in the estimations. T-ratios within parentheses. ***, ** and * denotes significance at the 10, 5 and 1-percent level respectively. 1274 observations, 280 municipalities over, in average, 4.5 years.

Results from fixed-effect regression using per capita spending on schools as dependent variable are presented in *Table 13*. Looking at the results and comparing them with the results in *Tables 8–11* we see that:

- Income enters insignificantly in most models, and when it is significant, it is so with the "wrong" sign, indicating that the higher income the median voter has, the less spending does he demand. This result is hard to understand if spending is seen as a proxy of output, but understandable if we consider the fact that high spending can also be a result of high costs or an inefficient provision.
- Intergovernmental grants now enter positively and significantly. Hence, there are indications of a flypaper effect, something we didn't find for the output variable.

- Tax share, which shows up in the median voter model, has, unexpectedly, a positive sign. This indicates that the larger share of the tax burden the individual has to pay, the higher spending does he/she demand. This too might be an indication that spending captures something else than output.
- Looking at the demographic variables, we see that spending is lower in municipalities with many children and higher in municipalities with many young inhabitants. The share of people older than 79 years does, on the other hand, not seem to matter. This result can be explained by the fact that it is people characterized as young that go to school. A large share of young people would hence lead to higher total spending on schooling, and consequently, higher per capita spending.
- The more sparsely the municipality is populated, the higher is total spending per capita. This finding is coherent with the view that high spending depends on high costs, rather than high quality. This would mean that costs are higher in the sparsely populated regions than in the cities.
- The political variable is insignificant in these regressions as well.

The results all indicate that the output measure I use in this paper is a better variable than total spending.

7 Conclusions

The purpose of this paper has been twofold: To investigate the effect of active labor market programs on municipal services and to create a measure of the output of local public services. Earlier studies have typically used municipal spending to measure municipal output. However, high spending might well be a result of, e.g., high costs caused by structural conditions or inefficient production, in which case it is hard to explain why spending enters in the individuals' utility functions. In this study, I instead apply factor analysis methods on municipal data in order to create a measure of municipal output. Thereafter I estimate the effect of program participants in active labor market programs engaged in municipal activities on municipal services, using panel data for the years 1994–99.

Using LISREL, I can successfully estimate a latent variable which measure the output of schooling. This measure is a combination of gross cost per student in primary, respectively secondary, schools, number of students per full-time employee, and share of inhabitants of age 16–19 attending secondary schools. Estimating a demand function using this variable as the dependent variable I find results that are in line with economic theory; income, price and demographic variables all enter with their expected signs. Hence, the higher income the more output does the individual demand and the higher price, the less. If I instead do as is standard in the literature and use per capita spending on schools as the dependent variable, I get results that are hard to explain if we believe that spending captures municipal output: Income enters insignificantly or with the "wrong" sign, and so does tax share. In addition, I find indications of a flypaper effect. I therefore conclude that the LISREL analysis is worth conducting and that the created output measure is preferable to spending.

The title of this paper is "The impact of active labor market programs on municipal services". So what do the findings in this paper tell us about that? I find that the number of participants in active labor market programs engaged in municipal activities has a negative effect on price of schooling. This indicates that the municipalities see the possibility to engage participants in active labor market programs as a way of employing people at a lower wage. But does this have any effect on municipal services, or do the municipalities simply replace ordinary employers with program participants? In order to answer this question we must first investigate the effect of price on output. It turns out that this effect is negative, however not always statistical significant. Taken together, these two effects seem to indicate a positive effect of program participants in active labor market programs on municipal output.

Finding a better way to measure output of municipal service than to use total spending is a high priority in the field of public economics. This paper shows that one possible way to proceed is to use factor analysis methods. The results in this paper shall be seen as a first attempt to solve this problem. It would be most interesting for future research to continue this work, using, e.g., survey data stating the satisfaction of the users themselves.

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Appendix

Definitions of the variables used

Mean income: Mean total income for inhabitants of age 16–64 in the municipality. Source: IFAU

Median income: Median total income for inhabitants of age 16–64 in the municipality. Source: IFAU

Tax share: Median income/Mean income

Grants: General intergovernmental grants to the municipality. For 1998 and 1999 the variable includes tax equalization grants as well. Source: Financial statement for Swedish municipalities (Vad kostar verksamheten i din kommun)

Wages: Total sum of wages paid in each municipality divided by the number of full-time employees in the municipality. Source: Financial statement for Swedish municipalities

ALMP, including youth: Number of participants in active labor market programs engaged in municipal activity per 1000 inhabitants. The following programs are included in ALMP: BESK, BEA m STB, UVIK, ALU, UP, API, APR, kommunavtal, lönebidrag, REKS, OSA, OTA, RES, KUP, UG, AS, FAS. Source: The Swedish Association of Local Governments

ALMP, excluding youth: As above but with youth programs (UP, UG, and KUP) excluded. Source: The Swedish Association of Local Governments

Total Spending: Total municipal gross costs divided by the number of inhabitants in the municipality. Source: Financial statement for Swedish municipalities

Spending on schooling: Total municipal gross costs on schooling divided by the number of inhabitants in the municipality. Source: Financial statement for Swedish municipalities

Spending on care for the elderly: Total municipal gross costs on care for the elderly/number of inhabitants in the municipality. Source: Financial statement for Swedish municipalities

Output, schooling: Variable created in LISREL. The following variables are used as input variables: Gross costs for primary schools per full time student, gross costs for primary schools per full time student, share of inhabitants of age 16–19 attending secondary schools, number of inhabitants of age 7–19 per full time employee in schooling and leisure. Source: Financial statement for Swedish municipalities and the Swedish Association of Local Governments

Output, care for the elderly: Variable created in LISREL. The following variables are used as input variables: Gross costs for care for the elderly per inhabitant, share of inhabitants of age 65–79 receiving home help, share of inhabitants of age 80 and older living in service flats, number of inhabitants of age 80+ per full time employee in care for the elderly. Source: Financial statement for Swedish municipalities and the Swedish Association of Local Governments

Children: Percent of the population of age 0–6. Source: Statistics Sweden

Young: Percent of the population of age 7–19. Source: Statistics Sweden

Old: Percent of the population of older than 79 years. Source: Statistics Sweden

Density: Number of inhabitants divided by municipal area. Source: Statistics Sweden

Socialist majority: Dummy variable taking the value 1 if the Social Democrats (S) and the Leftist party (V) received more than 50 percent of the votes in the election to the municipal council, 0 otherwise. Source: Statistics Sweden.

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