The relative performance of ‘sheltered employment’ companies: a multi-stage approach

5th Conference on Performance Measurement and Management Control

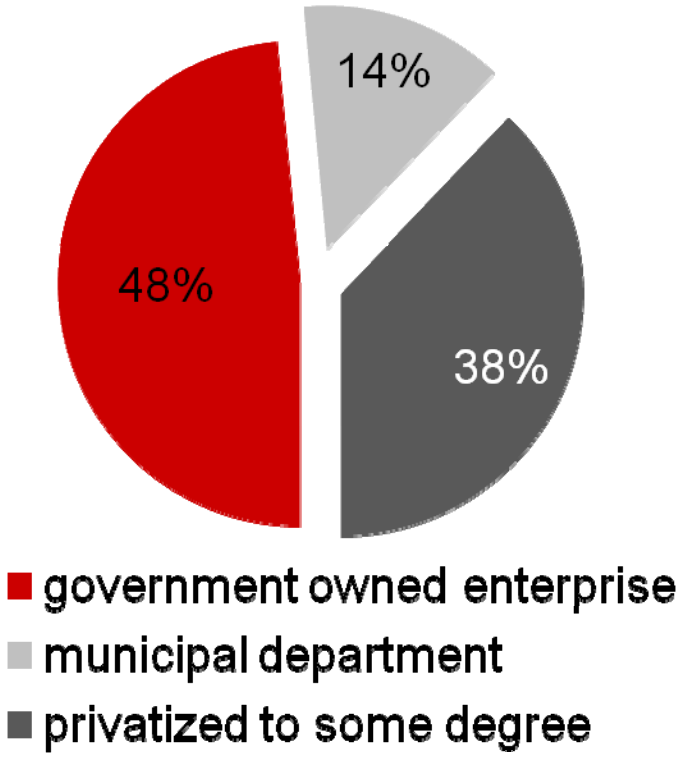
Nice, september 23, 2009

Marcel van den Berg & Peter Risseeuw

www.seo.nl - secretariaat@seo.nl - +31 20 525 1630

Dutch Sheltered employment companies (SECs)

- offer suitable employment to disabled people
- not-for-profit
- goals: participation (and integration)
- 90 SECs support over 100.000 individuals
- annual subsidy
  - plm. 25.000 euro per individual
  - total sum involved: over 2 billion euro



Production process

- three outputs of SECs (SEA = Sheltered Employment Act)
  - SEA-jobs created with regular employers
  - SEA-jobs created in sheltered workshop of the SECs themselves
  - non-SEA reintegration programmes

- two inputs of SECs
  - professional staff
    (management / job coaches / production / etc.)
  - non-payroll expenses

Operating environment

hypothesized impact on SEC performance in parenthesis

- **internal non-discretionary variables**
  - **the number of seriously handicapped SEA-employees (-)**
  - **the number of SEA-employees that was SEA-indicated before the year 1998 (-)**
  - **the number of SEA-employees above the age of 45 (+/-)**

- **external non-discretionary variables**
  - **the relative length of the SEA-waiting list (+/-)**
  - **the regional unemployment rate (-)**
  - **the number of jobs in manufacturing industries as a percentage of total regional employment (+)**

Data

- **data are derived from annual survey and Statistics Netherlands**
- **survey is commissioned by Cedris, the Dutch industry association of SECs**
- **survey data cover 63 of 90 SECs**

production process	mean	minimum	maximum
outputs:			
created SEA-jobs with regular employers	244	20	1087
created SEA-jobs in sheltered workshops	739	91	3497
number of non-SEA reintegration programmes	418	0	5855
inputs:			
professional staff	114	12	522
non-payroll expenses (€)	4,045,000	641,000	15,741,000

operating environment	mean	minimum	maximum
internal non-discretionary factors:			
number of seriously disabled SEA-employees	117	1	547
number of SEA-employees SEA-indicated before 1998	586	47	2480
number of SEA-employees aged over 45	562	66	2415
external non-discretionary factors:			
relative length of the waiting list	11%	0%	26%
regional unemployment rate	5%	3%	7%
regional fraction of jobs in industrial sectors	20%	8%	28%

Methodology

- **Five stage DEA-model:**
  - **modification of Fried's (1999) four-stage DEA-model**
  - **assess relative efficiency of SECs accounting for their operating environment**

- **1st stage: estimate DEA-frontier**
  - **input-oriented**
  - **variable returns to scale**
- **2nd stage: assess impact of the operating environment**
  - **Tobit regression of 1st stage total input slacks on various non-discretionary variables: internal and external**

Methodology

- 3rd stage: adjust primary input levels based on Tobit regression results
  - account for the impact of the (un)favorable operating environment of each SEC
- 4th stage: re-run 1st stage DEA-model using 3rd stage adjusted input levels
  - SECs operating in an unfavorable environment are ‘compensated’ by a downward adjustment of input levels and vv.
- 5th stage: relate radial efficiency scores to organizational characteristics
  - standard t-test

1st stage: results input oriented VRS DEA-model

number of efficient SECs	21
mean efficiency score	0.85
standard deviation	0.15
minimum	0.36
maximum	1.00

- **limited impact of non-radial slacks**
  - **total efficiency score for both inputs is 0.84**

2nd stage: Tobit regression results

	professional staff coefficient (std. error)	non-payroll expenses coefficient (std. error)
constant	-36.5 (27.6)	-931,889 (951,240)
internal non-discretionary factors:		
number of seriously disabled SEA-employees	0.195 (0.066)***	7753.5 (2272.2)***
number of SEA-employees SEA-indicated before 1998 *(regime switch)*	0.194 (0.067)***	7177.7 (2275.5)***
number of SEA-employees aged over 45	-0.235 (0.078)***	-8653.9 (2659.2)***
external non-discretionary factors:		
relative length of the waiting list	280.6 (89.8)***	8,824,800 (3,041,522)***
regional unemployment rate	-417.5 (368.2)	12,500,000 (12,600,000)
regional fraction of jobs in manufacturing industries	155.0 (83.8)*	3,312,794 (2,875,405)

3rd stage: adjusting primary input levels

	mean	standard deviation	minimum	maximum
primary input levels				
professional staff	114	93	12	522
non-payroll expenses (€)	4,045,000	3,151,000	641,000	15,741,000
predicted input slacks				
professional staff	11	19	-37	61
non-payroll expenses (€)	409,800	650,076	-1,152,870	2,232,620
adjusted inputs				
professional staff	103	91	8	506
non-payroll expenses (€)	3,634,755	3,042,544	376,037	15,631,851

4th stage: results input oriented VRS DEA-model

	stage 1 DEA efficiency scores	stage 4 DEA efficiency scores
number of efficient SECs	21	18
mean efficiency score	0.85	0.76
standard deviation	0.15	0.22
minimum	0.36	0.26
maximum	1.00	1.00

- **resulting inefficiency consists of**
  - **managerial inefficiency**
  - **inefficiency stemming from unknown environmental factors omitted from the 3rd stage Tobit regression**
  - **measurement error**

5th stage: relating 4th stage radial efficiency scores to organizational characteristics

	number of SECs	mean efficiency score	p-value (H_0: mean difference = 0)
municipal department	9	0.77	0.86
other SECs	54	0.75	
government owned enterprise	30	0.72	0.19
other SECs	33	0.79	
SECs privatized to some degree	24	0.80	0.22
other SECs	39	0.73	
SECs without non-SEA activities	25	0.75	0.91
other SECs	38	0.76	
SECs with limited non-SEA activities	18	0.71	0.30
other SECs	45	0.77	
SECs with many non-SEA activities	20	0.80	0.26
other SECs	43	0.73	
SECs in a region > 200.000 inhabitants	**25**	**0.85**	**0.00**
other SECs	**38**	**0.69**	
SECs with a professional staff < 50 fte's	**21**	**0.68**	**0.04**
other SECs	**42**	**0.80**	
SECs with a professional staff of 50 -120 fte's	21	0.75	0.85
other SECs	42	0.76	
SECs with a professional staff > 120 fte's	**21**	**0.84**	**0.03**
other SECs	**42**	**0.71**	

Conclusions

- production processes of SECs are very uniformly designed within the legal framework
- levels of efficiency vary significantly
  - both without and with accounting for characteristics of the operating environment
- our modification of Fried's (1999) model keeps 4th stage efficiency scores:
  - firm size independent
  - interpretable
- the presence of private shareholders does not have an impact on SEC performance
- the size of the region the SEC covers and the professional staff are positively correlated with performance
  - indications for increasing returns to scale

→ the operating environment of SECs only partly explains 1st stage inefficiency

Questions?

Contact details:
Marcel van den Berg
SEO Economic Research, University of Amsterdam
email: m.vandenberg@seo.nl