How efficient are municipalities in activating cash-help recipients in Denmark

James H. Weatherall & Tor Beltov

Socialpolitik og velfærdsydelser
Working Paper 03:2004

Working Paper
Socialforskningsinstituttet
The Danish National Institute of Social Research

How efficient are municipalities in activating cash-help recipients in Denmark

James H. Weatherall & Tor Beltov

Social Policy and Welfare Service
Working Paper 03:2004

How efficient are municipalities in activating cash-help recipients in Denmark?

James H. Weatherall[†] and Tor Beltov[‡]

[†] *Efficiency and Quality of Welfare Production, The Danish National Institute of Social Research, Herluf Trolles Gade 11, DK-1052 Kbh K, Denmark*

[‡] *Department of Organization and Management, Faculty of Social Sciences, University of Southern Denmark, Campusvej 11, DK-5230 Odense M.*

Abstract

Previous studies do not analyse activation starts as the parameter of interest in evaluating labour market programs. In this paper we evaluate municipality ability to activate cash-help recipients, which helps recipients gain the necessary skills vital to future regular employment in Denmark. A Data Envelopment Analysis (DEA) bootstrap approach contributes to the DEA literature by evaluating a new subject, which is the relative productive activation participation efficiency for a population of Danish municipalities in 2001. The main results indicate that municipality active labour market policy (ALMP) practices and organisation can only determine activation participation to a certain extent because unemployed cash-help recipient ability affects participation in activation. Municipalities can improve activation efficiency levels in the future by emulating the efficient municipalities that have a similar social and economic structure or through technological innovation developed through cooperation with other institutions.

Key Words: Activation; Efficiency; Municipality cooperation; Cash-help recipient ability; Active labour market policy; Data envelopment analysis bootstrap;

---

1. Introduction

How efficient are municipalities in activating cash-help recipients as a tool in preventing non-participation on the labour market and social exclusion? The answer to this question is one of the central issues in evaluating welfare production. In Denmark, policy makers believe that Active Labour Market Policy (ALMP) plays an important role in improving uninsured cash help recipients

connection to the labour market, see Ministry of Labour (2002). However, previous international literature finds that ALMP is not a successful venture in terms of securing regular future employment from an economic perspective, see Dar (1999). A major assumption in the literature is that employment is the best way of evaluating ALMP. There are on the other hand other ALMP objectives, which include additional economic and social objectives. The economic goals include employment, the value of output produced by trainees while in training and continued labour force participation. The social goals include participation in the labour market, educational attainment and improving an individual's social situation.

A closer look at the municipality's treatment of the cash-help recipient may provide evidence as to which types of goals individual municipalities value the most. Generally, regardless of municipality goal preferences, the key to achieving economic and social goals for society are realised when the maximum number of cash-help recipients are activated. Therefore our major assumption states that if the maximum number of cash-help recipients is activated, then the probability of fulfilling different types of economic and social goals is possible. This assumption is an important difference in the literature because evaluations are often solely based on employment outcomes, which means that some programs could be deemed unsuccessful if the evaluation is based on employment criteria but quite successful if they are based on multiple economic and social criteria. This should provide a more complete indication of ALMP evaluation and perhaps shed more light on how to turn improved social and economic outcomes into long-term employment.

Labour market outcomes dominate the evaluation literature because they are measurable, see Heckman et al. (1999). These studies do not however assess the improvement of other benefits that can come from ALMP. In addition these studies generally look at employment effects within the same period or in the period after. Perhaps the problem is not ALMP, but the way in which the efficiency and effects of ALMP is measured. ALMP may be succeeding on other fronts and that the true employment benefits are not realised in the short-term, but in the long-term.

This trend in the literature is also prevalent in Scandinavia. Previous Scandinavian studies find that among other things, individual labour market information, age, race, sex, education and training history influence the probability of finding regular employment after activation is received, see Heckman et al. (1999).

Although there seems to be much research on the individual effects of ALMP in society, there is much less emphasis in the literature on municipality efficiency in activating cash-help recipients. Those past studies don't merge survey data and administrative data and don't examine if the same relationship existed for the probability of being activated for cash-help recipients. Therefore many

policy practice variables, which could be vital to success aren't analysed. It is realistic to believe that policy practices can affect efficiency.

Policy practices include how municipalities that encourage cooperation with different actors in the economy may find that information sharing can lead to important knowledge about the job market or about the individual, which may help make activation more efficient. Having a job consultant solely employed to facilitate cooperation with local businesses should also further efficient gains.

Whereas a municipality that has few economic resources, lacks professional expertise or lacks suitable activation offers may create limited opportunities for cash-help recipients, which lead to decreases in efficiency. It is also possible that some municipality employees may have a preconceived notion about the cash-help recipient's future. Perhaps some recipients are never intended to participate in activation. Giving up on a certain group of recipients will lead to additional decreases in efficiency.

However municipalities that prioritise program reviews, the specialist model and categorisation of cash-help recipients should have positive influences on efficiency. The individual attention on cash-help recipients with additional problems – categorisation - and having case officers work on one case type – specialist model - combined with a review of how well the program is working should lead to optimal results for cash-help recipients who might have more problems than just unemployment because of the focus and goal oriented nature of the policy practice.

Furthermore municipalities that impose moratoriums or reduce cash-help benefit payments when cash-help recipients refuse to participate in an activation offer should have a positive effect on efficiency. The economic incentive to participate in an activation offer should persuade the cash-help recipient to accept the activation offer.

Sometimes, the municipalities are at the mercy of the cash-help recipient. If cash-help recipients don't show up to activation, or refuse activation or if they have extremely low preferences and ability, the capacity to activate will be very difficult. This difficulty in activating certain recipients could lead to decreases in efficiency, especially in municipalities with many cash-help recipients because it will be more difficult to monitor their actions.

By testing the validity of the hypotheses discussed above, this paper adds a new perspective to the ALMP literature by exploring efficiency results for a micro economic analysis of municipality behaviour in activating cash-help recipients into the different types of activation. Therefore the

success criteria focuses on activation participation, not employment starts.[1] A DEA bootstrap approach described in section 3 makes the choice of multidimensional success criteria possible.

Thus compared to previous studies this paper applies an internal success criterion by analysing the number of activated cash-help recipients in each municipality instead of the employment effects of activation in evaluating ALMP efficiency, see Heckmann et.al (1999). By conducting a comparative analysis we analyse which Danish municipalities are most efficient in activating cash-help recipients and which factors are the activation of cash-help recipient's dependent on for success. The study also illustrates different municipality practices, and the policy effects on the efficiency of activating cash-help recipients. We answer these questions by applying a DEA bootstrap method to measure relative efficiency and to overcome the dependency problem, which allows us to properly analyse municipality policy efforts on efficiency, see Simar et.al (1992). Not accounting for statistical independence is the fundamental problem in using relative efficiency scores for policy proposals, see Førsund (1999).

We find that the degree of activation participation among cash-help recipients depends on the level of sanctioning in the municipality, the degree of cooperation with different institutions, economic resources, the competence of employees, and the type of organisation within each municipality. Many municipalities proved to be inefficient in activating cash-help recipients and that may be due to the fact that municipality policy was not designed and conducted in an optimal manner.

Section 2 describes the current labour force and ALMP situation throughout Europe. Section 3 outlines the DEA and bootstrapping method used while section 4 characterises the data. Section 5 contains the empirical results. In section 6 conclusions are drawn.

2. ALMP in Denmark

The average number of individuals activated in Denmark each year is 100.770 and the total costs of activation investments are approximately 3 billion Euros each year in Denmark. Due to the number of individuals receiving activation and the costs of this investment, the activation legislation for uninsured cash help recipients in Denmark is designed to ensure that individuals with the ability to work shouldn't passively accept transfer income, but improve their connection to the labour market as quickly as possible. The tools that the Danish government uses to improve labour market connection include a wide variety of services that include basic education, classroom training, wage

[1] See James Weatherall's Ph.d. analysis on the direct and indirect effects of ALMP on employment

and employment subsidies to private firms, temporary work experience in the public or non-profit sector, public service employment, on-the-job training, employment service, job readiness training and job search training and subsidies. However, in Denmark today not every cash-help recipient receives activation. The number of cash-help recipients that can be activated also depends on legislation, municipality policy and investment and the positive outcome per Danish Krone (DKK) varies drastically from municipality to municipality, see Weatherall (2002). Thus, analysing the economic, social variation between municipalities on a national basis can help us discover the factors that contribute to the activation of cash-help recipients, which in turn should increase benefits to society.

The indirect effects and direct effects of ALMP on society

The possible benefits of these huge expenditure investments include the direct benefit of possible future employment of the cash-help recipients, but there are also possible gains to society which include savings in administrative costs because of society's reduced use of social welfare, reductions in asocial behaviour from employment, reduced expenditure on criminal justice system, substance abuse centers, and child welfare services, see Mallar et.al (1982).

Thus, the direct and indirect benefits of ALMP could improve the quality of life for the individual and society. However, ALMP can also be thought of as a preventive measure. Future pressure on the welfare system is a threat because the general population is getting older and the working age population is retiring earlier (dependency ratios are increasing). Combined with constant changes in demand and technology from globalisation, it is vital that the labour force can adjust to these types of changes in the economy that can produce various types of unemployment and pose new challenges for the welfare system. ALMP is one tool that a government can use to influence the behaviour of the labour force. However, ALMP is a controversial program due to the uncertainty surrounding the effects of activation. The activation period produces a number of desirable and undesirable effects for the labour force and on society in general. Firstly, the motivation effect results in an increase in job search, when the obligation to participate in activation becomes a reality. Secondly, the sticky effect states that an unemployed cash-help recipient's job search decreases while participating in an activation offer. Finally, the qualification effect finds that the probability of finding regular employment increases after participation in activation. Therefore

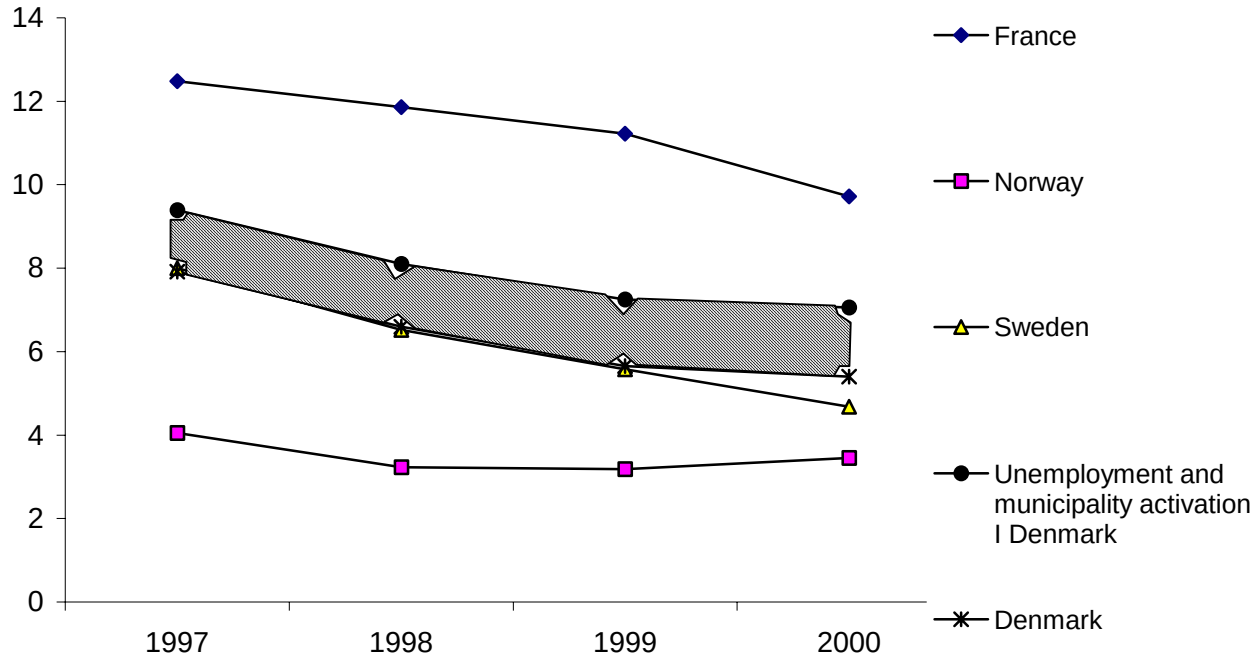
activation could directly affect job search, human capital and employment. There are also other indirect effects that may result from the activation programs. The indirect effects include displacement effects, substitution effects and deadweight losses. Firstly, the displacement effect claims that a firm with subsidised workers increases output, but decreases output among firms without subsidised workers. Secondly, the substitution effects result in the hiring of a subsidised worker instead of an unsubsidised worker who would be otherwise hired. Lastly, deadweight losses might occur because the recipients who benefit the most, are more skills to begin with, and may find the job even without the training. Generally speaking, indirect effects seem to produce some negative effects on the labour force.

The direct and indirect factors from the activation period itself can pose challenges to the person receiving activation, businesses, other individuals who are unemployed, and other businesses. In Denmark it is the municipalities that decide which recipients receive activation, and therefore it is the municipality that sets of the chain of direct and indirect effects on the labour force and labour market. Selecting the recipients who receive activation, when they receive activation, and how much activation they receive can alter the preferences for work and leisure of the labour force and can affect the way in which businesses operate and possibly their competitiveness.

The relationship between ALMP and hidden unemployment in the EU 15 and the OECD

The unemployment and ALMP problem facing Denmark is also prevalent in the EU and the OECD as unemployment affects the way in which individuals, business and governments behave and set policy. The extent of the problem varies as unemployment levels vary within the European Union (EU), but unemployment differentials between countries doesn't explain the entire economic labour market situation in a country. This can best be illustrated through a comparison between a few OECD countries.

Figure 1. Unemployment in Scandinavia and France. Percent.



Take for instance France and Denmark. Compared to France, Denmark's unemployment rate is low, see figure 1. However labour force participation in Denmark is also low. Presently in Denmark, 8 percent of individuals between 18-66 years of age receive disability pensions and many others between the ages of 60-66 receive early retirement pensions. In reality less than 20 percent of the population is active up to the retirement age of 67. Moreover, activation recipients in Denmark aren't counted as unemployed, while other countries such as France invest very little in active labour market policy. Therefore in reality some unemployment in Denmark and in many other OECD countries is hidden. A true relative comparison between countries would perhaps be more meaningful with countries that have similar cultures and welfare systems such as Sweden and Norway, see figure 1. Unemployment in Denmark and Sweden seems to be closely related, while Norway experiences less unemployment over the years. Why is this the case? One reason may have to due with each nation's ALMP.

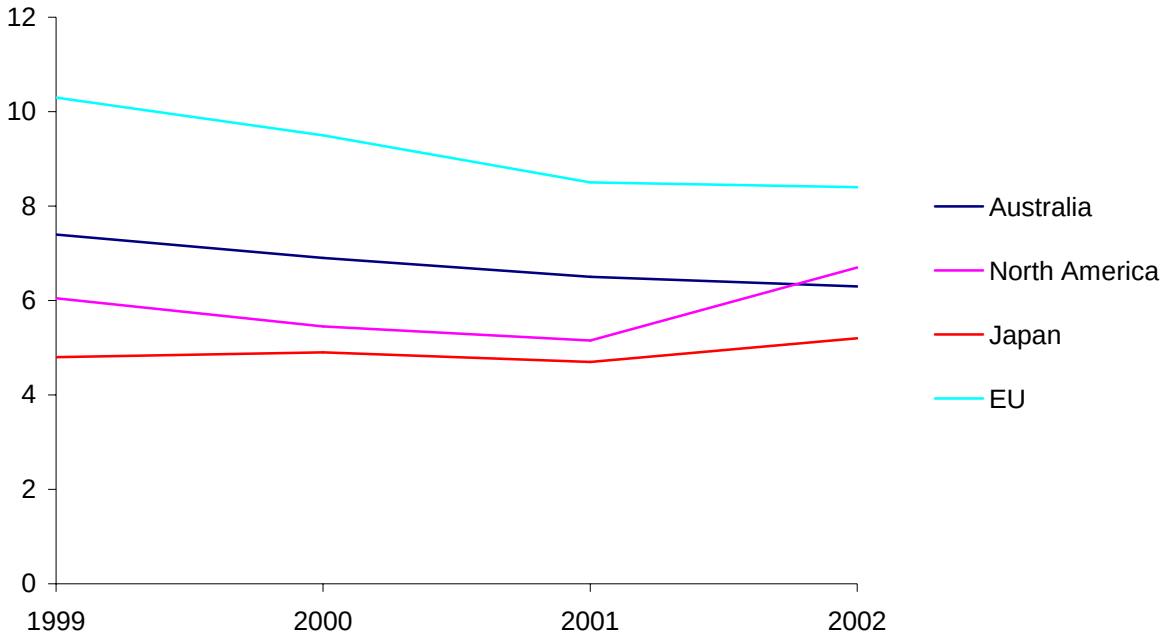
In order to take a closer look at this type of hidden unemployment this paper doesn't analyse the 5 percent unemployed in Denmark. This paper analyses the cash-help recipients that receive activation, see figure 1. It is evident that if cash-help recipients who receive activation count as being unemployed, then the level of unemployment in Denmark would be much higher.

ALMP can address different economic, political and social problems in the EU 15 and OECD

The way in which countries use ALMP varies with the economic situation. Many countries in the developed world use ALMP to prevent bottlenecks (oversupply of unskilled workers and an undersupply of skilled workers) in the economy, to adjust to structural changes in the economy that address changes in demand and technology, to counter business cycle swings, to improve labour market functioning in terms of efficiency and productivity (matching workers and jobs) and to help socially excluded workers re-enter the labour force and hence improve the quality of their lives.

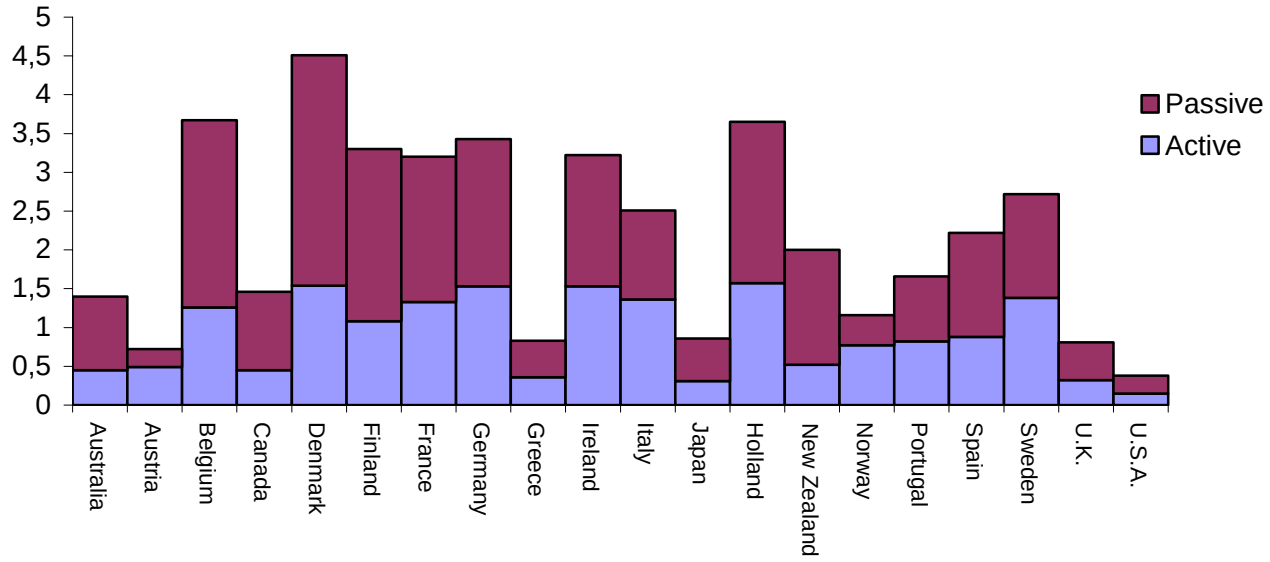
There is also another indirect benefit of ALMP. ALMP is politically also very attractive, because recipients receiving activation benefits aren't counted as unemployed. Therefore political incentives exist for politicians to implement ALMP in their country and to increase activation for countries that already use ALMP. Political incentives may be exacerbated before elections if high employment is a key issue in the campaign, see figure 2.

Figure 2. Unemployment in OECD. Percent.



Therefore different governments apply ALMP to varying degrees based on the political, social and the economic climate, see figure 3. Many countries run ALMP programs, but a substantial part of labour market policy still consists of passive social benefits, which consist of unconditional benefits for eligible recipients. In general OECD countries that have high "active" expenses also have high "passive" expenses and it appears that Denmark uses a high proportion of its GNP on active measures, see figure 3. There are different ways of measuring activation, but economic investment is one indication of a countries commitment to ALMP as the percentage of GNP used on labour market programs can indicate how governments prioritise labour market programs, their attitudes towards ALMP and provide a picture of missing resources in OECD countries.

Figure 3. Active and Passive expenses as a percentage of GNP. 2000.



Thus rising unemployment, structural changes in the economy and demographic changes have made ALMP an essential tool for increasing employment levels in the Euro zone. Currently, labour market reform is a work in progress for many EU country governments. Therefore comparisons between Denmark and other EU countries could demonstrate important factors that affect the efficiency of the ALMP designed to combat unemployment in the face of a changing economic and social environment.

Why is the Danish interesting for the EU 25?

Denmark has the most dynamic active labour market policy in the EU. The new enlargement countries and the existing EU countries are doing little to reform and develop active labour market policy. The existing EU employment policy gives a lot of freedom as to how individual countries should run their labour market programs. The idea of the strategy is to exchange past experiences, supervision of developments, and to support creative employment projects. Many of the enlargement countries are presently not in a good position to comply with the EU employment strategy. The goal that EU member countries agree on is that by 2010, employment levels reach 60 percent for women, 50 percent for the elderly and 70 percent for the labour force. At this point only Denmark, Sweden and Britain achieved these goals.

It is evident that the EU 25 have a lot of catching up to do, which means that the EU 25 have to look for better employment strategies for the unemployed, see table 1. The affect of the employment strategies will depend greatly on increasing the human capital of the recipients receiving assistance through ALMP. A way for the EU 25 to improve their employment strategies is to look at successful current ALMP programs that are currently implemented in Europe. Future success may follow through emulation of successful comparative strategies from other EU 25 countries. The blueprint of a successful program in Denmark could serve as a future policy guide for the new EU countries in developing an employment strategy that is in line with the current EU policy.

Table 1 Employment frequency in the EU 25. Percent. 2001.

EU 25	Population between 15 – 65			Population between 55 -65
	Total	Men	Women	Total
EU 15	63,9	73,0	54,9	38,5
Denmark	76,2	80,2	72,0	58,0
Finland	68,1	70,9	65,4	45,9
Sweden	71,7	73,0	70,4	66,5
The Netherlands	74,1	82,8	65,2	39,6
Belgium	59,9	69,1	50,5	24,1
Luxembourg	62,9	74,8	50,9	24,4
France	63,1	70,3	56,1	31,0
Germany	65,8	72,6	58,8	58,8
Austria	68,4	76,7	60,1	28,6
Italy	54,8	68,5	41,1	28,0
Spain	56,3	70,9	41,9	38,9
Portugal	68,9	76,9	61,1	45,7
Greece	55,4	70,8	40,9	38,0
Ireland	65,7	76,4	55,0	46,8
Britain	71,7	78,3	65,1	52,3
Estonia	61,1	65,6	56,9	48,6
Lithuania	58,9	61,9	56,1	36,4
Latvia	58,6	59,6	57,4	39,1
Poland	53,8	59,2	48,4	30,5
Hungary	56,3	63,3	49,6	23,7
Czech Republic	65,0	73,2	57,0	36,9
Slovakia	56,7	61,8	51,8	22,5
Slovenia	63,6	68,6	58,6	23,4
Bulgaria	50,7	53,6	47,9	23,9
Romania	63,3	68,6	58,6	50,5

Source: Eurostat 2002

3. DEA Method

The most commonly used ALMP evaluation strategy is the before-after estimator, which compares the same person at two different points in time, see Edin (1988), and the fixed effects estimator

without a comparison group. A more widely used estimator is the cross-section estimator, which compares mean outcomes of participants and non-participants at a particular point in time, see Ackum (1991). The OLS, probit and MLE are also widely used in the past, see Heckman, LaLonde and Smith (1999). The conclusions based on this is literature find that there is no preferred evaluation method and that the choice of the estimation method depends on the economic question being asked. This paper uses Data envelopment analysis (DEA) to contribute to ALMP evaluations by measuring the relative efficiency of municipalities in the presence of multiple inputs and outputs and thereby overcome a restriction present in many econometric models, see Thansoullis (1990).

The justification for using this estimator is as follows. The level of unemployment, the cash-help recipient population and employment opportunities for activation recipients differ from municipality to municipality. These differences between municipalities are due to internal and external factors. External factors include economic and social structure variables, which could seriously influence municipality efficiency in helping cash-help recipients into activation. Economic and social structure includes information on age, business cycles, taxes, education, work experience, demographics, children per family status, gender, unemployment, families on social assistance, income, housing, and businesses. Internal factors include the municipality investments.

The various external factors affect the demand and supply of labour for the potential employee and employer. However municipalities have some capability in reducing unemployment via their investments. The transformation process demonstrates that municipality policy and the external environment affect activation participation, which affects employment outcomes, see figure 4.

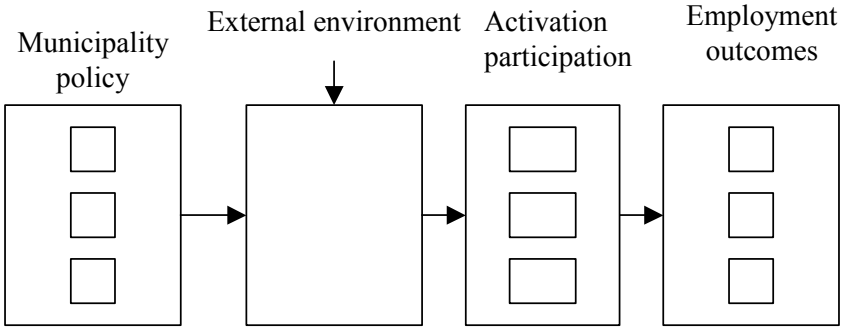


Figure 4. The ALMP transformation process

The best way to measure ALMP efficiency in this framework is data envelopment analysis. The basic concept can be explained graphically via a “one input-one output” example, see figure 5. The input is the amount of employee labour spent on municipality activation and the output is the number of cash-help recipients that have been activated. The different technologies show different

production patterns in the municipalities, which effects the envelopment of the data and results in different efficient frontiers. These frontiers are characterised by efficient municipalities. This is how DEA is applied to measure the relative efficiency of decision-making units. However, the DEA applied in this paper deals with multiple outputs. Compared to previous studies, the principle advantage of using DEA when evaluating ALMP, is the ability to measure relative efficiency in the presence of multiple outputs.

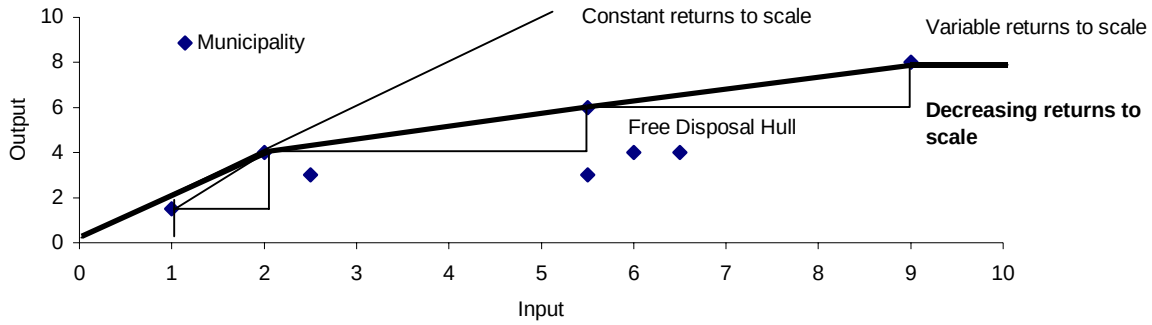


Figure 5. CRS, VRS, FDH and DRS technology in a one input, one output DEA example

The method we use in this paper has 1 input and 7 outputs. The input includes the number of municipality employee hours spent on ALMP. The outputs include the number of recipients that receive job training, individual job training, educational competence in the form of AMU, VUC, trade schools, and technical schools, other forms of education, which include production schools, day schools and language schools, employment projects, volunteer activities, and introductory courses. The purpose is to maximize the output efficiency, θ, for municipality, j_0, relative to all other municipalities, where inputs are constrained to be no worse off from where they started. Y is a vector of M outputs and X is a vector of S inputs. λ_j, is the proportion contributed by municipality, j_0, in evaluating another municipality. λ_j, will be greater than or equal to 0 for every municipality. In a multiple output world the DEA takes the following form:

$$Max\ \theta \qquad (1a)$$

$$x_{j0} \geq \sum_{j=1}^{n} \lambda_j x_j \qquad \theta y_{j0} \leq \sum_{j=1}^{n} \lambda_j y_j \qquad (1b)$$

(1c)

$\lambda_j \geq 0 \qquad \forall j = 1, \ldots\ldots n$ *(1d)*

This basic DEA model is sometimes supplemented in the DEA literature with regression analysis, which is widely applied to the analysis of the variation in DEA efficiency scores. However, the conventional procedure that generally is followed in the literature is invalid. Due to the presence of the inherent dependence among the DEA efficiency scores, one basic model assumption required by regression analysis, which is independence within the sample, is violated. A bootstrap overcomes the dependency problem, see Xue and Hacker (1999), which allows us to properly analyse municipality policy efforts on efficiency as not controlling for independence is a major problem in using relative efficiency scores for policy purposes, see Førsund (1999). Therefore this paper takes special care in evaluating different types of efficiency models to avoid insufficient method application. This can only be achieved with informative data on municipalities and recipients.

The results from the DEA model described above play an integral role in the bootstrapping algorithm. The goal is to substitute the incorrect conventional estimators for the standard errors of the regression coefficient estimates with the bootstrap estimators for the standard errors of these estimates. By bootstrapping the data, it is possible to produce appropriate standard errors when the n original municipalities are independently sampled from F, even though the original scores computed from the X's are dependent. The entire DEA Bootstrap procedure is outlined in the following algorithm:

1. For each DMU $(x_k, y_k), k = 1, \cdots, n$ calculate the efficiency score, $\hat{\theta}_k$, by using the programme in 1(a) – 1(d)
2. Define the empirical probability distribution $\hat{F}$ by assigning probability of 1/n at each $\hat{\theta}_k, k = 1, \cdots, n$
3. Generate a sample of efficiency scores, $\tilde{\theta}_k, k = 1, \cdots, n$ from $\hat{F}$
4. Construct pseudo DMUs $(x_k, y_k) = \left(\frac{L^E(y_k)}{\tilde{\theta}_k}, y_k \right), k = 1, \cdots, n$
5. Estimate the bootstrapped efficiency scores, $\tilde{\theta}_{k,b}^{*}$ by solving a DEA programme on the data obtained in 4
6. Repeat 3) - 5) B times for each DMU to obtain a set of bootstrapped efficiency scores defined by $\tilde{\theta}_{k,b}^{*}, b = 1, \cdots, B$

7. For each bootstrap sample $\tilde{\theta}_{k,b}{}^{*}, b = 1, \cdots, B$ evaluate the bootstrap replication $\beta_{kb}, b = 1,..., B,$ $j = 0,1,...m$ by fitting the regression model:

$$\tilde{\theta}_{kb} = G(\beta_b, v_{kb}) + \varepsilon_{kb}, \quad k = 1,..., n, \ \beta_b = (\beta_{b0}, \beta_{b1}, ..., \beta_{bj}, ..., \beta_{bm})$$

8. Estimate the standard error $se(\beta_j)$ by the sample standard deviation of the *B* Bootstrap replications of β_j:

$$se_{B(\beta_j)} = \left(\sqrt{((\sum_{b=1}^{B} \beta_{kb} - \beta_b)/(B-1))} \right)^{1/2}, \ j = 0,1,..., m,$$

9. where

$$\beta_b = \sum_{b=1}^{B} \beta_{bj} / B, \quad j = 0,1,..., m,$$

We call $se_B(\beta_j)$ the Bootstrap estimator for the standard error of β_j. Now, we are ready to use a t-test to test the following hypothesis:

$$H_0 : \beta_j = 0, vs. H_a : \beta_j \neq 0.$$

Calculate the test statistic according to:

$$t = \beta_j / se_B(\beta_j),$$

and compare t to the critical value $t_{\alpha/2}$ from the student t distribution with degrees of freedom equal to (n-m-1). If $|t| > t_{0.025}$, reject the null hypothesis $H_0 : \beta_j = 0$ in favour of $H_a : \beta_j \neq 0$, at α=0.05 significant level. Otherwise, the null hypothesis $H_0 : \beta_j = 0$ is tenable at α=0.05 significant level.

Each step in the DEA bootstrap plays a vital role in measuring the procedure properly. The first step is conducted because the original scores are used to create new samples. The second step is conducted because the new samples have to be drawn randomly. The third step is necessary because

the DEA random scores are needed to create lots of new data sets for the bootstrap. Step four is applied because it is necessary to show that the n original municipalities are independently sampled from F. Step five compares the original DMU with the new pseudo data set. Steps six and seven give the appropriate standard errors when the original DMU's are independently sampled from F, even though the efficiency scores computed from the x's are dependent.

The above procedure, unlike the direct regression method, correctly implements Efron's Bootstrap idea to give appropriate standard errors when the n original DMU's, $X_i, i = 1,2,...,n,$ are independently sampled from F, even though the efficiency scores computed from the X's are dependent.

After applying this methodology, the parametric and non-parametric analysis reveals, which municipalities are best at activating cash-help recipients. Other studies focus heavily on traditional econometric tools in examining ALMP and welfare efficiency, but this paper primarily focuses on bootstrapping and the DEA efficiency measure in order to represent the multi-dimensional nature of the real world. This is achieved by solving the dependency problem, which previous studies prove to produce distorted results that results in some inefficient municipalities being evaluated as efficient, see Efron (1993). The bootstrapped sample on original data better represents reality because internal and external factors not included in the DEA model are analysed correctly for correlation in the regression analysis.

4. The advantages and disadvantages of the data

The data set consists of rich survey data conducted by the centre for labour market research (CARMA), on all the municipalities in Denmark. The data set is relatively small because of the response rate and the cross-sectional nature of the survey. All the questions focused specifically on municipality ALMP practices. 197 out of the 275 municipalities in Denmark participated in the survey, however not all questions were answered. Therefore 39 municipalities are not used in the analysis because DEA can't handle missing observations in the data set. Although it would be ideal too have detailed data on all municipalities, the high response rate still allows us to monitor a number of differences in municipality practices.

Further explanations that contribute to differences in the efficiency of municipality practices are also possible to examine through the social structure data accessed from Statistics Denmark statistics bank.

In a perfect world, municipality data on employees, management, organisation type, leadership conduct, employee preferences, employee ability and professional conduct is extremely beneficial. As far as the activation recipient is concerned, detailed data on individual preferences, individual ability, duration of each activation period, number of activation periods, exact date that an individual enters the system, long time horizons and the precise type of activation benefit that an individual receives could be very helpful. It would also be beneficial to follow recipients through one time period and into another time period. All this information is valuable because it provides a complete representation of ALMP efficiency.

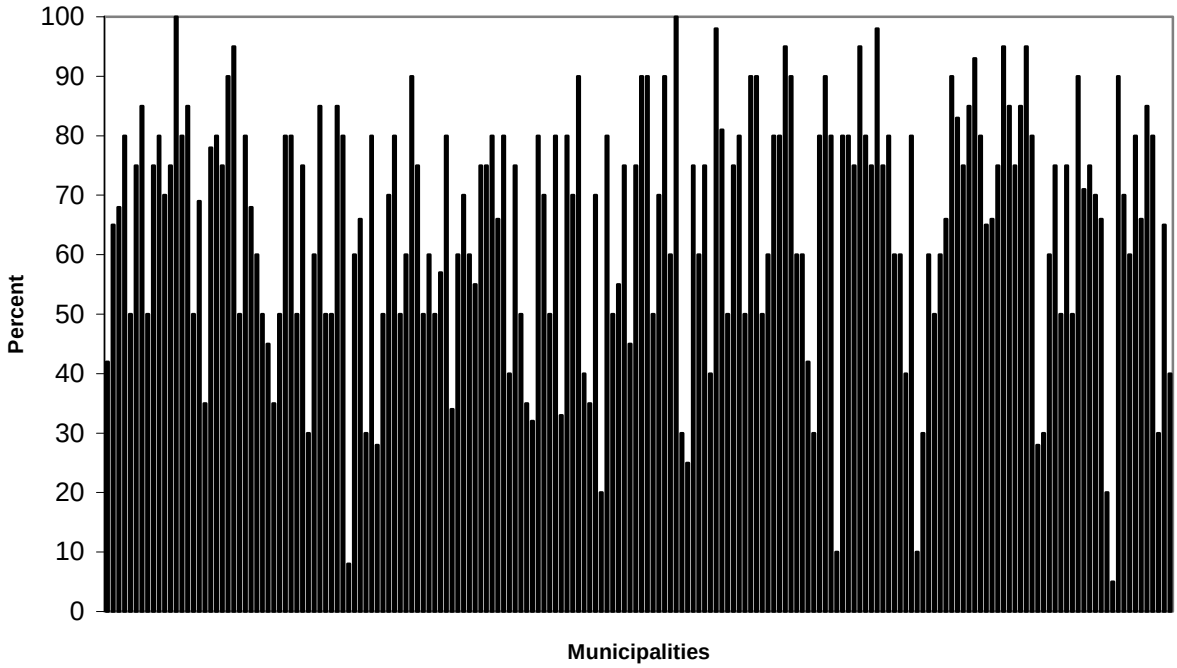
However in the absence of a perfect world, the data that is accessible still reflects what the project is interested in analysing due to the fact that we have access to administrative data and survey data on municipality activation practices, see Larsen (2001). The project specifically has access to cross-section data on expenses for activated uninsured cash-help recipients, social structure, employees, management, organisation type, leadership conduct, and professional conduct.[2]

By merging survey data, and statistic bank data, it is still possible to study a wide variety of data that is representative of a perfect world because of the accessible information on policy necessary to evaluate efficiency. This helps answer the questions set forth in the paper.

Before the questions set forth in the paper are explored, it would be insightful to get an idea as to what type of client the municipalities are dealing with in their quest to activate cash-help recipients. The differences between clients are characterized most specifically by the ability and preferences of cash-help recipients in each municipality, see figure 6. Evidence of this phenomenon means that municipalities' gear ALMP based on the type of cash-help recipient in each municipality in order to ensure success.

[2] See Appendix for variable definitions

Figure 6. Proportion of cash-help recipients in each municipality with more problems than just unemployment.



A major and important component of policy practice concerns the major reasons for cash-help recipients non-participation in activation, see table 2, with the knowledge that many cash-help recipients that have more problems than just unemployment. The most important reason for non-activation seems to be municipality attitude. 38,2 pct. claim that some cash-help recipients are never intended to be activated. It appears that certain municipalities give up on some types of recipients. Another important factor includes attendance issues. It appears that some municipalities allow recipients to skip activation because they don't show up. That must also mean that some municipalities don't have the resources to ensure attendance or that the municipality is too big to monitor cash-help recipient movements. Other problems involve the lack of suitable activation offers for particular groups of cash-help recipients. Perhaps these municipalities could focus more on fitting cash-help recipients into certain activation offers through case officer effort in helping certain recipients adjust (instead of trying to fit activation offers on cash-help recipients). Economic resources, activation refusal, professional ability and work pressure also seem to be fairly important.

Table 2. Why are some cash-help recipients not receiving activation?

	Very Important	Important	Fairly Important	Less Importance	No importance
Cash-help recipients refuse activation	3,1	2,1	17,5	45,9	31,4
Cash-help recipients don't attend activation	8,8	16,0	34,0	25,8	15,5
No activation offers match the group type	6,2	14,4	28,4	36,6	12,9
Some cash-help recipients are never meant to be activated	9,3	28,9	28,9	26,6	6,7
Economic resources aren't available to the municipalities	3,1	7,3	26,6	31,8	30,7
Municipalities lack the Professional ability to offer the right type of activation	2,1	4,2	19,8	35,9	37,5
The case officer withdraws the cash-help recipient from activation due to work pressure	7,9	13,2	34,2	25,8	18,9

Other qualitative factors can of course also influence activation participation. Local and national governments often believe that the best way to achieve an effective ALMP is through expenditure, which international studies find to differ across countries, see Ogawa (1999). However a successful ALMP depends on much more than expenditure. Management and leadership, which form a municipalities policy practices, are better proxies for success criteria. Generally, the different municipality policy practices produce participation in different forms of activation, see table 3.

Although we have identified some trends in the data, we can't find the determinants of municipalities' ability to activate cash-help recipients until we locate the efficient and inefficient municipalities', which makes future ALMP progress possible. Section 5 discusses how effective the allocation of activation is in the municipalities.

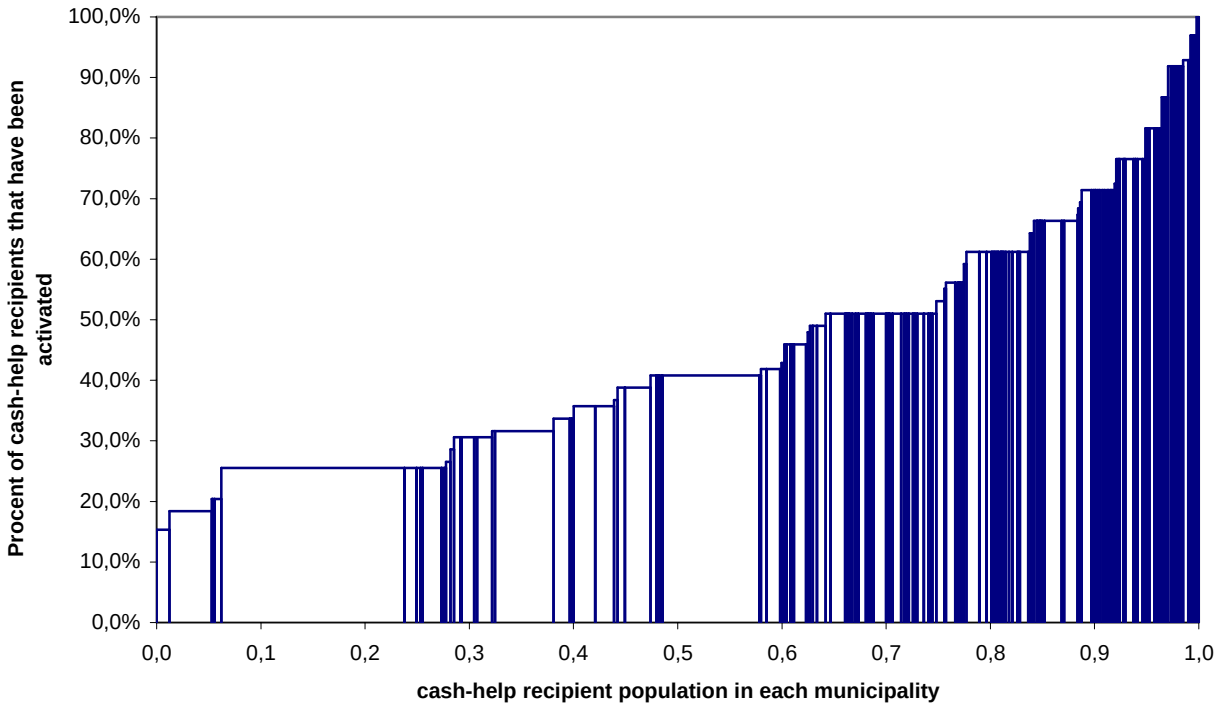
Table 3. Activation benefit distribution in Denmark. Percent.

	Job training	Individual Job Training	Competence Education	Classroom Training	Employment Projects	Volunteer Work	Introductory Courses
Municipality 1	9	35	7	12	29	3	5
Municipality 2	13	32	5	11	30	5	4
Municipality 3	11	36	8	13	26	1	5

5. Results

In the first part of this section we examine which municipalities are most efficient in activating cash-help recipients. Some recipients are more ready for activation than other recipient's, which also means that some municipalities use more resources in preparing recipients for activation than other municipalities. This inevitably affects efficiency. Many other factors such as municipality policy can also affect efficiency. The proportion of cash-help recipients receiving activation between municipalities varies from 15 pct. to 100 pct, see figure 7. The focus of the second part of this section will be on the factors that affect the efficiency of activating cash-help recipients.

Figure 7. Proportion of cash-help recipients in each municipality that participated in activation. Procent. 2000.

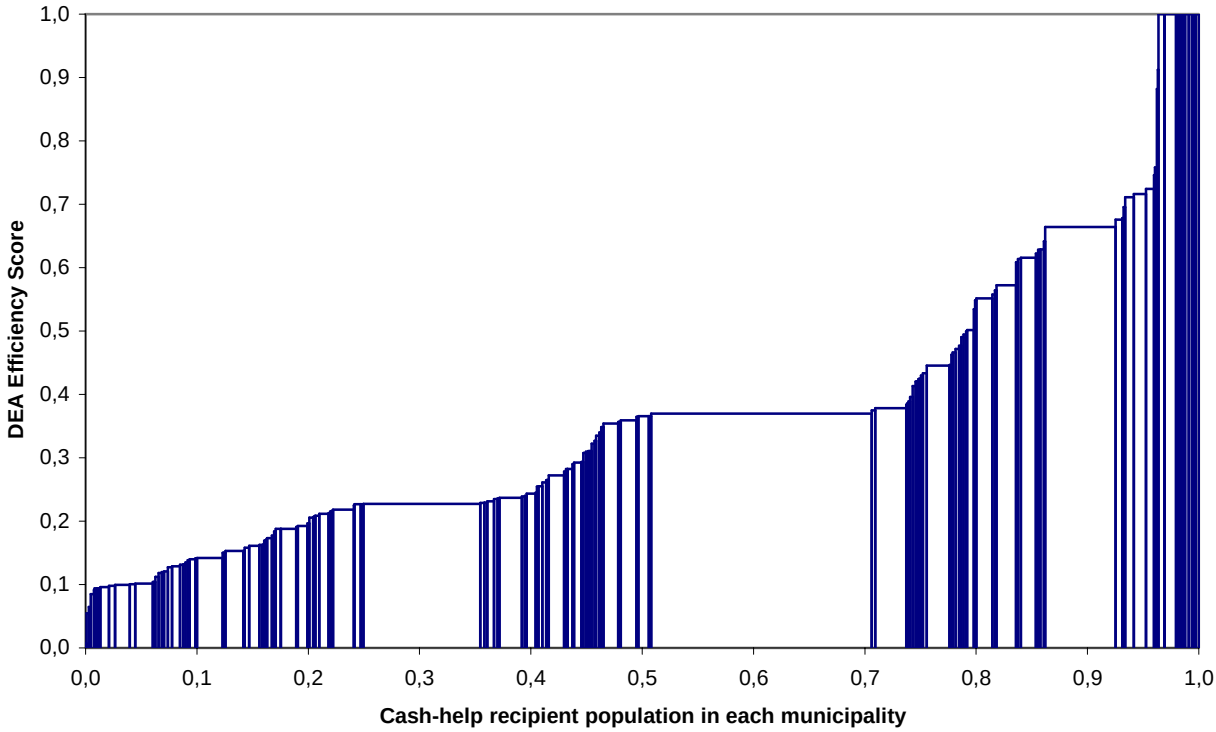


Which Danish municipalities are most efficient in activating cash-help recipients?

The efficiency results show that 11 out of 158 municipalities are efficient and that the efficient municipalities approximately contain about 5 pct. of the cash-help recipients in Denmark, see figure 8. Therefore these 11 municipalities, which represent 5 pct. of the cash-help recipients, should be

used as role models for the inefficient municipalities because they are best at activating cash-help recipients. If worst practice units are defined to be municipalities with an efficiency rating of under 0.5 pct, then about 80 pct. of the cash-help recipients falls into this category, which means that these municipalities are the least efficient in activating cash-help recipients. The most efficient units consist of municipalities with a small cash-help recipient population. The most inefficient units consist of municipalities with small, medium and large sized cash-help recipient populations. It appears that municipalities with small cash-help recipient populations have the most efficient ALMP perhaps due to more individualized attention, which may allow some cash-help recipients the possibility to develop the personal and professional characteristics necessary to start activation.

Figure 8. Original DEA Efficiency Scores from observed survey and administrative data



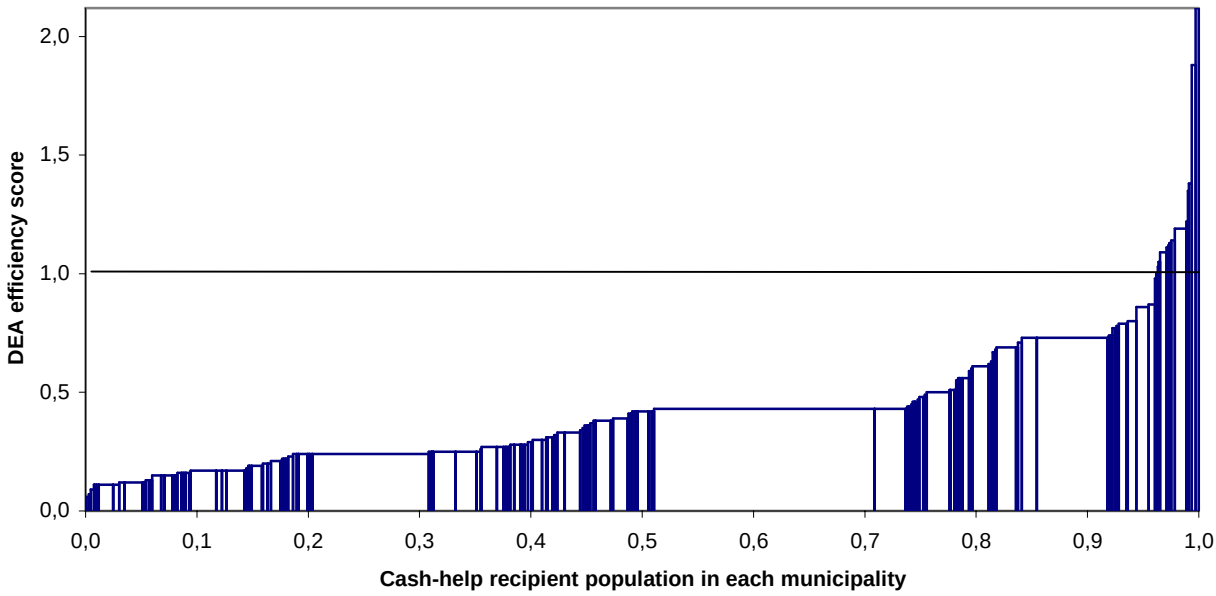
The low efficiency scores indicate that enormous strides in improvement are possible for a vast majority of municipalities in Denmark. If inefficient municipalities can discover, which policy practices produce optimal results, it will be possible to implement similar types of measures conditioned on the social structure of the municipality. Some municipalities could be less efficient

because they operate in unfavourable conditions, but other municipalities that find themselves in similar situations operate efficiently. This is most likely due to certain policy practices.

If we analyse the relationship between changes in efficiency and municipality policy practices it is necessary to address the dependency problem that exists when DEA scores are applied to regression models. The dependency problem between the efficiency scores is really the result of the municipalities on the frontier, because their scores directly influence the scores of inefficient municipalities.

The DEA Bootstrapped results produce efficient municipalities, which again consist of about 5 pct. of the cash-help recipient population. The worst practice units contain 77 pct. of the cash-help recipient population, see figure 9. This indicates that the average DEA scores for a bootstrapped sample resemble the original DEA efficiency scores. It is also evident that 14 out of 158 municipalities have an efficiency rating over 1. This is possible because the frontier is always compared to the original data for each municipality. Therefore in a randomised sample selection process based on real data, there is a possibility that some of the data - which would produce efficient scores and hence move the frontier outwards - are not chosen. The similarity between the two efficiency figures leads us to believe that the bootstrapped sample properly calculated 1000 sets of efficiency scores. These 1000 new DEA efficiency results are the dependent variable in the 1000 OLS regressions conducted in the next section.

Figure 9. Average DEA Efficiency scores for a Bootstrapped Sample



What factors contribute to the activation of cash-help recipients in Denmark?

To properly measure efficiency it is necessary to show that every regression coefficient estimate is a projection of a random sample from a population with an unknown distribution. This is achieved through the bootstrapping method, which overcomes the dependency problem by estimating the standard errors of the regression coefficient estimates. The bootstrap OLS method produces results and conclusions that are different from a standard OLS regression. These results are discussed in this section.

Municipalities that evaluate ALMP effort seem to have a positive effect on efficiency, see table 4. This may indicate that program reviews may reveal how well resources are employed, which may allow municipalities to adjust accordingly. A luxury that non-evaluating municipalities can't enjoy.

It is also evident that dividing cash-help recipients according to personal problems have positive effects on efficiency. This may mean that certain qualified case officers are allowed to work exclusively with cash-help recipients who have special problems, which may indeed increase the probability that some of these recipients will be activated.

The specialist model where case officers focus on one case type compared to a generalist model where case officers focus on different case types also has a positive effect on municipality efficiency. Having case officers work specifically on activation cases versus case officers who work with many different types of cases may mean that more time can be spent on individual cases.

Another effective determinant of efficiency is moratoriums on cash-help for recipients who refuse activation compared with municipalities who continue to provide cash-help. Obviously, if an individual is faced with the prospect of non-payment, activation may seem more attractive. The consequences of a moratorium may therefore affect activation participation.

Cooperation with the institutional insurance system (AF), educational institutions and other municipalities also has a positive influence on efficiency compared to municipalities who don't cooperate. Information sharing can lead to better and more opportunities for both the cash-help recipient by means of finding suitable activation offers and the municipality by means of exchanging specific information on some cash-help recipients that have perhaps moved from the AF system to the cash-help system.

Table 4. Results of Bootstrap Regression with C=1000 Samples

Explanatory Variable	$\hat{\beta}_j$	$\overline{\beta}_j$	$\hat{se}_{1000}(\hat{\beta}_j)$	t value	Pr(>|t|)
Intercept	0,1417	0,1919	0,0853	1,6613	0,0970
Municipality Population	0,0008	0,0002	0,0001	0,4948	0,6208
Social Democrats	-0,1686	-0,2731	0,1896	-0,8895	0,3740
Social Liberal Party	-0,0531	-0,0477	0,1535	-0,3461	0,7294
Conservative's People Party	-0,2064	-0,3111	0,1621	-1,2733	0,2032
Liberal Party	-0,1090	-0,2175	0,1905	-0,5723	0,5672
Progressive Party	-0,3533	-0,4552	0,2551	-1,3850	0,1664
Evaluation of ALMP Effort	0,0833	0,1125	0,1166	0,7143	0,0752
Case officer Departments	0,0887	0,1155	0,1156	0,7675	0,0430
Case officer organization	0,03892	0,0586	0,4433	0,0878	0,0300
Job consultants	-0,0753	-0,1442	0,1351	-0,5577	0,5772
Start activation: Under 30 – unemployment problems	0,0009	-0,0055	0,3280	0,0028	0,9977
Start activation: Over 30 - unemployment problems	-0,0012	-0,0005	0,1606	-0,0076	0,9939
Start activation: Under 30 – more than just unemployment problems	-0,0047	0,0145	0,3639	0,0129	0,0897
Start activation: Over 30 – more than just unemployment problems	-0,0003	-0,0013	0,2882	-0,0012	0,0991
Category definitions	0,0122	0,0266	0,0362	0,3381	0,7354
Case officer evaluation	-0,1216	-0,1902	0,2070	-0,5874	0,5571
Cash-help recipients own wishes	-0,0952	-0,0978	0,1615	-0,5894	0,5557

Estimated returns on ALMP Investment	-0,0151	0,2567	0,5908	-0,0255	0,9797
Administrative decision making	0,0111	0,0276	0,3105	0,0358	0,9715
Political decisions from municipality committees	0,0464	0,0640	0,5787	0,0802	0,9361
Local business wishes	-0,0966	-0,1337	0,3368	-0,2868	0,7743
Municipality net expenses	0,0419	0,0590	0,0590	0,7098	0,4780
Reject-Moratorium on cash-help	0,1126	0,1635	0,1729	0,6515	0,0149
Reject- Receive less cash-help	-0,0948	-0,1354	0,2343	-0,4045	0,6860
Moratorium - Inclinations for unemployed	-0,1372	-0,0832	0,2798	-0,4902	0,6241
Reduce - Inclinations for under 30	-0,1336	-0,1368	0,2069	-0,6458	0,5186
Cooperation with local businesses	-0,0219	0,0110	0,1075	-0,0413	0,9671
Leadership level: Cooperation with AF	0,2144	0,2573	0,0126	1,9942	0,0464
Employee level: Cooperation with AF	0,0115	-0,0123	0,4553	0,9188	0,3584
Cooperation with educational Institutions	0,0346	0,0460	0,0105	0,0766	0,0389
Professional organisations influence on municipality ALMP	0,0724	0,0673	0,3898	0,1857	0,8527
Cooperation with other municipalities on ALMP	0,05546	0,0620	0,1887	0,2940	0,0688

These policy practices are significant and confirmed our suspicions. However there were some other policy practices that don't seem to influence efficiency. Political mayor affiliation, municipalities with job consultants, cash-help reduction for recipients who refuse activation, and cooperation with local businesses is insignificant contrary to prior belief.

Despite the fact that some policy practices don't seem to affect efficiency it is clear that the type of cash-help recipient is important to a municipality's ability to activate. As expected, cash-help recipients experiencing problems besides unemployment, seems to negatively affect municipality efficiency. In reality some cash-help recipients may not be in any condition to participate in activation and others may require a large investment, which makes the activation of cash-help recipients for some municipalities very difficult.

Generally, policy practices and cash-help recipient ability and preferences prove to influence the municipality's capability of activating cash-help recipients. Gearing policy that focuses on case officer specialization, cooperation, penalties for non-participation and program review could lead to increases in efficiency if the implementation is flexible enough to address the individual specific needs of the cash-help recipient population. If this policy is implemented in a flexible manner, positive employment effects for more cash-help recipients may result.

How well does DEA measure ALMP?

From what we find in our review of the DEA literature, DEA isn't used in the past to measure ALMP. Thus an obvious question is how well can we measure ALMP using DEA? The answer reveals that it is more the data, than the method that creates problems. In this paper, we proxy social structure, municipality and cash-help recipients preferences and ability, and controlled for the dependency problem, but the lack of data, imperfect proxies, not controlling for quality and selectivity bias leaves room for improvement.

We can't compare DEA to other methods used, because from what we can see, other methods aren't used to measure activation participation as the main parameter of interest. However, we know that past research finds that some of the same factors that affect activation participation in our study also are some of the same factors that affect participation and employment outcomes in other international studies, which leads us to believe that using DEA is a valid evaluation method in measuring ALMP.

6. Conclusion

Due to changing demographics and high levels of structural unemployment in Europe created in part by globalisation, increasing domestic human capital to prevent bottlenecks in the labour market is a priority among many European governments. An analysis on municipality activation investments and activation participation among cash-help recipients provides us with a better understanding of the cash-help recipient and internal municipality practices.

Past methodology evaluation research focuses on econometric tools in examining ALMP, but this paper focuses on DEA and bootstrapping to accurately represent the activation participation for cash-help recipients. The DEA bootstrap is applied in order to correct the original distorted DEA results that had lead some inefficient municipalities to be evaluated as efficient, see Efron (1993). This is achieved by solving the problem of statistical dependency, which arises in econometrics when the DEA scores are used as a dependent variable.

Previous ALMP literature generally makes conclusions based on results that focus entirely on employment and earnings where we suggest that a combination of factors may affect efficiency. The heterogeneity of cash-help recipients across municipalities means that activation participation varies from municipality to municipality. However, part of the variation in activation participation is due to municipality policy. The degree of activation participation among cash-help recipients

depends on the level of sanctioning in the municipality, the degree of cooperation with different institutions, economic resources, the competence of employees, and the type of organisation within each municipality. Many municipalities prove to be inefficient in activating cash-help recipients and that may be due to the fact that municipality policy is not designed and conducted in an optimal manner.

Therefore huge improvement possibilities exist for inefficient municipalities if they can emulate efficient municipalities that operate in a similar type of environment. Once the maximum number of cash-help recipients is activated through a better understanding of policy effects, then perhaps employment outcomes may be more positive in the future for a greater number of cash-help recipients. The reasons as to why municipalities are not getting the most out of their investments may also be a combination of other macroeconomic factors, which include conflicting goals amongst different labour market players, business cycles and the social structure of the municipality. This could be due to the fact that municipalities don't gear the programs to cash-help recipients with more problems than unemployment or perhaps municipalities don't believe in some recipient's ability to be activated. However some municipalities in Denmark are efficient in spite of their environment. Perhaps other countries and inefficient Danish municipalities can become more efficient by modelling the practices and organisation of efficient municipalities that have a similar economic and social structure.

From a European Union (EU) policy perspective, it is evident that despite a national policy with social and economic goals in Denmark, the effect of activation depends on a wide variety of factors, which sometimes impede ALMP and at other times expedite ALMP. Overall, the focus of our initial recommendation is an assiduously planned legislation, economic sanctioning for non-attendance, and creating a culture of cooperation.

Denmark provides a great opportunity to analyse the variation that can exist within a country because different municipalities are able to achieve different levels of success for different costs depending on internal and external factors. The analysis of variation in efficiency between municipalities can be improved upon further by conducting comparative studies on countries with similar welfare regimes such as within Scandinavia, North America, and Oceania in order to discover the factors that influence activation effects and employment effects of ALMP in other systems and cultures. Transparent information on successful municipality practices between regions may result in policy changes that may lead to increases in labour market participation and positive employment effects for uninsured activation recipients. Having more information on each

individual cash-help recipient may also help explain the reasons that lead to unemployment and may also help municipality case officers find better suited activation offers that could increase cash-help recipients human capital and lead to future long-term employment.

Acknowledgements

The findings, interpretations and conclusions expressed in this working paper are entirely those of the authors. They do not necessarily represent the views of the Danish National Institute of Social Research or the municipalities in Denmark. We would like to thank N.C. Petersen for his monthly insightful suggestions, C. Overgård for his helpful comments and SFI for its financial support. We have also benefited from comments received by conference participants at the 8th European Workshop on Efficiency and Productivity Analysis held in Oviedo, Spain.

Appendix

VARIABLE DEFINITIONS

Table 1
Variable definitions

Variable Definition	Variable Code	Definition
Municipality	UNIT	Name of municipality
Inputs		
Number of man hours	V7	Measured in hours
Outputs		
Job Training	V18A	Number of recipients in job training
Individual training	V18B	Number of recipients in individual training
Education	V18C	Number of recipients in education
Other types of education	V18D	Number of recipients in other types of education
Employment projects	V18E	Number of recipients in other types of employment projects
Volunteer activities	V18F	Number of recipients involved with volunteer activities
Introductory courses	V18G	Number of recipients involved with introductory courses
Policy Variables		

Evaluation of ALMP Effort	V2	Existence of ALMP evaluation in each municipality
Case officer Departments	V5	Division of case officer departments for recipients with and without additional problems besides unemployment
Case officer organization	V6	Organisation of case officer work in each municipality
Job consultants	V8	Existence of employees at a municipality with a special contact to private firms
Category definitions	EGNE	Municipality's own definition of target groups
Case officer evaluation	SAGS	Choice of activation is dependent on case officer evaluation
Cash-help recipients own wishes	ONSKE	Choice of activation is dependent on recipients own wishes
Estimated returns on ALMP Investment	UDBYT	Choice of activation is dependent on estimated returns on ALMP investment
Administrative decision making	BESL	Choice of activation is dependent on administrative decision making
Political decisions from municipality committees	UDVALG	Choice of activation is dependent on political decisions from municipality committees
Local business wishes	VIRK	Choice of activation is dependent on local business wishes
Municipality net expenses	NETTO	Choice of activation is dependent on municipality expenses
Reject-Moratorium on cash-help	STAND	Moratorium of cash-help payments for recipients that refuse activation
Reject- Receive less cash-help	TILLAG	Reduction of cash-help payments for recipients that refuse activation
Moratorium - Inclinations for unemployed	SANK	Municipality willingness to reduce or stop cash-help for unemployed recipients that reject activation
Reduce - Inclinations for under 30	FRAD	Municipality willingness to reduce or stop cash-help for recipients under 30 that reject activation
Cooperation with local businesses	UDEB	Cooperation between municipalities and businesses
Leadership level: Cooperation with AF	SAMARB	Cooperation between AF and the municipalities at a leadership level
Employee level: Cooperation with AF	ERFAR	Cooperation between AF and the municipalities

		at an employee level
Cooperation with educational Institutions	MED	Cooperation between municipalities
Professional organisations influence on municipality ALMP	INDFLY	Professional organisations influence on municipality effort
Cooperation with other municipalities on ALMP	TVAERT	Cooperation between municipalities
Social *Structure Variables*		
Municipality Population	INDBYGGE	Number of individuals in each municipality
Mayor	BORGMEST	Political party in power in each municipality
Cash-help recipients	ANTAL_KONT	Number of cash-help recipients in each municipality
Activation recipients	AKTIVERE	Number of activation recipients in each municipality
Start activation: Under 30 – unemployment problems	V17A	Time between first contact with the municipality and activation for recipients under 30
Start activation: Over 30 - unemployment problems	V	Time between first contact with the municipality and activation for recipients over 30
Start activation: Under 30 – more than just unemployment problems	V17C	Time between first contact with the municipality and activation for recipients under 30 with additional problems
Start activation: Over 30 – more than just unemployment problems	V17D	Time between first contact with the municipality and activation for recipients over 30 with additional problems

Literature

Ackum, S. (1991): Youth unemployment, labour market programs and subsequent earnings, Scandinavian Journal of Economics 93 (4): 531-543.

Andersen, K., R. Burkhauser, J. Raymond and C. Russell (1991): Mixed signals in Job Training Partnership Act, Growth and Change 22 (3): 32-48.

Andersen, Jørgen Goul (2001): Economic Security, Labour Market Integration and Citizenship: University of Ålborg. Report 01:04

Ashenfelter, O. (1978): Estimating the effect of training programs on earnings, Review of Economic Statisitics 6 (1): 47-57.

Ashenfelter, O. (1979): Estimating the effect of training programs on earnings with longitudinal data, Evaluating manpower training programs (JAI Press, Greenwich, CT) pages 97-117.

Ashenfelter, O. and Card, D. (1985): Using the longitudinal structure of earnings to estimate the effect of training programs, Review of Economics and Statistics 67 (3): 648-660.

Barrientos, Armando and Powell, Martin (2001): Welfare Regimes and Labour Market Policy: University of Bath. Report 01:04

Boeri, Tito and Borsch-Supan, Axel and Tabellini, Guido (2001): Would you like to shrink the welfare state? A survey of European citizens: IGIER. Report 01:04

Brogaard, Susanne and Weise Hanne (1997): Evaluation of municipalities activation procedures. Copenhagen: The Danish National Institute of Social Research. Report 97:7

Browning, E (1987):On the marginal welfare cost of taxation, American Economic Review 77, (1), January 1987, pages 11-23.

Dar, Amit and Ogawa, Makoto (1999): Active Labour Market Policies: Policy Issues for East Asia. Social Protection Unit. The World Bank.

Edin, P.A. (1998): Individual consequences of plant closures, PhD dissertation.

Efron, B. (1979): Bootstrap Methods: Another Look at the Jackknife, Statistics,7, pages 1-26.

Fridberg, Torben (2000): Ændringer i den nordiske socialpolitik siden 1998. Nordisk Socialstatistisk Komite.

Førsund, F.R. and Erlandsen, Espen (1999): Efficiency in the provision of municipality nursing and home care services: The Norwegian Experience. Memorandum.

Greenberg, D (1997): The leisure bias in cost-benefit analyses of employment and training programs, Journal of Human Resources, 32(2), February 1997, pages 413-439.

Hammer, Torlid and Julkunen, Ilse (2001): Surviving Unemployment – a Question of money or Families: NOVA. Report 01:04

Hammermesh, D (1971): Economic aspects of manpower training programs (Lexington Books, Lexington, MA).

Hammermesh, D (1993):Labor demand (Princeton University Press, Princeton, NJ).

Harker, Patrick and Xue, Mei (1999): Overcoming the Inherent Dependency of DEA Efficiency Scores: A Bootstrap Approach (Working paper for The Wharton School at the University of Pennsylvania.

Heckman, J. and J. Smith (1998a): Evaluating the welfare state, Econometrics and economics in the 20th century (Cambridge University Press for Econometric Society, New York).

Heckman, J. and J. Smith (1998b): The sensitivity of experimental impact estimates (University of Chicago Press for NBER, Chicago, IL).

Johnson, G (1979): The labor market displacement effect in the analysis of the net impact of manpower training programs (JAI Press, Greenwich, CT) pages 227-254.

Kvist, Jon (2001): Activating Welfare States: Scandinavian Experiences in the 1990's. Copenhagen: The Danish National Institute of Social Research. Report 00:7

LaLonde, R. (1984): Evaluating the econometric evaluations of training programs with experimental data: Working paper no. 183 (Industrial Relations Section, Princeton University).

LaLonde, R. (1986): Evaluating the econometric evaluations of training programs with experimental data, American Economic Review 76 (4): pages 604-620.

Lalonde, R. (1995):The promise of public sector-sponsored training programs, Journal of Economic Perspectives, 9(2), February 1995, pages 149-168.

Larsen Flemming (2001): Effektivitet i kommunal aktivering. Aalborg Universitet.

Mallar, C and Kerachsky, S and Thorton, C and Long, D (1982): Evaluation of the economic impact of the Job Corps program: third follow-up report (Mathematica Policy, Princeton, NJ).

O'Connell, Philip and Russell, Helen (2001): Unemployment and the Transition to Work: a Comparative Analysis: ESRI. Report 01:04

Petersen, N.C. and Olesen, O.B.(1995): Incorporating quality into data envelopment analysis: a stochastic dominance approach, International Journal of Production Economics, 39, pages 117-135.

Simar, L. and Wilson, P (1998): Sensitivity Analysis of Efficiency Scores: How to Bootstrap in Nonparametric Frontier Models, 44, pages 49-61.

Thanassoulis, E. and Dyson, R.G. and Foster, M.J. (1987): Relative efficiency assessments using data envelopment analysis, Journal of Operational Research Society, 38, pages 513-521.

Weatherall, James. (2002): Quality and exogeneity considerations in evaluating data envelopment analysis. The Danish National Institute of Social Research. Working Paper 02:17