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**Recruitment to sheltered
employment:
Evidence from Samhall, a
Swedish state-owned company**

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WORKING PAPER 2003:11

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Recruitment to sheltered employment: Evidence from Samhall, a Swedish state-owned company[#]

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July 29, 2003

Abstract

This paper analyses recruitment practices to Samhall, a state-owned company that provides sheltered employment for individuals with severe work disabilities. Besides providing employment for disabled workers and rehabilitating them to employment outside Samhall, the company is expected to decrease its dependence on Government subsidies. This profitability goal may come into conflict with the recruitment goals, resulting in cream skimming effects. The job security offered at the company may also provide incentives at the individual level for using Samhall as a means of escaping unemployment rather than as an employer of last resort for the most disabled.

The evidence regarding cream skimming is mixed; the recruitment-to-Samhall hazards of the prioritised groups, i.e., individuals with intellectual or psychic disabilities, are significantly higher than the hazards for some, but not

[#] We are grateful to Per Johansson, Erik Mellander, Harald Niklasson and seminar participants at IFAU and IUI for helpful comments.

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all, disability groups. Individuals without disabilities tend to be hired by the company, which suggests creaming and is contrary to the guidelines. Finally, the Samhall hazard increases slightly with time in unemployment. This is consistent both with Samhall acting as an employer of last resort and the existence of incentives among individuals to use Samhall in order to escape unemployment.

JEL codes: J24, J23, J45, I12.

Keywords: Policy programmes, disability, performance standards.

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1 Introduction

Functional impairment seems to afflict a non-negligible proportion of the workforce in many countries. According to a 1998 *Statistics Sweden* survey, about 17 per cent of the working population in Sweden considers itself work disabled, i.e. that the work capacity is reduced because of a disability. Because of high unemployment among the work disabled, there are also special labour market programmes targeted exclusively to this group. Around 20 percent of labour market expenditures were spent on measures for the disabled in 2000 (OECD, 2001) Moreover, there has also been a strong trend increase in participation in such programmes since the 1970's (Skogman Thoursie, 1999). This development is not unique to Sweden. Many other countries exhibit a growing emphasis on various programmes for the disabled; in the US, for instance, disability insurance has grown to become the largest cash assistance programme, despite improving aggregate health (Autor & Duggan, 2003, Black et al., 2002).

In Sweden, the two largest labour market programmes for the work disabled are subsidised employment (*lönebidrag*) and sheltered employment, of which *Samhall*, a state-owned company, is the main provider. In addition, all traditional labour market programmes are open for the work disabled, and many of them are engaged in, e.g., educational programmes. Subsidised employment engaged on average some 50,000 participants in 1999, according to the *National Labour Market Board* (AMS). There were around 33,000 disabled workers in sheltered employment, of which the majority – over 80 per cent – are employed in *Samhall*. Sweden is among the countries that rely most heavily on subsidised employment for the work disabled, whereas other OECD countries focus more on training and non-subsidised employment (Bergeskog, 2001).

An important aspect of disability is that it is difficult to define, while associated (cash assistance) benefits for the disabled individual may be generous. This has prompted much research on the potential for moral hazard in disability insurance and its effect on labour supply (see, e.g, Autor & Duggan, 2003, Black et al., 2002, Bound & Waidmann, 1992, Gruber, 2000). Gearing expenditures towards rehabilitation and work training programmes for the disabled, as in Sweden, may mitigate the problem by serving as an efficient *work-test* mechanism, to the extent that moral hazard among beneficiaries is important. The provision of handicap programmes may, however, also generate incentive problems. Under this regime, there is, among other things, a potential for *cream*

skimming among programme providers. The difficulty of defining disability, in combination with loose monitoring, may leave room for programme providers to recruit participants without a disability or with less severe disabilities than required by the (central) government, in order to pursue other objectives. This possibility has received little attention in the previous empirical literature on the economics of disability, possibly because of lack of data.

Heckman et al. (2002) analyse cream skimming in US programmes for the non-disabled (the Job Training Partnership Act). The authors conclude that the efficiency cost from cream skimming is small. Melkersson (1999a) finds evidence of cream skimming among the disabled in Swedish programmes; individuals with a previous attachment to the labour market seem to be favoured as participants. However, programmes exclusively targeted on the disabled are not considered explicitly. Skogman Thoursie (1999) considers the selection of individuals into a vocational rehabilitation project (*Unga Handikappade*) for the disabled in Sweden. No direct evidence of cream skimming was found, but, e.g., individuals not living in institutions were more likely to be selected. This could suggest creaming, to the extent that such individuals are more capable than others.

The purpose of this study is to shed light on the recruitment practices of Samhall. In doing so, we intend to especially consider the potential for cream skimming. It is also possible to examine duration dependence, e.g., whether individuals are more likely, given disability status, to enter Samhall as the unemployment period proceeds. Such dependence may be due to the company's objective to act as an employer of last resort, but may also reflect incentives for using Samhall in a manner not intended by the Government. The employment security offered at the company may shift preferences towards Samhall jobs as the unemployment period proceeds.

Samhall's main objective, as laid down by the Government, is to create meaningful employment for individuals with severe work disabilities. Workers with psychic, intellectual or multiple handicaps should be prioritised. There are also other goals – the company should, *inter alia*, be profitable and decrease its dependence on Government funding. It is not difficult to imagine potential conflicts between these objectives.

In normal circumstances it is assumed that an employer wants to find a person with a high capacity for work, and tries to minimise employee turnover among trained and productive employees. The situation for Samhall is the *reverse*; the company should employ disabled individuals with very low capacity

for work, train these workers in order to increase their work capacity, and then encourage them to seek other employment when fully trained and rehabilitated. If Samhall can, and does, choose employees on grounds that are in conflict with stated recruitment guidelines, the benefits to society of the company's activities may be overestimated. Available evaluations of the social benefit of Samhall rest on the assumption that the opportunity cost of its disabled employees is zero, i.e., the workers were unemployed at the time of hiring and employed in the company because of very slim or non-existing chances of finding employment elsewhere.¹ If persons with no or "too little" disability are hired, this assumption is obviously violated.

The data used in this study is a random selection of 10,000 unemployed individuals with work disabilities during the period 1995 to 1999. The recruitment practices and the potential for cream skimming are examined by analysing the determinants of the duration of unemployment until employment in Samhall, in general as well as conditional on participation in a programme for the disabled. It is crucial for the analysis that the data on disability are not measured with error. In order to gain information about the prevalence of such errors, we examine changes in disability status as well as the determinants of the external employment hazard for the subset of individuals who have found employment at Samhall. External employment is defined as either regular jobs or subsidised employment.

The paper is organised as follows. Section 2 contains a brief description of the Samhall company, its goals and recruitment practices. The data set, containing disabled individuals registered as unemployed with the public employment service (PES), is presented in Section 3. This section also contains a discussion on the difficulty of defining and measuring disability. Section 4 presents the econometric findings and Section 5 concludes.

¹ In 1997, the social benefit of Samhall was estimated at 677 million SEK, which is equivalent to approximately 75 million Euros (SOU 1997:64). See also Haavisto et al. (1993).

2 The Samhall company²

Samhall is a limited liability company and part of Sweden's active labour market policy. Samhall is the second largest wholly state-owned Swedish enterprise, as measured by the number of employees, and the country's largest subcontractor. It employed some 27,000 workers with disabilities in 1999. Employment is created by producing goods and services, which should be marketed on equal terms with other businesses. About 60 per cent of employees work in the production of goods, and the other 40 per cent produce services. Industrial products include electronics, furniture, cabling, packaging, telecom components and mechanical engineering. Among the services supplied are property services, cleaning, information technology support, service of technical aids, domestic services and catering services. The workplaces are spread out across the country where there is considered to be a need for job opportunities for the disabled. The geographic locations are determined jointly with the National Labour Market Administration (AMV).

Government support to Samhall, 4,262 million SEK (about 470 million Euros) in 1999, covers roughly 90 per cent of the salaries paid to disabled employees. The cost of providing full-time employment for one worker is on average 21,000 SEK (2,300 Euros) per month, which is about twice as much as the average subsidy required for one month's full-time employment with wage subsidies outside Samhall. The Government compensates Samhall for its additional costs, compared to other companies. The additional compensation should cover costs primarily for an adapted work pace, support measures for the work adaptation and costs incurred because employees with functional impairments are not laid off when there is a decline in the demand for Samhall's goods and services.³

Samhall's objectives are to provide meaningful employment for individuals with severe work disabilities, and rehabilitate employees so that employment

² This section is based on information contained in Samhall's publications "Group review and annual report", various issues, and "Personalberättelse", various issues, if not otherwise indicated.

³ According to a study by the Swedish National Audit Office (1999), the average work capacity of a Samhall employee is about 70 per cent of the work capacity of a person without a work disability. State subsidies are calculated under the assumption of a 40 per cent work capacity, which means that the actual work capacity among Samhall employees is considerably higher on average than the work capacity presumed in the determination of the state subsidies.

elsewhere (possibly subsidised employment) becomes possible. Recruitment should be targeted to disabled individuals with “difficulties on the labour market”. Samhall is also supposed to fulfil a specific set of measurable goals, determined by the owner. The targets, which, according to the company, are “equally important”, are set on an annual basis. In 1999, the targets were the following:

- **Recruitment from prioritised groups**; more than 40 per cent of new recruits should belong to a prioritised group (determined by the owner), currently people with intellectual or psychic disabilities or multiple disabilities.
- **Transitions to employment outside Samhall**; more than 3 per cent of employees should find other employment, possibly subsidised, each year.
- **Number of work hours** supplied by disabled employees; Samhall should provide almost 32 million work hours, equivalent to about 17,800 full-time employment contracts.
- **Profitability**; Samhall should have a positive financial result (given current Government subsidies), and decrease the dependence on Government financial support.

It is not hard to see that these goals may be conflicting. Most importantly, the targeting towards individuals with the most severe disabilities should decrease profitability. As the most productive employees are the ones most likely to find jobs outside Samhall, the goal regarding transitions may also reduce profits.

2.1 Recruitment to Samhall

A job seeker does not apply for a vacancy in Samhall, but is assigned to a job opening. Public employment service (PES) officials (or the branch in the PES that deals specifically with the work disabled) are responsible for selecting individuals who can be considered suitable candidates for an opening in Samhall. The PES is normally expected to make an assessment of the individual and his or her abilities, and direct the individual to employment in Samhall, subsidised employment or other work-related activity. These possibilities should also be discussed with the unemployed individual, and the prospective employer.

However, the availability of vacancies in Samhall depends on job openings in the local Samhall workplace. The company is not expanding its workforce, so recruitment of new employees occurs mainly because other employees leave

the company.⁴ PES officials state that there are too few vacancies in Samhall to cover the perceived need for such employment (SOU 1997:64).

Since the need for sheltered employment generally is greater than the number of vacancies, the local Samhall workplace could potentially choose among prospective employees on grounds that are contrary to the recruitment targets. A trial period of employment is sometimes used to train individuals and assess whether the individual is suited for work in Samhall. This period can be used by the local Samhall workplace to assess ability, and could be used as a sorting device. Sometimes the local Samhall workplace can choose among several individuals and choose the one best suited to the job, as a normal employer would, instead of employing the individual most in need of sheltered employment, as assessed by the PES office or other agents who can assign individuals to employment in Samhall. In light of this, it is not evident whether it is the PES officials that select individuals who are to be employed in Samhall, or if the local Samhall workplace has a substantial influence on the selection of new recruits. Thus we conclude that cream skimming in connection with the recruitment practices of Samhall cannot be ruled out *a priori*.

Even if individuals with severe disabilities should be prioritised, there is of course some minimum of work capacity required for employment in Samhall. If the minimum is not met, early retirement is a likely outcome. For disabled workers above the minimum work capacity, but with slim chances of getting a regular job, participation in other handicap programmes seems to be the main alternative to a Samhall job. How attractive, then, is employment in Samhall relative to participation in other handicap programmes for the individual worker? Since disabled employees are not laid off due to declining demand, there seems to be more employment security in Samhall than in, e.g., subsidised employment.

Average wages in Samhall are slightly lower than the industry average, but the most productive workers should receive wages on a par with those of outside jobs (Haavisto et al., 1993). Considering the reduced work pace at Samhall, the most productive workers may find the offered wage attractive. However, it is possible that there is a stigma associated with employment in Samhall, which may well be larger than for subsidised employment. We thus do not

⁴ In 1999, 2,608 new employees were hired. In general, the number of new recruits to Samhall has amounted to around 1,000 per year.

know whether there also is an important element of self-selection, besides selection by PES officials and possible cream skimming by Samhall, in the recruitment process.

3 The data

The data set used in this study is a subset of HÄNDEL, a database maintained by the Swedish Labour Market Board (AMS). The database contains information on every individual registered as unemployed at the PES office. Daily information about unemployment status is available from August 1, 1991. This information states whether the individual is openly unemployed, i.e., can take a job immediately, or participates in a labour market programme, and if so, in which type of programme. There is also some background information about the individuals. Additional information on the employment history and escape routes for the individuals in HÄNDEL who found jobs at Samhall was obtained directly from the company.⁵

The subset used in this study is a sample of 10,000 unemployed persons with work disabilities. Of those individuals with work disabilities who were registered as unemployed on March 31 in 1995-1999, 2,000 persons were randomly selected each year. The data set consists of the unemployment histories of the selected individuals from January 1, 1992 until October 31, 1999. Unemployment spells beginning before January 1, 1992 were omitted. Because of the stock sampling procedure, unemployment duration tends to be longer for the individuals in this data set than for the average unemployed, since the stock at each moment holds a disproportionate number of long-term unemployed.

Because of errors in the data set, the unemployment history of 553 individuals had to be discarded.⁶ In addition, around 600 individuals were excluded because they had only one unemployment spell, and this spell began before January 1, 1992. This group consists mainly of individuals in subsidised unemployment. After the exclusions, there were 8,849 individuals, with 23,878 unemployment spells, in the data set.

⁵ The data were kindly provided by Britt Hellström at Samhall.

⁶ An unemployment history was discarded if at least one unemployment spell had a negative duration.

In this study, an unemployment spell is defined as a period when the individual is registered with the PES office, and is either openly unemployed or in a mainstream labour market programme, i.e., not in a programme for the handicapped. The motivation behind this definition is that we are interested in investigating the factors influencing escapes to Samhall (and other handicap programmes), as opposed to escapes to other types of labour market programmes.

Not all individuals were classified as work disabled during *all* of the unemployment spells. Some persons have changed disability status between unemployment spells, either from being work disabled to not being disabled, or vice versa. There were 15,483 unemployment spells during which the individuals were classified as being work disabled.

The data contain objective information on work disability, which is rarely available. Typically, researchers have to rely on subjective information about functional impairment or on objective information, such as medical reports, that may not be perfectly correlated with work disability. Subjective and objective data of this kind tend to generate various biases in the effects of health and retirement benefits on, e.g., labour force participation (Bound et al., 2001). Thus it is an advantage that our data are based on a direct measure of work disability by the PES office. However, there are some limitations also with the data used in this study. For instance, it should be noted that only *incidence* is recorded, and there is no information regarding the *severity* of the disability or an assessment of the reduction of working capacity. The *type* of disability is recorded, i.e., heart and/or lung disease, hearing, vision or motion impairment, other somatic disabilities, and psychic, intellectual or socio-medicinal disabilities, the latter of which includes substance abuse. Only one type is recorded, so it is not known whether an individual has *multiple* disabilities.

An individual may be classified as *not* work disabled, due to (i) having a disability that is not disabling enough to be classified as a work disability; (ii) not being disabled at all; (iii) having declined to be classified as work disabled, as such classification is not mandatory⁷; or (iv) misreporting, i.e., classical measurement errors in the data. There is no way to distinguish among the possibilities (i) to (iii) in the data set, but due to its longitudinal nature we may estimate the reliability of the disability measures by looking at individuals who

⁷ According to the regulations, an unemployed person who does not view himself as disabled, and is not interested in participating in a handicap programme, should not be classified as work disabled.

change disability status. Arguably, individuals with disabilities that *a priori* can be expected to be of a more permanent type, e.g., hearing impairment or intellectual disabilities, should be less likely to change disability status than individuals with less permanent conditions, i.e., motion impairment, psychic disorders or socio-medicinal handicaps. Under the assumption of no misreporting, the information that the individual is not classified as work disabled can be interpreted as an indication that the individual is or is not disabled, but *if* he or she is disabled, the disability is less severe than for those who are classified as work disabled.

Thus the classification of work disability is rather blunt, since only incidence of work disability of a certain type is recorded. There are probably additional factors, unobservable in our data, but possibly known by the PES official, about the severity of the disability, possible multiple disabilities, work ability and other factors that might influence the probability that the individual gets a job at Samhall or participates in other handicap programmes. Furthermore, it cannot be ruled out that the incidence of work disability is to some extent influenced by factors unrelated to the disability, such as screening stringency, the generosity of benefits or the chances of finding a regular job. The value of labour-market participation may influence the behaviour of individuals registered as unemployed as well as PES officials in this respect.

Sample characteristics are presented in *Table 1* for the units of analysis, i.e., unemployment spells of individuals with work disabilities. The table also reports on characteristics for subsamples of spells terminating in participation in handicap programmes, i.e., Samhall and subsidised employment. There are 433 unemployment spells ending with the person being assigned employment in Samhall (and 397 individuals were hired, i.e., some more than once). Subsidised employment is a considerably larger programme – 3,530 unemployment spells ended with the individual finding such employment.

In the full sample, the average number of unemployment spells is three, lasting on average 445 days. In the Samhall subsample, the average number of spells is somewhat smaller, but the duration is much longer, 571 days. Those who find employment in Samhall have also been unemployed longer than those who are in subsidised employment.

On the whole, motion impairment is the most common type of disability, accounting for one quarter of all spells, along with socio-medicinal and other somatic disabilities (about 13 percent each). It is seen that spells of individuals with psychic or intellectual disabilities, i.e., Samhall's prioritised groups, are

more common among those ending with employment in the company (22 percent in total) than among those in the sample as a whole (8 percent) or those terminating in subsidised employment (15 percent). This is an indication that Samhall may prioritise among groups according to the guidelines discussed previously.⁸ However, it is not known to what extent individuals with multiple disabilities are recruited to Samhall, since this information is neither recorded in the data nor available from the company. Individuals with multiple disabilities would have to make up a substantial proportion of the recruits in order to fulfil the goal of 40 percent recruitment from the prioritised groups.

It can also be noted that Samhall appears to employ persons who are *not* classified as work disabled, which is not in line with the recruitment goals. Four percent of the Samhall spells belong to this category, while the equivalent figure for subsidised employment is lower, around two percent. According to the annual reports of the company, there are *no* recruits without work disabilities, a discrepancy that remains to be explained.

Changes of disability status have occurred during quite a few spells (20 percent), and the most common change is from being not work disabled to being disabled. Such changes are most frequent in the subsample of spells preceding employment in Samhall, accounting for 23 percent of the spells. Changes in the type of disability also occur, although less frequently.

The individuals have escaped unemployment by finding regular employment (16 percent of spells), Samhall jobs (2 percent) or subsidised employment (15 percent) or for “other or unknown reasons” (52 percent). These reasons may be retirement, education, or simply that the individual has lost contact with the PES office, in which case he or she may well be regularly employed.⁹ Unfortunately, there is no possibility to identify individuals with early retirement, which may be an important escape route for disabled individuals. In addition, some spells are not completed, i.e., right-hand side censored.

In order to get an idea about the reliability of the disability measurement, it is useful to examine changes of disability status. Certain types of changes may

⁸ Those among the disabled who have the smallest chance of finding *regular* employment (not shown in Table 1) are the intellectually disabled and those with a psychic disability. This suggests that Samhall’s targeting towards these groups is justified.

⁹ According to Bring & Carling (2000), there is reason to believe that a fair amount of the attrition in HÄNDEL is due to finding regular employment. In their sample of 168 interviewed individuals, 45 percent had found jobs at the time of attrition. Since we are mainly interested in the recruitment to Samhall in our study, this type of attrition should not be a major problem.

indicate measurement errors, as argued previously. *Table 2* presents sequences of three consecutive unemployment spells, where it is noted whether the individual is disabled (*D*) or not disabled (*ND*). The table shows sequences of the form *D – ND – D*, by type of disability (initial and last spell). There are 347 such individuals in the data set. About 70 percent of the individuals change back to the same type of disability, as indicated by the diagonal values in the table (the sum of which is 245). It seems highly unlikely that persons suffering from disabilities assumed to be of the “most permanent” type (hearing impairment or intellectual disabilities) should experience such changes in disability status. Only 12 observations of this type can be found in the data. A formal test was carried out whether this proportion (12 out of 245, i.e., $s_1 = 0.049$) is equal to the proportion of individuals with such impairment in the initial spells of all individuals (569 out of 5,780, i.e., $s_2 = 0.098$), against a one-sided alternative hypothesis ($s_1 < s_2$). The null was rejected ($z = -2.57$). So, of all individuals with three consecutive spells of the *D – ND – D* type who change back to the same disability, there are significantly fewer persons with “permanent” disabilities, than there are in the sample of all initial *D* spells (unconditional of subsequent disability status).

Individuals with the “least-permanent” impairments (assumed to be motion impairment, psychic and socio-medicinal disabilities) exhibit a different pattern, with as many as 189 individuals changing back to the same disability. Now we expect the proportion of individuals with “least-permanent” disabilities changing back to the same disability to be larger than among all initial spells. An analogous test (against the alternative $s_1 > s_2$) again yielded a rejection of the null ($z = 4.00$, with $s_1 = 0.771$ and $s_2 = 0.647$). The conclusion of this exercise is that some misreporting of disability status probably occurs, but to a limited extent.¹⁰

¹⁰ An alternative interpretation of the findings in *Table 2* is that the no-disability status is explained by the individuals having declined to be classified as being disabled during that particular period, but not during the other periods. To the extent that having declined represents an attempt to avoid potential stigmatisation costs, this sequence of events seems unlikely.

4 Econometric analysis

This section presents an econometric analysis of the recruitment of unemployed individuals to Samhall. The purpose is to shed further light on the recruitment of prioritised groups, while controlling for background characteristics such as age, sex and education. We do this in the framework of a duration model. Analysing the time spent in unemployment before exiting to Samhall should be of interest, since the welfare of the disabled as well as subsequent regular employment opportunities may be closely linked to unemployment duration. It is also possible to examine duration *dependence*, e.g., whether individuals are more likely, given disability status, to enter Samhall as the unemployment period proceeds.¹¹ Such dependence may be due to the company's objective to act as an employer of last resort, when all other possibilities to find employment have been exhausted. However, positive duration dependence could also indicate that employment in Samhall is used in a manner not intended by the Government. The employment security offered at the company may shift the preferences of the unemployed and PES officials towards Samhall jobs as the unemployment period proceeds.

The final part of this section considers exits from Samhall to outside employment, i.e., the Samhall employment duration, for the subsample of individuals who have been recruited to the company. These estimations should shed additional light on the reliability of our data on disability status, since the non-disabled should be expected to exit sooner than the disabled. If this is not the case, our data indicating no disability should be regarded with skepticism.

According to the eligibility rules, an individual may only participate in a handicap programme if he or she is classified as having a work disability. However, it should be noted that some individuals in the sample participate in handicap programmes *without* this classification: there are unemployment spells during which individuals were not classified as work disabled and these spells have ended because the individual entered a handicap programme. In the analysis, it is therefore assumed that all unemployment spells for the individuals may be terminated by the individual entering a handicap programme, not just the spells when the individual was classified as work disabled.

¹¹ Melkersson (1999b) estimates a positive duration dependence for entry into programmes aimed in particular (but not exclusively) at disabled workers.

As noted previously, there are several sources of unobserved heterogeneity in the data, which may pose problems for an econometric analysis as, e.g., the estimated duration dependence becomes more difficult to interpret. Some of the variables relating to Samhall's recruitment goals are unobserved. We lack information about the severity of the handicaps and whether there are multiple disabilities among the individuals in the data set. Other unobserved variables that may influence labour market outcomes include local unemployment, unemployment benefits, family status and motivation.

It should also be noted that the data contain little information about the recruitment process involving Samhall jobs, aside from the fact that a hiring has taken place. For example, it is not observed to what extent unemployed individuals self-select into the company, or whether applicants are rejected by Samhall.

The estimations proceed in three steps. Firstly, we focus on the determinants of the recruitment-to-Samhall hazard, i.e., the relative risk of leaving unemployment for a job at the company, given unemployment up to that time, in a competing risk framework. Then we estimate the recruitment-to-Samhall hazard *conditional* on participation in a handicap programme, i.e., Samhall and subsidised employment, treating exits to the latter as censored observations. When analysing the determinants of employment in Samhall and relating the results to the recruitment goals, it seems appropriate to use as a comparison the main *alternative* for the disabled, which is subsidised employment. In the final step, the outside-employment hazard for the subsample of Samhall employees is estimated.

For the purposes of analysing unemployment duration until recruitment in Samhall, a parametric Weibull baseline hazard with time-invariant covariates is specified, see e.g., Greene (1995). The recruitment-to-Samhall hazard, i.e., the probability of finding a job at the company after t days of unemployment, given that the individual is still unemployed, is

$$\Lambda_t = \varphi(x, \beta)\lambda_0(t), \quad (1)$$

where x is a vector of covariates, β is a vector of parameters and $\lambda_0(t)$ is the baseline hazard, i.e., the hazard function describing the pattern of duration dependence common to all individuals. (For convenience, the subscripts for individuals, escape routes and unemployment spells are suppressed.) For the Weibull model, the baseline hazard is

$$\lambda_0(t) = pt^{p-1}. \quad (2)$$

The hazard rate rises monotonically with time if $p > 1$ and falls monotonically with time if $p < 1$. (If $p=1$, the hazard rate is constant and the model reduces to the special case known as the Exponential model.)

The associated survival function for the Weibull model is

$$S(t) = \exp[-\varphi(x, \beta)t^p], \quad (3)$$

which gives the probability that a spell is of length at least t .

As mentioned previously, unobserved heterogeneity among the unemployed individuals may bias our coefficient estimates. It may also bias the estimate of duration dependence, p . As time passes, “survivors” increasingly comprise individuals without multiple disabilities or with less severe handicaps, as these are getting jobs at Samhall less quickly (if recruitment guidelines are adhered to). This implies that the model that does not take unobserved heterogeneity into account will underestimate the degree of positive duration dependence.

In order to account for unobserved heterogeneity, we adopt the frequently used procedure of assuming that such effects have a Gamma distribution with unit mean and variance θ and enter the hazard function multiplicatively. The hazard function for this model is

$$\Lambda_t = \varphi(x, \beta)\lambda_0(t)S(t)^\theta, \quad (4)$$

where $\theta = 0$ corresponds to the special case of no heterogeneity, i.e., the model in (1). In the regressions, it is furthermore assumed that the unobserved heterogeneity is constant across multiple spells of the same individuals (see, e.g., Gutierrez, 2002). We also attempt to test for lagged duration dependence, i.e., whether the probability of exiting to Samhall depends on previous unemployment prior to the current spell. The length of previous unemployment is measured as the number of unemployment spells.¹²

¹² The total number of days in unemployment is the preferred measure, but this is not available for spells prior to 1992. It should be noted that the number of spells in unemployment is a crude measure of previous unemployment, since individuals with many spells may be more likely to have short spells.

The first set of maximum-likelihood estimates of the Weibull-Gamma mixture model is presented in *Table 3*. The determinants of the hazards to Samhall are estimated in a competing risk framework, i.e., treating all observations with other escape routes as right-censored at the points of exit. This estimation method requires the risks to be independent conditional on the effects of the covariates. Three different regressions are reported, the first of which includes only the disability variables, with motion impairment as the reference category. In the second column, demographic characteristics that are likely to affect the probability of leaving unemployment are added: age, sex, education, with primary school as the reference, and foreign citizenship. The final column also includes dummies for the number of unemployment spells.

The results are presented as hazard ratios, where a coefficient greater than unity indicates that the covariate increases the recruitment-to-Samhall hazard. The estimates are rather similar across specifications. Spells of individuals who are not classified with a work disability are associated with much lower relative risks of escapes to Samhall than to other destinations, at any given unemployment duration. The estimates imply that the hazard ratio is only between 21 and 23 percent of the hazard ratio for individuals with motion impairment. Still, no person should, according to the rules discussed previously, participate in a handicap programme if he or she is not classified as work disabled. Thus, even if the estimated risk is small, the fact that it is significantly larger than zero is noteworthy.

The hazard ratios of the prioritised groups, i.e., individuals with psychic or intellectual disabilities, are the highest among all disability groups. The hazards are all significant and 2–3 times higher than those of the reference group. The remaining disability categories (except the not disabled) also exhibit hazard ratios larger than unity, indicating that the motion impaired are the least likely to exit to Samhall. Not unexpectedly, foreign nationals exhibit higher hazards than Swedish citizens and the hazard declines with educational level. We also find that the hazard is slowly decreasing with age.

According to column (3), previous unemployment experience increases the hazard to Samhall. But most of the effect sets in already during the second spell and there is little evidence of further increases thereafter. The results do not suggest duration dependence *within* current spells, since a value of 1 for p cannot be rejected at the 5 percent level. (Thus the Weibull reduces to the Exponential model.) However, a likelihood ratio test of the hypothesis of no unobserved heterogeneity ($\theta = 0$) is rejected.

How should the hazards pertaining to the prioritised groups be judged in relation to the objectives of Samhall? Obviously, the choice of reference category matters. Individuals with psychic or intellectual handicaps are significantly prioritised over the motion impaired, as evident in Table 3. Relative to other disability groups, this is not always the case, however. The hazards for the hearing and the vision impaired and individuals with heart and/or lung disease are not significantly different from those of the prioritised groups. Thus we find but partial evidence that the recruitment guidelines are adhered to.

Table 4 reports the recruitment-to-Samhall hazard conditional on participation in a handicap programme. Observations with exits to subsidised employment are treated as right-censored. It can be argued that unobserved heterogeneity should be less important in these estimates, compared to the analysis on the full sample, reported in Table 3. On the other hand, the analysis here suffers from the fact that those who participate in handicap measures are probably not a random selection of unemployed individuals. Unfortunately, there is no suitable variable that is correlated with participation in handicap programmes that could be justifiably excluded from the recruitment-to-Samhall equation in order to achieve identification. But since we are mainly interested in the determinants of the Samhall hazard in relation to the hazard to subsidised employment, we regard this to be less of a problem.

In Table 4, it is seen that spells of individuals with no disabilities are associated with a hazard ratio between seven and eight times higher than the hazard ratio of the reference group. Among the non-disabled entering handicap programmes, there is thus a higher hazard to Samhall than to subsidised employment, all else equal. This finding indicates cream skimming on the part of Samhall.

As in the previous table, individuals with intellectual and psychic disabilities are more prone to exit to Samhall. Again, the evidence regarding prioritisation over other disability groups is mixed. There is a significant difference in hazards in relation to only two groups, namely the motion impaired, i.e., the reference, and individuals with socio-medicinal disabilities. It should be noted, however, the results regarding the non-disabled appear to be robust in the sense that the hazards are significantly higher than the hazards for all categories of the disabled.

The results in Column (3) suggest a positive lagged duration dependence, monotonically increasing in the number of previous spells. In addition, the es-

timate of p indicates a positive, but modest, duration dependence within spells. Since $p < 2$, the hazard increases at a decreasing rate.

A number of robustness tests of the results were undertaken. In order to further examine the reliability of the “no disability” coding, we investigated to what extent the individuals finding jobs at Samhall exit to employment outside the company, depending on type of disability. The results of the Weibull-Gamma mixture regressions are presented in full in *Appendix*, which also describes the data. The most important finding is that the hazards for individuals without disabilities are higher than for the other individuals, although imprecisely estimated. This lends additional, albeit weak, support to the hypothesis, examined in Table 2, that measurement error in disability status is not a major concern. Thus the presence of non-disabled persons in the Samhall data seems not primarily to be due to errors-in-variables problems.

In order to assess the sensitivity of the estimates to the Weibull specification of the baseline hazard, all regressions in Tables 3, 4 and in the Appendix were rerun using the semi-parametric Cox proportional hazards model (see, e.g., Greene, 1995). Unlike the Weibull model, this formulation allows a flexible formulation of the baseline hazard $\lambda_0(t)$ in (2), i.e., no particular distribution is assumed. The hazard ratios, available on request, were similar to the ones obtained with the Weibull models. In addition, the hazard ratios of the no disability variable in the Appendix were estimated with better precision.

5 Conclusions

In this study, we have examined recruitment to sheltered employment in Samhall, a Swedish state-owned company. According to the guidelines, workers with severe disabilities should be prioritised. The company should also be profitable. The potential conflict between these objectives could lead to cream skimming in recruitment. Aside from the inherent difficulties in defining disability, the conflict may be aggravated by a number of circumstances pertaining to administrative routines. Firstly, important aspects of the disability, e.g., its severity, are not recorded by the public employment service (PES), which is responsible for assigning disabled workers to Samhall. Secondly, the PES and Samhall keep separate records, with different definitions, of the type of disability. Finally, Samhall is allowed to reject assigned workers (e.g., on the grounds of having no job slots available at the moment).

Our findings indicate that the recruitment-to-Samhall hazards for persons with psychic or intellectual handicaps, who are included in the prioritised groups, are significantly higher than the hazards for some, but not all, disability groups. Persons with multiple disabilities should also be prioritised, but it is not possible to examine the recruitment of this group. This is because information about multiple disabilities is not recorded, neither by the PES nor by Samhall. In addition, the results suggest that individuals without disabilities are recruited to the company, which is contrary to the guidelines. However, it should be stressed that individuals without disabilities constitute only a minor share of the recruits to Samhall. We have also found that there is a positive, but slight, duration dependence in the Samhall hazard, conditional on participation in a handicap programme. This result may be explained by Samhall's role as an employer of last resort, when all other possibilities to find employment have been exhausted. Since the job security offered at Samhall makes employment there attractive, the finding could also reflect that Samhall jobs are used in a way not intended by the Government.

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Appendix

Table A: Determinants of the external employment hazard for Samhall employees, 1992-2003. Estimated employment duration (in days). Weibull-Gamma mixture model. Hazard ratios.

Variable	(1)	(2)	(3)
Not disabled	4.438 (1.39)	6.778 (1.67)	6.514 (1.62)
Heart and/or lung disease	0.477 (0.81)	0.424 (0.83)	0.409 (0.84)
Hearing impairment	4.671 (1.76)	5.601 (1.67)	4.860 (1.61)
Other somatic disabilities	0.573 (0.94)	0.493 (1.06)	0.409 (1.27)
Psychic disability	3.968 (1.90)	3.969 (1.79)	4.380 (1.92)
Intellectual disability	1.562 (0.70)	1.526 (0.56)	1.322 (0.35)
Socio-medicinal disability	0.726 (0.52)	0.690 (0.54)	0.808 (0.30)
Female		0.456 (1.53)	0.457 (1.47)
Foreign national		0.398 (1.41)	0.377 (1.51)
Upper secondary education		2.195 (1.73)	2.479 (1.77)
Age		1.003 (0.12)	0.999 (0.05)
Second unemployment spell			1.001 (0.00)
Third unemployment spell			0.396 (1.37)

Table A (Continued)

Variable	(1)	(2)	(3)
Fourth unemployment spell			0.591 (0.64)
Fifth or more unemployment spell			0.313 (1.46)
Duration dependence (ρ)	1.316 (1.22)	1.453 (1.38)	1.509 (1.54)
Variance of unobserved heterogeneity (θ)	3.201 (1.30)	4.129 (1.42)	4.360 (1.57)
Log likelihood: N: 319	-207.17	-202.95	-200.70

Notes: External employment is defined as regular employment or subsidised employment. All other destinations were treated as right-censored, i.e., a competing risk model was estimated. Information on the duration of employment and causes of escape up to January 2, 2003 were obtained directly from Samhall. The data include the latest Samhall spell only. If the exit (to Samhall) dates in HÄNDEL did not match the entry dates in the Samhall data, the spells were excluded. After the exclusions, there were 319 observations remaining in the data, with 63 exits to external employment. See also notes to Table 3.

Table 1: Sample characteristics. Unemployment spells of individuals with work disabilities, 1992-99. Means.

Characteristics	All spells	Spells preceding hcp programme	
		Samhall	Subs. employment
Age	37.8	38.8	41.4
Female	0.420	0.402	0.342
Primary education	0.478	0.552	0.546
Upper secondary education	0.470	0.423	0.408
University education	0.052	0.025	0.046
Foreign citizenship	0.100	0.164	0.062
Previous employment in Samhall	0.013	0.134	0.022
Average number of unemployment spells	3.0	2.7	2.5
Average duration of unemployment spells (days)	445	571	384
Type of disability			
- Heart and/or lung disease	0.021	0.044	0.030
- Hearing impairment	0.018	0.042	0.026
- Vision impairment	0.010	0.021	0.018
- Motion impairment	0.261	0.309	0.388
- Other somatic disabilities	0.123	0.185	0.163
- Psychic disability	0.053	0.115	0.079
- Intellectual disability	0.031	0.109	0.067
- Socio-medicinal disability	0.131	0.139	0.210
- None	0.352	0.037	0.019
Change of disability status	0.201	0.240	0.173
- From not disabled to disabled	0.137	0.226	0.170
- From disabled to not disabled	0.064	0.014	0.003
Change of type of disability	0.018	0.028	0.027
Escape route			
- Regular employment	0.164		
- Samhall	0.018		
- Subsidised employment	0.148		
- Other or unknown	0.523		
- None (right censored spells)	0.146		
N	23,878	433	3,530

Table 2: Changes of disability status, by type of disability. Subsample of individuals with three consecutive unemployment spells of the type “disability – no disability – disability”.

Disability at end spell	HL	H	V	M	OS	P	I	SM	All
Disability at initial spell									
Heart and/or lung disease (HL)	4	0	0	2	2	0	0	3	11
Hearing impairment (H)	0	4	0	0	0	1	0	0	5
Vision impairment (V)	0	0	2	0	0	0	0	0	2
Motion impairment (M)	0	0	0	74	13	5	1	6	99
Other somatic disabilities (OS)	3	0	0	17	38	1	2	6	67
Psychic disability (P)	0	0	0	5	3	15	0	6	29
Intellectual disability (I)	0	0	0	2	2	0	8	3	15
Socio-medicinal disability (SM)	0	0	0	10	4	4	1	100	119
All	7	4	2	110	62	26	12	124	347

Note: The subsample consists of individuals registered as having a disability during the first and third unemployment spells, but no disability during the second spell.

Table 3: Determinants of the recruitment-to-Samhall hazard, 1992-99.
 Estimated unemployment duration (in days). Weibull-Gamma mixture model.
 Hazard ratios.

Variable	(1)	(2)	(3)
Not disabled	0.233 (5.37)	0.212 (5.68)	0.215 (5.62)
Heart and/or lung disease	1.738 (1.96)	1.882 (2.21)	1.882 (2.22)
Hearing impairment	2.012 (2.37)	1.817 (2.02)	1.893 (2.16)
Vision impairment	1.729 (1.37)	1.559 (1.10)	1.546 (1.08)
Other somatic disabilities	1.284 (1.59)	1.254 (1.43)	1.256 (1.44)
Psychic disability	2.032 (3.73)	1.995 (3.61)	1.966 (3.54)
Intellectual disability	3.097 (5.49)	2.559 (4.36)	2.690 (4.58)
Socio-medicinal disability	1.450 (2.14)	1.224 (1.12)	1.151 (0.77)
Female		0.813 (1.80)	0.818 (1.75)
Foreign national		1.968 (4.31)	2.002 (4.41)
Upper secondary education		0.735 (2.66)	0.734 (2.67)
University education		0.332 (3.27)	0.326 (3.32)
Age		0.985 (2.76)	0.987 (2.39)
Second unemployment spell			1.514 (2.96)
Third unemployment spell			1.265 (1.41)

Table 3 (Continued)

Variable	(1)	(2)	(3)
Fourth unemployment spell			1.432 (1.83)
Fifth or more unemployment spell			1.603 (2.47)
Duration dependence (ρ)	1.041 (0.99)	1.054 (1.30)	1.064 (1.50)
Variance of unobserved heterogeneity (θ)	4.127 (4.59)	3.852 (4.55)	3.746 (4.51)
Log likelihood: N: 23,878	-2,233.93	-2,211.90	-2,206.45

Notes: Absolute values of z-statistics in parentheses. Models estimated with unobserved heterogeneity of the Gamma type, shared among multiple spells of the same individuals. The reference category for the disability variables (including not disabled) is motion impairment and the reference for the education variables is primary school.

Table 4: Determinants of the recruitment-to-Samhall hazard, conditional on participation in handicap programmes, 1992-99. Estimated unemployment duration (in days). Weibull-Gamma mixture model. Hazard ratios.

Variable	(1)	(2)	(3)
Not disabled	7.586 (5.90)	7.393 (5.95)	7.609 (6.19)
Heart and/or lung disease	1.480 (1.34)	1.914 (2.23)	2.005 (2.39)
Hearing impairment	1.455 (1.23)	1.361 (1.02)	1.446 (1.24)
Vision impairment	0.966 (0.09)	0.911 (0.23)	0.954 (0.12)
Other somatic disabilities	1.354 (1.84)	1.297 (1.57)	1.384 (1.99)
Psychic disability	1.862 (3.16)	1.779 (2.90)	1.763 (2.91)
Intellectual disability	1.709 (2.60)	1.386 (1.52)	1.512 (1.95)
Socio-medicinal disability	1.107 (0.58)	1.026 (0.14)	0.878 (0.72)
Female		1.241 (1.83)	1.240 (1.85)
Foreign national		2.530 (5.58)	2.668 (5.94)
Upper secondary education		0.711 (2.84)	0.698 (3.03)
University education		0.266 (3.78)	0.266 (3.80)
Age		0.979 (3.55)	0.983 (2.95)
Second unemployment spell			1.475 (2.70)
Third unemployment spell			1.897 (3.63)

Table 4 (Continued)

Variable	(1)	(2)	(3)
Fourth unemployment spell			2.207 (3.86)
Fifth or more unemployment spell			3.029 (5.60)
Duration dependence (ρ)	1.189 (3.77)	1.198 (3.91)	1.224 (4.39)
Variance of unobserved heterogeneity (θ)	1.257 (3.43)	1.078 (3.29)	0.924 (3.00)
Log likelihood: N: 3,963	-1,479.43	-1,447.43	-1,428.85

Notes: See notes to Table 3.

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