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Estimating the Effects of Vocational Rehabilitation Programs in Sweden

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Preface

Estimating the Effects of Vocational Rehabilitation Programs in Sweden is a working paper within CEFOS research area 'Administration and organization aspects of public sector'. This study estimates the effects of vocational rehabilitation on the probability of improved health status and reintegration of program participants in the labor market. Bivariate probit models are used to estimate the probability of selection into a rehabilitation program, its effect on participants restored work capacity and rejoining the labor market. Empirical application is based on a sample of individuals qualified for vocational rehabilitation programs and residing in Western Sweden with long-term sickness observed during 1991 to 1994. The results show variations in the fraction of sample selected to participate in rehabilitation programs, program effects and the importance of individual heterogeneity to the outcome of programs. VR program participation is found to have no effect on the participants' health status but positive effects on their return to work. There was no evidence of selection on unobservable characteristics of individuals that are most likely to become healthy or individuals with high potential to be re-employed. The social aspects and health related needs of participants is more important than the economic efficiency of the VR programs. The working paper is written by Associate Professor Almas Heshmati jointly with PhD student Lars-Gunnar Engström.

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1 Introducation[1]

During the 1990s, and in particular after the rehabilitation reform of 1991, there has been an expansion in vocational rehabilitation (VR) activities in Sweden. Expenditures on VR increased from 1665 MSEK in 1992 to 3474 MSEK in 1995. The number of VR-beneficiaries increased during the corresponding period from 37000 to 65000. The VR activities are part of the comprehensive social security system incorporating health, labor market as well as social work segments. The VR measures undertaken are generally classified into evaluations of work capacity, education and labor market training. The successfulness of VR activities in Sweden in reintegration of individuals into the labor market has not been the subject of extensive analysis. One of the main reasons for this is most likely to be found in methodological difficulties to deal with this type of problem.[2]

The difficulties arise because in practice the local managers of VR programs may select the program participants in such a way as to enhance a successful program outcome. The main outcome states are classified into healthy, return to work, education, unemployed and disability pension. This

[1] Heshmati acknowledges financial support from the Center for Public Sector Research (CEFOS). The authors wish to thank Erik Ruist and other participants of the seminars held at the Stockholm School of Economics, The Swedish Institute of Social Research, The Office of Labor Market Policy Evaluation, The National Social Insurance Board and CEFOS for their helpful comments and suggestions on an earlier version of this paper and Karin Sutherland for reading the manuscript.

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[2] For a general study of sickness absenteeism and early retirement pension in Sweden see Bargendorff et al. (1997).

internal selection process causes difficulties in evaluating the effects of VR programs. Hence, we do not know what a participant's performance would have been with regard to reemployment without participation in a VR program. Depending on the selection process, the selection of participants with greater potential will result in a higher program efficiency and thus in an increased ex ante probability of reemployment. This non-random selection process raises the issues of the participants' heterogeneity in success rates among different subgroups with serious implications for the estimation of the program effects (see Berkowitz, 1988).

There is an extensive literature on the issue of methodological approaches of evaluating programs directed towards the unemployed individuals. The literature can broadly be divided into vocational rehabilitation and manpower programs. The literature on vocational rehabilitation is less developed than the manpower one. The key factor distinguishing the two types of programs is the health status of the program participants. In addition to being unemployed or outside the labor market the VR participants have reduced work capacity due to health problems.

Labor market program evaluations can be based on experimental or non-experimental data. The issues of the relative merits of experimental and non-experimental evaluation methods in the literature of manpower programs are discussed in association with unemployed individuals. Some references are Burtless and Orr (1986), Fraker and Maynard (1987), Worrall (1988), Björklund (1988), Heckman and Hotz (1989), Burtless (1995), Lalonde (1986, 1995) and Lechner (1996). The limitation of the literature lies in the absence of estimates of program effects based on controlled experiment where the program participants are selected randomly. Alternative non-experimental estimators of the same program produce different estimates of program effects. Heckman and Hotz (1989) provide model specification tests in selecting an appropriate non-experimental estimator. For analyses of labor market program with non-experimental design, see Gay and Borus (1980), Bassi (1984), Ashenfelter and Card (1985), Barrow (1987), Heckman and Hotz (1989), Anderson, Burkhauser and Raymond (1993), among other studies.

This study estimates the effects of VR program participation on the probabilities of reintegration in the labor market after having obtained a restored work capacity. The main feature of this study compared to previous research is that in addition to the participants' employment it accounts for their health status, in terms of entries to and exits from sickness spells, as well. Evaluation of the effects of VR on the probability of an individual becoming healthy after a long-term sickness is important in this context. Thus we consider a sample of individuals qualified for VR programs. Bivariate probit models are used to estimate the probability of selection in a rehabilitation program as well as the program effects in terms of improved health status and rejoining the labor market. The empirical application is based on a sample of 9210 individuals extracted from the Riks-LS[3] data residing in five counties located in Western Sweden with long-term sickness observed during 1991 to 1994. VR program participation is found to have no effects on the participants' health status but positive effects on their return to work. There was no evidence of selection on unobservable characteristics of individuals that are most likely to become healthy or individuals with high potential to be re-employed. The social aspects and health related needs of participants is more important than the economic efficiency of the VR programs.

The remainder of the paper is organized as follows. In Section 2 the objectives of Swedish VR policy is introduced. Section 3, contains a description of the data and variables. The models used to estimate the program effects are outlined in Section 4. Empirical results are discussed in Section 5. The final section provides the summary and conclusions.

[3] Riks-LS is a data set collected by the National Social Insurance Board on long term sickness and labor market rehabilitation in Sweden.

2 The Swedish VR Policy

Following the rehabilitation reform of 1991, the Swedish social insurance offices have the responsibility for administration of VR through a co-ordination role. A number of governmental agencies, and private employers when appropriate, are involved in the design and implementation of the VR policy. The different parties or actors involved, besides the social insurance offices and the individuals, include the employer who has a principal responsibility for assessing the needs for VR. The occupational health services, hospitals, unemployment agencies and private rehabilitation contractors are other actors.

The objectives of the social insurance activities directed towards individuals with incapacity for work caused by illness, are to supply and coordinate VR-actions to fully or partially restore work capacity of participants in a step towards their independence from cash benefit support. Thus a successful rehabilitation in that context is not only when the client is able to return to employment, but also when the client after completion of a VR-program remains unemployed, receives partial disability pension, or is enrolled in education but with an increased or restored work capacity. The Swedish VR programs generally consist of combinations of a number of different measures: evaluation of individual health status and work capacity, educational measures towards a new occupation, work training at regular employment or at new place of work. Medical and social rehabilitation are also important instruments in reintegrating individuals to the labor market. Individuals having received evaluation of their health status and work capacity as a sole VR measure are not considered as VR participants in this study. The VR services are provided only to eligible candidates. Eligibility to VR program participation is determined by the social insurance offices based on the candidates' medical conditions and needs.

3 The Data

The data is part of the Riks-LS study carried out by The National Social Insurance Board. Riks-LS is a data set with national coverage collected as a basis for analysis of long-term sickness and vocational rehabilitation programs in Sweden. The complete material covers the entire country and includes about 75000 randomly selected cases of long-term sickness observed during 1991–1994, a fraction of which has participated in some VR programs. The data are aimed at providing information that can serve as a survey of the social insurance offices' activities in relation with long-term sickness, the measures taken and evaluation of their outcome.

The sample data used in this study consists of information collected from the five counties with a total of 67 municipalities/social insurance offices located in West Sweden.[4] The study is built up from random samples of approximately 70 cases per period drawn from each municipality. It covers individuals having received sickness benefits for a period of at least 60 consecutive days between July 1991 and June 1994. Individuals older than 65 years, ending the sickness spell with an old-age pension, those who deceased during the spell and incomplete cases in January 1995 were excluded from the original sample (13580). The sample used in the analysis is 9210 observations. A sampling weight (WEIGHT) was used defined as the ratio of number of sickness spells exceeding 60 days and the sample size. It varies by community and over time. Completeness and legibility of the information was checked through extensive control processing. The data was found to be of high quality.

The dependent variables are defined based on the individuals program participation and status after the sickness spell has ended: vocational program participation (VR) and two outcome of healthy outcome (HEALTHY) and return to work (WORK). The outcome are estimated separately but each jointly

[4] Analysis of the data is based on the counties of Halland, Göteborg, Bohuslän, Älvsborg and Värmland. Our objective is to use the entire Riks-LS data set.

with VR participation. A person is associated with a healthy outcome if during the six months period following the last day of the sickness spell she/he has not had a new sickness spell exceeding 30 days and has not been transferred to a permanent or temporary full disability pension. Return to work is defined as return to work on the competitive labor market and is conditional of healthy outcome. The rest of the data include individual, socioeconomic, demographic, labor market, social insurance office characteristics, individuals' health status, sickness records, labor market participation history before and after the disability period, vocational rehabilitation, other actions taken by the local social insurance office for each sickness spells, and variables characterizing the counties.

The demographic variables include information on gender, marital status, age, citizenship, and country of origin of sample individuals. Marital status is specified based on a classification into: married and unmarried. Age is classified into 18–35, 36–45, 46–55 and 55–65 intervals. The variable citizenship is grouped into individuals born in Sweden and others.

The socioeconomic (SOCE1-3) characteristic variable is also an indicator of the level of education and includes three classes namely non-trained workers, trained workers and other (self) employees. In addition to the socioeconomic variable an occupational (OCCU1-4) variable is defined and classified into four classes: health care; natural, human and social sciences; manufacturing and machinery; and other services. In addition to the occupational variables there are two labor market variables characterizing the labor market and employment status of individuals prior to the start of a sickness spell. The employment status (EMPL1-4) is divided into: working, participating in educational programs, unemployed and others. The unemployment rate (LOCUN) is measured as the rate of local open unemployment where individuals are resident. The rate varies both across insurance offices and over time.

The health related variables include information on the length of current sickness spell (LENGTH) measured in days, the previous sick-leave record, the extent of current sick-leave spell, previous vocational rehabilitation program

participation, the main diagnosis of health status and presence of drug or alcohol abuse (ALCO). The previous sick-leave (PRES1-3) variable is classified in time intervals based on the length of past sick-leaves measured in days. The intervals contain 1–60 days, more than 60 days and unknown. The previous VR participation variable (PREV1-3) provides information on whether the individual participated in any VR program or not during the twelve month period prior to the sickness spell and absence of documentation in this regard. PREV is defined as no VR, completed and unknown VR participation. The main health diagnoses (DIAG1-7) as bases for VR decisions making are classified into psychiatrics, circulation, respiratory, digestion, musculoskeletal diseases, injuries and other diagnosis. Two income definitions are used. A variable indicates whether an individual received partial disability pension or sick-leave benefit (NOBEN) and another variable shows the magnitude of income losses during a sick-leave period.

The variables characterizing the social insurance office and their involvement include the results from early contact between the social insurance office and the individual, medical assessment, VR assessment and finally the institution of sick-leave registration. Initial degree of sick-leave (DEGR) is measured by the extent of sick-leaves in full time (100%) and part time (25%–75%). Institution of sick-leave registration (INST1-3) identifies the medical or health care institution of registration namely health care centers or hospitals, psychiatric and social medicine, or private and others. Results from early contact (CONT1-3) and medical assessment (MEDD1-3) are both defined as decisions of VR measures needed and defined, possible or definite eligibility for disability pension and no VR needed. The VR assessment variables (ASSE1-3) are based on the organization that carried out the assessment namely the employer, the insurance office, or insurance office but on the behalf of employer.

Finally a number of dummy variables are defined to capture the unobserved time-specific and county specific effects. The time (T) dummies capture effects that are changing over time but are constant across counties, such as health care and labor market policies that changes over time but where all counties are subject to same policy. The second type of effects is on the other

hand constant over time but changes across counties. We used county (COUN1-5) instead of office dummies to avoid a large number of intercepts to be estimated. Variables characterizing individual municipalities such as political majority and local government are among heterogeneity factors of interest. These effects (COMM1-4) are captured through four municipality types dummies constructed on the basis of the population and industrial characteristics of sample municipalities namely: urban and suburban, major and middle sized, industrial and rural and other cities. It should be noted that the variables presented above are in general defined in up to 10, or even more, alternative or subintervals. In construction of set of dummy variables the number of alternative or subintervals are reduced to 2–4 to avoid an over parameterization of the models.

4 Estimating Program Effects

Not having a random assignment of participants to the VR programs generates selectivity problem when trying to estimate the program effects. That is, we do not know what the result of the participation group would have been had they not participated in the VR-program. The non-random selection might have positive as well as negative association with the outcome of programs.

It has, for instance, been argued that VR-participants run an increased risk of disability pension (Marklund, 1995). A high positive correlation between selection into a program and disability pension is among the negative association with outcomes of rehabilitation. The negative outcome is not a result of any VR program participation. The clientele selected for VR program participation belong to a group which ex ante has a significantly higher risk of ending up with a disability pension, and thus is more difficult to rehabilitate. The presence of managerial creaming which would be the opposite (a positive association between non-random selection and program outcome) is another possibility, i.e. the VR administrators will more frequently select individuals with a higher ex ante probability of successful rehabilitation. This has for instance been observed in Norway (Aakvik and Risa, 1996).

The most common methods of analyzing the effects of VR in general have been to evaluate the effects on individual re-entry into labor market or alternatively the effect of VR on individual income (see Dean and Dolan (1991), Worall (1988), Nowak (1983)). We are able to use pre-sickness income records but not post-sickness income. We use a bivariate probit approach that allows for controlling for non-random selection into the VR-programs. For other applications of bivariate probit models see Pissarides and Wadsworth (1994), in the context of job search by employed workers in Britain, and Aakvik and Risa (1996), in the context of estimation of the impact of VR programs in Norway.

In evaluation of rehabilitation programs the post program health and employment status is subject of evaluation. The health status and return to

work are the two outcome measures of participants that are compared with the same outcome measures of non-participants. The latter, which is a control group as well, consists of individuals who are assumed to be comparable to the participants and eligible for VR program participation except they have not received any rehabilitation.

The econometric model consists of two simultaneous equations, one for the program participation and another for program evaluation. Let $Y1_i^*$ be the unobserved decision variable to participate in the VR program or not and $Y2_i^*$ be the unobserved program outcome (healthy or return to work) of individual i. $Y1_i$ and $Y2_i$ are the corresponding observable counterparts. The linear specification of the program participation and evaluation as a function of a set of observed characteristics $X1$ and $X2$ specified as a bivariate probit model is written as[5]

$$(1) \quad Y1_i = X1_i\beta1 + \varepsilon1_i, \qquad Y1_i = 1, \quad if \quad Y1_i^* > 0, \quad else \quad Y1_i = 0,$$

$$(2) \quad Y2_i = X2_i\beta2 + \varepsilon2_i, \qquad Y2_i = 1, \quad if \quad Y2_i^* > 0, \quad else \quad Y2_i = 0$$

where $\beta1$ and $\beta2$ are vectors of parameters to be estimated reflecting the effects of changes in $X1$ and $X2$ on the probability of participation in a program and expected program outcome, respectively. It is important to note that one of the explanatory variables containing $X2$ is VR, the coefficient of which captures the effects of VR program participation on the health status and return to work of the program participants. The error terms $(\varepsilon1_i, \varepsilon2_i) \sim$ bivariate normal $\left[\begin{pmatrix}0\\0\end{pmatrix}, \begin{pmatrix}1 & \rho\\ \rho & 1\end{pmatrix}\right]$. The ρ is the correlation between the error terms $\varepsilon1_i$ and $\varepsilon2_i$. A positive ρ suggests a selection on unobservable characteristics of individuals with high potential to be re-employed or to achieve restored work capacity. The four regime log likelihood

[5] It should be noted that the data is not a panel data where individuals are observed several periods. No time subscript is used because our data consists of three repeated cross sections. The individuals are observed only once but the time length of observations might cover one or more periods.

$$\ln L = \sum_{Y1_i=0,Y2_i=0} \ln \Phi(-X1_i\beta 1, -X2_i\beta 2, \rho) + \sum_{Y1_i=1,Y2_i=0} \ln \Phi(X1_i\beta 1, -X2_i\beta 2, -\rho)$$
$$+ \sum_{Y1_i=0,Y2_i=1} \ln \Phi(-X1_i\beta 1, X2_i\beta 2, -\rho) + \sum_{Y1_i=1,Y2_i=1} \ln \Phi(X1_i\beta 1, X2_i\beta 2, \rho) \quad (3)$$

is rewritten to the one regime log likelihood

$$\ln L = \sum_i \ln \Phi(\tilde{Y}1X1\beta 1, \tilde{Y}2X2\beta 2, \tilde{Y}1\tilde{Y}2\rho) \quad (4)$$

where $\Phi(.,.,\rho)$ denotes the bivariate standard normal cumulative distribution function and $\tilde{Y}_{.i} = 2Y_{.i} - 1$ transform 0/1 indicator to a –1/+1 indicator (see Greene, 1993).

5 Empirical Results

The bivariate probit model covers two aspects of how the rehabilitation period is ended. First, the probability of restored work capacity and then the returning to work aspects. The former is interesting because of it's correspondence with the goals for VR set out by the Swedish social insurance authorities.

The success rates for the healthy and return to work outcomes (of both VR participants and non-participants) were respectively 67% and 58%. The percentages of success rate for VR participants is higher (72% and 65%), while that of non-participants is somewhat lower (66% and 56%). The male (female) VR program participation is 18% (15%). About 74% (70%) of the males (females) who complete VR programs gains a restored work capacity while only 62% (68%) returns to work. The corresponding numbers for the non-rehab group is 64% (67%) for restored work capacity and 57% (57%) for returns to work.

In Table 1 the full information maximum likelihood estimates of the bivariate probit models of the influence of the explanatory variables on the probability of being subject to VR measure and the probability of healthy and return to work outcomes are reported.[6]

Looking at the observed and calculated probabilities of the two outcomes shows little difference in predictive ability of the models. The correct percent prediction of non-VR participants not becoming healthy or returning to work is 71% for healthy outcome and 87% for return to work. The corresponding for desired outcomes is 62% for healthy outcome and 54% for return to work. The models underestimate healthiness status (29%) and return to work (52%) of VR participants, while it overestimates the frequency healthy outcome (132%) and return to work (131%) of non-participants. In general the results indicate the importance of social aspects of rehabilitation program participation decisions.

[6] Parameter estimates from the univariate probit models are used as start values in the estimation of the bivariate probit models using the Newton algorithm.

5.1 Selection to VR program

Estimation results obtained for the rehabilitation model is very similar in terms of sign, significance and magnitude of parameter estimates for the two program outcomes defined as healthy status and return to work. Thus, interpretations given in this section should apply to both outcome specifications.[7]

Looking at the probability of an individual being selected to undergo VR-measures, the estimation results show a negative association with respect to age and at an increasing rate. The sex and marital status variables are found to be insignificant but the Swedish citizenship has positive effect while reported alcohol and drug abuse as expected has negative effect on the probability of selection to a VR program. We find a negative association between urbanization and rehabilitation participation. Residents of urban and sub-urban municipalities, have a lower probability of participation in VR program compared to other municipality types residents. The decision patterns of selection into VR program differ among social insurance offices indicating the presence of heterogeneity in resources and preferences across insurance offices. We do not find significant association between selection into VR program and participants occupation. Due to the short period of study, no change in the time patterns of selection process is found.

The individual socioeconomic characteristics show that non-trained workers are more likely to participate in VR programs. Candidates identified as unemployed prior to their sickness spells are offered less VR program participation. A priori one could expect the main diagnosis to be the most relevant variables. To our surprise, none of diagnosis are found to affect the selection to VR programs. Compared with full time sick-leaves part time sick-leaves reduces the probability of VR participation. Previous sick-leaves and VR participation, during the 12-month period preceding the current sickness period increases the probability of reselection to VR program. The institution where the

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[7] In order to maintain flexibility of the models, no equality restrictions are imposed on the βl parameters in the two bivariate probit of healthy and return to work outcome models.

sick registration took part also shows no evidence of heterogeneous effects on the VR-selection procedure.

The medical assessment results of possible or definite eligibility for disability pension has much lower VR probabilities compared to the alternative of possibly needed and defined VR measures. This points to the significance of the physician's opinion in the selection process. The organization that carried out the process of VR assessment also has major impact on the selection process. The insurance office and insurance office on the behalf of employer has lower propensity to recommend VR measures compared to a case where the employers carry out the VR assessment. The results of contacts taken show that a significant and positive association between selection to VR program and the decision made in favor of rehabilitation. The alternative possible or definite eligibility for disability pension has a negative impact on the individuals' probability of selection into a VR program.

Selection to VR is largely based on the variables characterizing the county and community, social insurance offices and their actions in the early VR-process. For instance VR assessments and medical assessments, degrees of sick-leaves, previous sickness and VR participation, have major impact on the selection process. The observable individual characteristics do not to the same extent show a significant impact on VR selection. The exceptions are age, citizenship, alcohol or drug abuse and educational level.

5.2 The Probability of Healthy Outcome

As mentioned previously in addition to increased probability of return to work, restored work capacity or healthy outcome is the main goal of VR set out by the Swedish social insurance authorities. There is evidence of selection on observable characteristics in the process of who will receive VR-measures or not but some of the observable characteristics does not affect the outcome of rehabilitation to the same extent. This is valid using both definitions of successful rehabilitation. The selection seems to be influenced more by the

social background and health related needs rather than purely by the desire to achieve a higher success rate of return to work.

On the contrary to our expectations and the programs objectives, the coefficient of VR program participation is insignificant indicating that the VR program participation has no effects on the participants' health status. The effect of age on the probability of healthy outcome is negative and at an increasing rate. Alcohol and drug abuse has as expected a negative impact. The time effect is positive indicating improved effectiveness of the VR programs due to learning process. The municipalities differ by their performance and potential with respect to restoring health status of program participants but less differences are found among the five counties.

The socioeconomic groups as expected indicate a higher return to probabilities of restored work capacity for salary earners but no differences are observed for workers differentiated by their levels of education. Neither have the occupational variables any effects The individual employment status indicates that employment enhances a higher probability of healthy outcome. All diagnosis (digestions excepted) are positively related to a restored work capacity compared to the reference groups of psychiatrics diagnosis. A part-time degree of sick-leaves has positive effect on the chances of recovery. Recipients of partial pension benefits have lower propensity for recovery. The insurance office has higher propensity in health recovery issues. Thus the employer's incentive seems less important when it comes to recovery of work capacity rather than to actual return to work. This is expected since a healthy outcome is not automatically associated with return to work. Also repeated VR-measures and/or repeated sickness spells seem to have a negative impact on the healthy outcome probabilities. The longer the length of sickness spell, the lower are chances of recovery indicating a positive correlation between the length of sickness period and severity of illness of participants. Insurance office promotes health recovery. Patients registered at psychiatric and social medicine have lower probability of recovery. Education as VR measure shows to have positive impact on the health of participants and so does social rehabilitation.

Due to the endogeneity of sickness benefit a wage equation was estimated using tobit model where sickness benefit is regressed on a number individual characteristics such as age and sets of dummy variables representing marital status, citizenship, alcohol and drug abuse, time, county, municipality, occupation, socioeconomic, and employment status. The results are reported in Table 2. The tobit model is specified to capture parameter heterogeneity by sex of candidates. We observed significant heterogeneity by the age, time and employment status. Using the predicted sickness benefit the income loss during the sickness spell was calculated and used as an explanatory variable in the healthy and return to work models. We expected a positive correlation between the amount of income loss and the propensity of health recovery and return to work. The coefficient was found to be positive but insignificant.[8]

We have utilized the richness and high quality of the data to observe and to control for the relevant selection effects across groups of individuals. The test for unobservable selection, ρ, is found to be positive but insignificant suggesting no selection on unobservable characteristics of individuals who are most likely to become healthy. The program managers select program participants on the basis of participants' needs rather than their expectations of a rapid health recovery.

5.3 The Probability of Returning to Work

The effect of VR program participation on participants' return to work is found to be positive and significantly different from zero. This indicates that despite the fact that the program participants have major work disabilities and are difficult to rehabilitate the program outcome is positive. In addition to the economic efficiency, the social aspect of VR programs certainly has a great value. The age effect on the return to work probability is positive but at a decreasing rate. Alcohol and drug abuse has as expected, a negative impact on

[8] Using predicted sickness benefit as explanatory variables was also found to have no effects on individuals' health recovery.

the probability of rejoining the labor market. Male participants have higher probability of returning to work than the female participants. The time patterns show that the probability is lower in the last two periods compared to the base year, 1991/92. The rate of local unemployment is not affecting the probability of return to work after VR program participation. This is an indication of the fact that rehabilitated individuals return to previous employment or alternatively are offered job at sheltered public sector areas in periods coinciding with a high unemployment rate. The counties and communities differ by their performance and potential in helping people to return to labor market. The type of municipality however reveals a lower performance for major and middle large and rural municipalities compared to urban and suburban.

The Swedish born individuals have a higher probability of return to work than the non-Swedish born and foreign citizens. The length of sickness spell affects return to work negatively. The socioeconomic groups indicate as expected a higher return to work probabilities for salary earners compared to workers. Also individuals working in the health care sector display higher return to work probabilities. The individual employment status indicates that employment enhances return to work. Only the diagnosis of respiratory is negatively related to the probability of return to work, while the effects of injuries and other diagnosis is positive. Part time in relation to full time sick-leave increases the chance of recovery and return to work. Previous partial pension benefit reduces the probability of return to work. The same is true if the VR assessment is carried out by other agencies than the employer, possibly indicating the lack of employer incentives to encourage rehabilitation and return of certain groups with low productivity back to work. As in the case of healthy outcome, the length of sickness spell and repeated VR-measures have negative impacts on the participants' return to work probabilities. Psychiatric, social medicine and private clinics are less effective in promoting return to work of patients. Rehabilitation at own work is negative, while the effects of social and medical rehabilitation are positive to the return to work. The effect of income loss is unexpectedly negative and significant.

Having taken account of the richness and high quality of the data, we have been able to observe and control for most of the observable and relevant factors of selection between groups. The coefficient ρ is found to be positive but insignificant, again suggesting no selection on unobservable characteristics of individuals who are most likely to be re-employed. Again the results is an indication of the importance of social aspects of the VR program participation rather than its effectiveness to promote return to work. Aakvik and Risa (1996) also found the unobservable selection effects to be negative, small and insignificant in their analysis of Norwegian vocational rehabilitation data indicating that selection on unobservable variables was not important for the participants return to work.

6 Summary and Conclusions

This paper estimates the effects of vocational rehabilitation on the probability of restored work capacity and reintegration in the labor market. Bivariate probit models are used to estimate the models. Empirical application is based on a sample of 9210 individuals qualified for vocational rehabilitation programs and residing the West Sweden with long-term sickness observed during 1991 to 1994.

The results show variations in the fraction of sample participating in rehabilitation programs by county of residence, municipality type and the individual's socioeconomic background. Other types of variations are attributed to the types of programs provided and the importance of individual heterogeneity to the expected outcome of programs. Individual characteristics seem to be less influential on the selection process whereas they are important determinants of participants' ability to achieve desired outcome. Factors as sex, age, nationality and employment status have significant impact on either or both outcome states.

An important issue is whether the program managers select participants to enhance a higher probability of success. A high rate of success is either due to the efficiency of program or a selection of participants with a high ex ante probability of success. There is indication that program managers select program participants in a manner that is consistent with the main goal of the VR activities including a creaming of applicants based on their primary needs of restored health that not necessarily results in re-employment. For instance non-trained workers, with high degrees of sick-leaves, having repeated previous sick-leaves and rehabilitation records are over represented as program participants without having higher re-employment rate. We find no clear indication of managerial creaming in this study that increases the success rate of return to work.

Our results indicate that vocational rehabilitation is less important to restoring the work capacity of individuals with long-term sickness, but it is important to re-integrate those individuals back to work on the competitive labor market. The VR participants have severe work disabilities and are difficult to rehabilitate. From a social point of view, the benefit of the program is associated with both of the outcomes but with improved health status as the primary objective. Taking into account the higher work incapacity of the VR group, the VR-participants have a relatively lower probability of success even though the positive selections effect. The selection seems to be influenced more by the social background and health related needs rather than by the desire to achieve a higher success rate.

Given that we have been able to observe and control for most of the relevant factors of selection between groups. The insignificant correlation between the error terms in the selection and in the re-employment and healthy outcome regressions is evidence of the fact that the large number of relevant background variables captures most of observable selection criteria. The selection of VR participants is central in evaluating the effects of VR programs. An important future research issue using the entire or a larger fraction of the Riks-LS data could be to investigate whether or not the vocational rehabilitation effects are homogenous across groups of participants. Thus, in addition to controlling for observable selection our objective is to introduce heterogeneous effects in the model specification that is associated with important characteristics of participants, different types of programs provided and program providers. The effectiveness of VR programs and their program providers in transferring individuals with long-term sick-leaves to healthy and employed status can then be better quantified and evaluated.

References

Aakvik A. and A.E. Risa (1996), Success through Selection in Norwegian Vocational Rehabilitation Programs?, Unpublished Working Paper, Department of Economics, University of Bergen, Norway.

Anderson K.H., R.V. Burkhauser and J.E. Raymond (1993), The Effects of Creaming on Placement Rates under the Job Training Partnership Act, *Industrial and Labor Relations Review* 46, 613–624.

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

Barrow B. (1987), The Impact of CETA Programs on Earnings: A Review of the Literature, *Journal of Human Resources* 22, 157–193.

Bassi L. (1984), Estimating the Effect of Training Programs with Non-Random Selection, *Review of Economics and Statistics* 66, 36–43.

Bergendorff S., U. Lidwall, D. Ljungberg and S. Marklund (1997), Sickness Absenteeism and Vocational Rehabilitation in Sweden – A Summary, in Steffan Marklund (ed.): *Risk-, friskfaktorer – sjukskrivning och rehabilitering i Sverige*, RFV Redovisar 1997:6, pp 157–166.

Berkowitz E. (1988), The Cost-Benefit Tradition in Vocational Rehabilitation. In Monroe Berkowitz (ed): *Measuring the Efficiency of Public Programs. Costs and Benefits in Vocational Rehabilitation.* Temple University press, Philadelphia.

Björklund A. (1988), What Experiment Are Needed for Manpower Policy, *Journal of Human Resources* 23, 267–277.

Burtless G. (1995), The Case of Randomized Field Trials in Economic and Policy Research, *Journal of Economic Perspectives* 9, 63–84.

Burtless G. and L. Orr (1986), Are Classical Experiments Needed for Man-Power Policy? *Journal of Human Resources* 21, 606–639.

Dean D. and R.C. Dolan (1991), Fixed-Effects Estimates of Earnings Impacts for the Vocational Rehabilitation Program, *Journal of Human Resources* 26, 380–391.

Fraker T. and R. Maynard (1987), The Adequacy of Comparison Group Design for Evaluation of Employment Related Programs, *Journal of Human Resources* 22, 194–227.

Gay R.S. and M.E. Borus (1980), Validating Performance Indicators for Employment and Training Programs, *Journal of Human Resources* 15, 29–48.

Greene H.W. (1993), *Econometric Analysis*, Macmillan Publishing Company, New York.

Heckman J.J. and V.J. Hotz (1989), Choosing Among Alternative Nonexperimental Methods for Estimating the Impact of Social Programs: The Case of Manpower Training, *Journal of the American Statistical Association*, 84(408), 862–880 (including comments by P.W. Holland and R. Moffitt and a rejoinder by J.J. Heckman and V.J. Hotz).

LaLonde R.J. (1986), Evaluating the Econometric Evaluations of Training Programs with Experimental Data, *American Economic Review* 74, 604–620.

LaLonde R.J. (1995), The Promise of Public Sector-Sponsored Training Programs, *Journal of Economic Perspectives* 9, 149–168.

Lechner M. (1996), An Evaluation of Public Sector Sponsored Continuous Vocational Training Programs in East Germany, *Discussion Paper* 1996:539, Institut fur Volkswirtschaffslehre und Statistik, Universität Mannheim, Mannheim, Germany.

Marklund S. (1995), Vilka långtidssjuka blir rehabiliterade?, in Marklund S. (ed) *Rehabilitering i ett samhällsperspektiv*, Lund, Studentlitteratur.

Nowak L. (1983), A Cost Effectiveness Evaluation of the Federal/State Vocational Rehabilitation Program – Using a Comparison Group, *The American Economist* 27, 23–29.

Pissarides C.A. and J. Wadsworth (1994), On-the-job Search: Some Empirical Evidence from Britain, *European Economic Review* 38, 385–402.

Worrall J. (1988), Benefit and Cost Models. In Monroe Berkowitz (Ed.): *Measuring the Efficiency of Public Programs. Costs and Benefits in Vocational Rehabilitation.* Temple University Press, Philadelphia.

Table 1 **Full information ML parameter estimates of bivariate probit models (n=9210).**

Outcome models		Healthy outcome		Return to work		
Parameter	Definition of X	Estimate	Std error	Estimate	Std error	Mean of X
A. VR selection models β 1-parameters (dependent variable is participation in VR programs):						
Constant	Intercept	0.1389	0.1333	0.1333	0.1339	1.000
SEX	Male=1	0.0176	0.0454	0.0162	0.0455	0.454
MARIT	Married=1	0.0623	0.0390	0.0613	0.0389	0.524
CITIZ	Swedish=1	0.1137b	0.0543	0.1136b	0.0543	0.845
AGE45	Ages of 36–45	-0.0729	0.0507	-0.0749	0.0508	0.227
AGE55	Ages of 46–55	-0.1858a	0.0510	-0.1894a	0.0510	0.276
AGE65	Ages of 56–65	-0.5140a	0.0651	-0.5146a	0.0651	0.218
ALCOH	Alcohol and drug abuse=1	-0.1955b	0.0908	-0.1974b	0.0912	0.055
T2	1992/93	0.0369	0.0458	0.0382	0.0458	0.349
T3	1993794	-0.0048	0.0474	-0.0045	0.0476	0.309
DEGR2	Sick-leave degree 25%–75%	-0.4437a	0.0632	-0.4437a	0.0633	0.139
COUN2	Bohuslän	-0.0102	0.0681	-0.0072	0.0683	0.213
COUN3	Älvsborgslän	0.2445a	0.0654	0.2477a	0.0656	0.213
COUN4	Värmlandslän	0.1853a	0.0688	0.1881a	0.0688	0.153
COUN5	Göteborgskommun	-0.1755b	0.0777	-0.1773b	0.0777	0.268
COMM2	Major and middle large cities	0.1528a	0.0606	0.1496a	0.0606	0.241
COMM3	Industrial cities	0.2089a	0.0829	0.2059a	0.0830	0.067
COMM4	Other cities	0.3240a	0.0582	0.3217a	0.0581	0.195
OCCU2	Various sciences	0.0902	0.0741	0.0913	0.0743	0.300
OCCU3	Manufacturing	-0.0249	0.0804	-0.0233	0.0804	0.270
OCCU4	Agri., mining, transp., services	0.0871	0.0735	0.0879	0.0736	0.338
SOCE2	Trained workers	-0.0667	0.0543	-0.0669	0.0543	0.190
SOCE3	Salary earners	-0.1150b	0.0557	-0.1138b	0.0556	0.266
SOCE4	Others	-0.1979a	0.0747	-0.1973a	0.0746	0.139
EMPL2	Education	-0.1592	0.1985	-0.1509	0.1995	0.015
EMPL3	Unemployed	-0.2840a	0.0655	-0.2776a	0.0661	0.159
EMPL4	Others	0.0402	0.1503	0.0390	0.1511	0.017
DIAG2	Circulation	0.1391	0.1049	0.1429	0.1054	0.059
DIAG3	Respiratory	0.0406	0.1165	0.0467	0.1170	0.027
DIAG4	Digestion	-0.0805	0.1236	-0.0694	0.1227	0.034
DIAG5	Musculoskeletal	0.0988	0.0640	0.1039	0.0645	0.412
DIAG6	Injuries	0.0759	0.0787	0.0786	0.0790	0.132
DIAG7	Others	-0.0011	0.0756	0.0081	0.0761	0.165
PRES2	Previous sick-leave 61- days	0.1618a	0.0504	0.1616a	0.0502	0.209
PRES3	Previous sick-leave unknown	0.1748	0.1322	0.1776	0.1322	0.027
PREV2	Previous VR=1	0.3755a	0.0634	0.3783a	0.0634	0.078
PREV3	Previous VR, unknown	-0.1448	0.1164	-0.1365	0.1155	0.034
MEDD2	Eligible to disability pension	-0.9660a	0.0913	-0.9752a	0.0917	0.128
MEDD3	No VR needed	-0.8457a	0.0442	-0.8435a	0.0440	0.705
ASSE2	Insurance office (IO)	-0.1261b	0.0627	-0.1284b	0.0630	0.139
ASSE3	IO on behalf of employer	-0.7490a	0.0444	-0.7500a	0.0446	0.668
INST2	Psychiatric & social medicine	0.0356	0.0917	0.0358	0.0923	0.068
INST3	Private and others	0.0704	0.0532	0.0674	0.0532	0.142
CONT2	Eligible to disability pension	-0.6646a	0.0955	-0.6715a	0.0960	0.107
CONT3	No VR needed	-0.3740a	0.0394	-0.3704a	0.0394	0.497

Table 1 Continued.

Outcome models		Healthy outcome		Return to work		
Parameter	Definition of X	Estimate	Std error	Estimate	Std error	Mean of X
B. VR outcome models β 2-parameters (dependent variables are HEALTHY and WORK):						
Constant	Intercept	0.2558	1.0187	3.0522a	1.0493	1.000
VR	VR participation=1	0.3070	0.1946	0.8924a	0.1634	0.161
SEX	Male=1	0.0227	0.0660	0.3309a	0.0669	0.454
MARIT	Married=1	-0.0230	0.0313	-0.0389	0.0330	0.524
CITIZ	Swedish=1	0.0671	0.0425	0.0990b	0.0457	0.845
LENGTH	Length sickness spell	-0.0011a	0.0001	-0.0020a	0.0001	253.417
LOSSGI	Sickness benefit loss	0.0160	0.1868	-0.4922a	0.1919	5.435
AGE45	Ages of 36–45	-0.2102a	0.0449	0.5154a	0.0462	0.227
AGE55	Ages of 46–55	-0.4663a	0.0487	0.5120a	0.0526	0.276
AGE65	Ages of 56–65	-0.8871a	0.0591	-0.1107c	0.0603	0.218
ALCOH	Alcohol and drug abuse=1	-0.2848a	0.0683	-0.4844a	0.0833	0.055
T2	1992/93	0.0725b	0.0361	-0.1272b	0.0642	0.349
T3	1993/94	0.0882b	0.0385	-0.1386b	0.0597	0.309
LOCUN	Local unemployment rate	.	.	0.0262	0.0187	6.581
DEGR2	Sick-leave degree 25%–75%	0.2480a	0.0426	0.4843a	0.0464	0.139
NOBEN	No sickness/pension benefit	0.6487a	0.0554	0.4525a	0.0598	0.921
COUN2	Bohuslän	-0.2068a	0.0557	-0.1328b	0.0591	0.213
COUN3	Älvsborgslän	-0.1205b	0.0578	-0.1198c	0.0628	0.213
COUN4	Värmlandslän	-0.3240a	0.0598	-0.1922a	0.0655	0.153
COUN5	Göteborgskommun	-0.2291a	0.0631	-0.2791a	0.0852	0.268
COMM2	Major and middle large cities	-0.0790c	0.0473	-0.1134b	0.0553	0.241
COMM3	Industrial cities	-0.0475	0.0706	-0.0402	0.0787	0.067
COMM4	Rural and other cities	0.0396	0.0486	-0.0983c	0.0561	0.195
OCCU2	Various sciences	-0.0074	0.0602	-0.0934	0.0633	0.300
OCCU3	Manufacturing	0.0233	0.0635	-0.1308b	0.0664	0.270
OCCU4	Agri., mining, transp., services	-0.0086	0.0622	-0.1552b	0.0645	0.338
SOCE2	Trained workers	0.0621	0.0441	0.0646	0.0462	0.190
SOCE3	Salary earners	0.2092a	0.0554	0.2220a	0.0581	0.266
SOCE4	Others	0.0462	0.0622	-0.1609b	0.0689	0.139
EMPL2	Education	-0.3004b	0.1389	-1.9215a	0.1613	0.015
EMPL3	Unemployed	-0.1456a	0.0483	-1.7195a	0.0567	0.159
EMPL4	Others	-0.1465	0.2223	-1.5115a	0.2241	0.017
DIAG2	Circulation	0.2068a	0.0750	-0.0338	0.0834	0.059
DIAG3	Respiratory	0.1707c	0.0970	-0.2433a	0.0987	0.027
DIAG4	Digestion	-0.0508	0.0820	-0.0107	0.1003	0.034
DIAG5	Musculoskeletal	0.0795c	0.0480	-0.0810	0.0517	0.412
DIAG6	Injuries	0.4742a	0.0614	0.3207a	0.0670	0.132
DIAG7	Others	0.2183a	0.0559	-0.3601a	0.0578	0.165
PRES2	Previous sick-leave 61- days	-0.2707a	0.0375	-0.0213	0.0415	0.209
PRES3	Previous sick-leave unknown	0.1043	0.0964	0.0544	0.1012	0.027
PREV2	Previous VR=1	-0.1948a	0.0574	-0.2559a	0.0644	0.078
PREV3	Previous VR, unknown	-0.0003	0.0834	0.0128	0.0925	0.034
ASSE2	Insurance office (IO)	0.0232	0.0566	-0.0533	0.0592	0.139
ASSE3	IO on behalf of employer	0.0996b	0.0463	-0.1386a	0.0488	0.668

Table 1 Continued.

Outcome models		Healthy outcome		Return to work		
Parameter	Definition of X	Estimate	Std error	Estimate	Std error	Mean of X
INST2	Psychiatrics & social medicine	-0.1532b	0.0646	-0.1794b	0.0778	0.068
INST3	Private and others	0.0216	0.0432	-0.1233a	0.0443	0.142
REHOWN	VR at own work place		0.2328	0.1439	-0.8751a	0.1193
	0.036					
REHNEW	VR at new work place	0.0032	0.1590	-0.1265	0.1264	0.088
REHEDU	VR education	0.2638c	0.1487	-0.0932	0.1188	0.048
REHMED	Medical rehabilitation	0.0114	0.0450	0.1335a	0.0497	0.141
REHSOC	Social rehabilitation	0.2501c	0.1433	0.3079c	0.1759	0.008
RHO	Selection on unobservable	-0.0651	0.0665	-0.0868	0.0661	.
Log L	Log likelihood	-8111.840		-7557.284		

	Model	Healthy outcome			Return to work		
N	No of observation	0	1	0+1	0	1	0+1

C. Joint frequency table of observed and fitted values:

Rehab	Observed No of rehabilitation	484	1237	1721	604	1117	1721
	Fitted No of rehabilitation	(141)	(766)	(907)	(311)	(606)	(917)
	Percent correct predictions	0.29	0.62	0.41	0.51	0.54	0.53
Non-Rehab	Observed No of non-rehabilitated	2558	4931	7489	3292	4197	7489
	Fitted No of non-rehabilitated	(1812)	(6491)	(8303)	(2813)	(5480)	(8293)
	Percent (in)correct predictions	0.71	1.32	1.11	0.85	1.31	1.10
Total	Total No of observations	3042	6168	9210	3896	5314	9210
	Total fitted values	(1953)	(7257)	(9210)	(3124)	(6086)	(9210)
	Percent (in)correct predictions	0.64	1.18	1.00	0.80	1.15	1.00

Reference groups: AEGE1=18–35 years, T1=1991/1992, COUN1=Hallandslän, COMM1=Urban and Suburban cities, OCCU1=health care, SOCE1=non-trained workers, EMPL1=working, DIAG1=psychistric, DEGR1=100% sick-leave, PRES1=previous sick-leave <60 days, PREV1=no previous VR, MEDD1=VR needed and defined, ASSE1=employer, INST1=health care center or hospital, CONT1=VR needed and defined, REHOTH=evaluation of work capacity and other rehabilitation measures.

Significant at <1% (a), 1–5% (b), 5–10% (c) levels of significance.

Table 2 **ML parameter estimates of tobit model of sickness benefit equation (n=9210).**

Parameter	Definition of X	Estimate	Std error	Mean of X
A. Common (Female) Effects:				
Constant	Intercept	7.2841a	0.0480	1.000
MARIT	Married=1	-0.0744a	0.0176	0.545
CITIZ	Swedish=1	-0.0630a	0.0248	0.870
AGE	Age	-0.0072a	0.0007	44.357
ALCOH	Alcohol & drug abuse=1	0.0871	0.0574	0.050
T2	1992/93	0.0512a	0.0201	0.356
T3	1993/94	0.0203	0.0211	0.298
COUN2	Bohuslän	-0.0060	0.0334	0.244
COUN3	Älvsborgslän	0.0069	0.0315	0.283
COUN4	Värmlandslän	0.0289	0.0329	0.237
COUN5	Göteborgskommun	0.1145a	0.0408	0.120
COMM2	Major and middle large cities	0.0107	0.0314	0.145
COMM3	Industrial cities	-0.0090	0.0324	0.120
COMM4	Rural and other cities	-0.0356	0.0235	0.395
OCCU2	Various sciences	0.0253	0.0268	0.273
OCCU3	Manufacturing	0.0609b	0.0300	0.303
OCCU4	Agri., mining, transport, services	-0.1076a	0.0272	0.326
SOCE2	Trained workers	0.0534c	0.0293	0.192
SOCE3	Salary earners	0.1910a	0.0237	0.240
SOCE4	Others	-0.2592a	0.0343	0.125
EMPL2	Education	-0.3045a	0.0706	0.014
EMPL3	Unemployed	-0.0499c	0.0293	0.153
EMPL4	Others	-1.1158a	0.0571	0.018
B. Additional Male Effects:				
XMARIT	Married=1	0.1809a	0.0266	0.240
XCITIZ	Swedish=1	0.0565	0.0364	0.403
XAGE	Age	0.0035a	0.0010	20.882
XALCOH	Alcohol and drug abuse=1	-0.0975	0.0670	0.038
XT2	1992/93	-0.0679b	0.0295	0.164
XT3	1993794	-0.0595b	0.0309	0.137
XCOUN2	Bohuslän	0.0238	0.0466	0.109
XCOUN3	Älvsborgslän	-0.0154	0.0453	0.130
XCOUN4	Värmlandslän	0.0285	0.0468	0.112
XCOUN5	Göteborgskommun	-0.0454	0.0566	0.054
XCOMM2	Major and middle large cities	-0.0085	0.0451	0.064
XCOMM3	industrial cities	-0.0274	0.0472	0.054
XCOMM4	Rural and other cities	-0.0124	0.0340	0.187
XOCCU2	Various sciences	0.0534	0.0629	0.065
XOCCU3	Manufacturing	-0.0291	0.0599	0.221
XOCCU4	Agri., mining, transport, services	0.0580	0.0587	0.166
XSOCE2	Trained workers	-0.0079	0.0380	0.135
XSOCE3	Salary earners	-0.0550	0.0403	0.085
XSOCE4	Others	0.1431a	0.0475	0.067
XEMPL2	Education	-0.1624	0.1112	0.005
XEMPL3	Unemployed	0.1076a	0.0394	0.086
XEMPL4	Others	0.4291a	0.1025	0.005
σ^2	Variance	0.5922a	0.0044	.
Log L	Log likelihood	-8322.599		

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