

Sheltered vs. Supported Employment: A Direct Comparison of Long-Term Earnings Outcomes for Individuals with Cognitive Disabilities

John Kregel and David H. Dean

The long-term earnings impact of sheltered and supported employment on 877 individuals with cognitive disabilities was investigated through the implementation of a comprehensive analytical framework for assessing employment outcomes for people with disabilities who have been served by a vocational rehabilitation (VR) agency in a single state. Information on demographic characteristics, pre- and post-program earnings, and local economic conditions were merged to allow a comprehensive examination of the earnings outcomes of individuals who receive alternative types of VR services. Results indicated that people served in sheltered and supported employment differ in many ways from other individuals with cognitive disabilities successfully served by the VR agency. Individuals in the supported employment cohort were more likely to have worked in competitive, integrated employment prior to program entry than their sheltered employment counterparts. The sheltered and supported employment cohorts differ slightly in terms of demographic characteristics. Earnings of the supported employment cohort were 250% greater than the sheltered employment cohort across a seven-year post-program period. A fixed effects modeling (FEM) procedure revealed that supported employment had a statistically greater impact on the earnings of persons with disabilities than participation in sheltered employment. Implications are discussed in relation to the recent U.S. Department of Education decision to amend the definition of employment outcome.

On January 22, 2001, the U.S. Department of Education published final regulations governing the State Vocational Rehabilitation Services Program that amended the definition of “employment outcome” (Federal Register, January 22, 2001). The revised regulations overturned a decades old policy that allowed State Vocational Rehabilitation (VR) agencies to consider placement in segregated employment settings such as sheltered workshops to be an appropriate employment outcome for individuals with disabilities. Under the amended regulations, employment outcome is defined as full or part-time employment in the integrated labor market. Appropriate employment outcomes also include supported employment, self-employment, telecommuting, or business ownership.

The amended regulations have been controversial. The Department of Education received over 3,000 comments in response to the initial notice of proposed rulemaking in June, 2000. Proponents of the amended regulations contended that the change would significantly increase access to integrated employment settings, eliminate barriers to competitive jobs for persons with significant disabilities, and improve the overall accountability of the VR program. Critics expressed concern that restricting the definition of appropriate employment outcome exclu-

sively to integrated employment settings would unnecessarily limit consumer choice, reduce the number of employment options available to individuals with disabilities, limit access to the VR system for individuals with the most significant support needs, and lead to the elimination of sheltered workshops where individuals currently work.

Sheltered employment programs are designed to assist individuals who for whatever reason are viewed as not capable of working in a competitive employment setting in their local community. The term “sheltered employment” is often used to refer to a wide range of segregated vocational and non-vocational programs for individuals with disabilities, such as sheltered workshops, adult activity centers, work activity centers, and day treatment centers. These programs differ extensively in terms of their mission, services provided, and funding sources. Currently, most sheltered employment services are operated through private, not-for-profit organizations that are funded through a variety of State and Federal funding sources.

Virtually all forms of sheltered employment can generally be classified into two types. *Transitional employment programs* are intended to provide training and experience to individuals in segregated settings so that they will be able to acquire the skills necessary to succeed in subsequent competitive employment. *Extended employment programs* are designed to be long-term or permanent placements for individuals that will allow them to use their existing abilities to earn wages in the segregated workshop setting.

In amending the regulations regarding employment outcome, the Department of Education recognized the two different types of sheltered employment settings. “Extended employment (i.e. sheltered or non-integrated employment) remains both an initial step toward achieving integrated employment under the VR program and a long-term employment option through sources of support other than the VR program” (Federal Register, January 22, 2001, p. 7254). In other words, the revised regulations still recognize the transitional (training) function of sheltered workshops by allowing the use of VR funds to support an individual’s placement in a sheltered workshop, if the purpose of that placement is to prepare for work in an integrated employment setting. Furthermore, the regulations acknowledge that placement sheltered employment may still remain a long-term outcome for individuals with disabilities. The regulations merely require that funds other than VR monies be used to support this segregated placement.

The move by the Department of Education to focus the use of VR funds on the achievement of integrated employment outcomes is the most recent episode in a long and contentious debate over the appropriateness of sheltered employment for persons with cognitive disabilities (McLoughlin, Garner, & Callahan, 1987; TenBroek & Matson, 1959; Wehman, 1981; Whitehead, 1979). Sheltered workshops and other segregated employment settings formed the core of our nation’s system of vocational training and employment supports for adults with significant cognitive disabilities throughout the twentieth century. The majority of adults with cognitive disabilities still work in segregated, sheltered employment settings, as opposed to integrated settings in the competitive labor force. Despite the continued reliance on these programs, critics have consistently questioned the effectiveness of segregated employment settings. For example:

- Sheltered employment settings fail to provide individuals meaningful employment outcomes. Earnings are low or inconsequential, forcing individuals to remain dependent on Federal cash benefit programs (Bellamy, Rhodes, Bourbeau, & Mank, 1986).
- Sheltered employment programs unnecessarily isolate individuals from the rest of their community. Rather than lessening obstacles to employment for persons with

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disabilities, this segregation actually contributes to lowered expectations and negative public attitudes (Wehman, 1981).

- Once in sheltered employment, very few persons are able to progress into competitive employment. The long-term impact of sheltered employment on the productivity and community integration of individuals with disabilities is very small (Murphy & Rogan, 1995).

In reaction to these criticisms, supported employment has emerged as an alternative to sheltered employment, particularly for individuals with cognitive disabilities. Supported employment, developed in the Federal/State VR program in 1986, is viewed as competitive employment in an integrated work setting for individuals traditionally unable to obtain and maintain employment in the open labor market. As recently as 1986, only 300 programs across the country provided supported employment services. Today, over 3,000 agencies provide supported employment to over 250,000 individuals across the nation (Kregel & Wehman, 1997).

Despite its rapid emergence as the preferred employment alternative for individuals with significant cognitive disabilities, supported employment has also been occasionally criticized (Kregel & Wehman, 1989; Wehman & Kregel, 1995). Concerns have been raised that individuals with cognitive disabilities are frequently unable to retain their jobs for extended periods of time after initial placement, individuals are often placed into low-paying jobs that do not allow them to achieve economic self-sufficiency, and the program fails to effectively meet the needs of individuals with the most significant and ongoing support needs.

The ability of both sheltered and supported employment to have a long-term impact on the earnings and economic self-sufficiency of individuals with cognitive disabilities directly relates to the Department of Education's decision to modify the definition of employment outcome. The revised regulations reject sheltered employment as a meaningful employment outcome for the VR program, yet retain sheltered employment as an "interim step in the rehabilitation process" (p. 7255).

While the relative merits of sheltered and supported employment have been widely debated, little empirical evidence exists that directly compares the outcomes generated by these programs for individuals with cognitive disabilities (Cimera, 1998; Coker, Osgood, & Clouse, 1995). Existing research has been hampered by a lack of valid comparisons between sheltered employment and supported employment populations, lack of long-term earnings data, especially for individuals who have exited sheltered employment settings, and an inability to account for the impact of changing economic conditions on earnings outcomes. The present study attempts to avoid some of the shortcomings of previous research through the implementation of a comprehensive analytical framework for assessing employment outcomes for persons with disabilities who have been served by a VR agency in a single state.

The purpose of this investigation was to compare the characteristics and long-term employment outcomes of individuals with cognitive disabilities placed into sheltered employment or supported employment by a state VR agency. Specifically, the study investigates the following questions:

- How do individuals placed into sheltered or supported employment differ from other individuals with cognitive disabilities served by the state vocational rehabilitation agency?

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- What are the demographic characteristics and pre-employment earnings histories of individuals with cognitive disabilities placed into sheltered or supported employment?
- What is the long-term earnings impact of placement into sheltered or supported employment on persons with cognitive disabilities served by a state vocational rehabilitation agency?

Method

The present study is a part of a larger effort to conduct a long-term evaluation of the federal-state vocational rehabilitation (VR) program in a single state (Virginia). The overall effort attempts to develop and pilot a comprehensive framework to evaluate the employment outcomes achieved by individuals who receive various types of services through the state VR agency (Dean et al., 2001). Key features of the analytical framework include:

- Development of alternative “internal” comparison groups, including program dropouts as a method of controlling for selection bias;
- Development of an extensive earnings profile for each applicant that contains three years of pre-VR earnings and seven years of post-VR earnings;
- Measures of the local business climate that might influence employment opportunities for individual clients; and
- Use of a “fixed effects modeling” (FEM) analysis to examine the impact of vocational rehabilitation services on post-program earnings that controls for the influence of demographic characteristics, socio-economic factors, and local economic conditions.

The larger study looks at the longitudinal earnings profiles for over 4,000 applicants for VR services in Virginia in 1988, including individuals with differing types of disabilities who received a wide variety of services through the federal state VR program. The present study focuses only on one group of individuals (people with cognitive disabilities) who were closed into sheltered or supported employment situations.

Data Sources

Three distinct types of data, each derived from a different administrative data set, were merged to compare the experiences of individuals with cognitive disabilities served by vocational rehabilitation in sheltered and supported employment programs. These data included information on the demographic characteristics of individuals applying for services, indicators of local economic conditions, and pre-service and post-service individual earnings histories for all sample participants. Each of these data types is described on the following page.

Demographic and Socio-Economic Characteristics

Information on the individual's age, sex, disabling condition, ethnicity, educational experiences, benefits status and other relevant information was obtained from the federally mandated reporting system (RSA 911) maintained by the state VR agency.

Local Economic Conditions

Annual information on per capita income and unemployment rates was obtained for each of the state's 21 "planning districts" for each year from 1985 to 1997, in order to assess the impact of local economic factors on earnings outcomes across diverse local communities.

Earnings Histories

The major dependent variable for this study was the annualized earnings of program applicants ultimately served in sheltered and supported employment settings. These data are obtained through the transfer of a series of administrative databases provided by the Virginia Employment Commission (VEC). The combined VEC database contains quarterly earnings throughout the period 1985-1997. For the individuals in the present sample, these data allow the development of an "earnings profile" that describes each individual's earnings history during the three years prior to receiving VR services and the seven years after receiving services.

Sample

The sample for the investigation consisted of 877 individuals with (1) a diagnostic label of cognitive disability (mental retardation), (2) who received services through the public vocational rehabilitation program in Virginia, and (3) who were closed into sheltered (N=447) or supported (N = 430) employment status. Individuals who were placed into *both* sheltered and supported employment were excluded from the sample. To create a sufficient sample for the analyses, the sample is comprised of individuals who were either *closed* into sheltered or supported employment during federal Fiscal Year (FY) 1988, or who *applied* for VR services in 1988 and were closed into sheltered or supported employment in subsequent years.

Since the applicants and closure groups were accepted under basically the same eligibility criteria and were receiving VR services at roughly the same point in time, it seems appropriate to combine for analyses. Nonetheless, to determine if significant differences exist between the two cohorts, a battery of "difference in means" tests was conducted on multiple demographic, service and outcome variables (Dean, Dolan, & Schmidt, 2001). Results showed only one statistically significant difference between the closure and applicant (i.e. the likelihood of benefits receipt at the time of application). No other statistically significant demographic differences were detected. While it is important to acknowledge these differences, the closure and applicant cohort were remarkably similar in over 10 demographic and program earnings variables. On balance, merging the two cohorts appears to be justified and the two cohorts will be reflected in all reported data.

Comparison of the Sheltered Employment and Supported Employment Groups with Other Individuals Served by the VR Agency

An initial set of analyses was performed to examine the demographic and socio-economic characteristics of the sheltered and supported employment groups to other individuals with cognitive disabilities who (1) were included

in the same application/closure cohort, (2) did not receive any type of sheltered employment or supported employment service, and (3) were successfully served by the VR agency (closed into status 26 – Successfully Rehabilitated). These analyses were completed to determine whether the sheltered and supported employment groups differed from the “mainstream” vocational rehabilitation population in ways that would justify their service in these specialized programs.

Table 1 below summarizes the demographic characteristics for the sheltered, supported, and status 26 groups. As indicated in the table, the sheltered and supported employment groups differed from the Status 26 group in a number of ways.

- Individuals in the sheltered and supported employment groups were significantly more likely to have been classified with a moderate or severe cognitive disability, as opposed to a classification of mild cognitive disability.
- Females comprised a slightly larger percentage of the sheltered and supported groups, as opposed to the Status 26 group.
- African-Americans comprised nearly half (46%) of the Status 26 group, as compared to 29% of the sheltered employment and 36% of the supported employment groups.
- Individuals in the sheltered and supported employment programs were five times more likely to receive Social Security Disability Insurance and/or Supplemental Security Income than persons in the Status 26 group.

In summary, individuals in the sheltered and supported employment groups appear to possess more significant support needs, as indicated by their diagnostic classification and their dependence on SSA benefit programs, in comparison to the Status 26 group. The Status 26 group was more likely to be African-American and male. The sheltered and supported employment groups were more like to be white and female.

Table 1 -- Demographic and Socio-Economic Characteristics of the Sheltered Employment, Supported Employment and Status 26 Groups

Characteristic	Sheltered Employment (n = 447)	Supported Employment (n = 430)	Status 26 (n = 926)
Diagnostic Classification - Mild Cognitive Disability	18.6	24.6	55.1
Diagnostic Classification - Moderate/Severe Cognitive Disability	81.4	75.4	44.9
Gender -- Male	52.9	53.5	58.4
Gender -- Female	47.1	46.5	41.6
Ethnicity -- White	69.3	62.9	53.2
Ethnicity -- African American	29.1	36.7	46.0
Ethnicity -- Other	1.6	0.4	0.8
SSDI Beneficiary	17.3	20.8	3.6
SSI Recipient	56.0	48.3	11.7

Comparison of the Pre-Program Earning and Demographic Characteristics of the Sheltered Employment and Supported Employment Groups

Information on pre-program earnings of individuals in the sheltered and supported employment cohorts was obtained from the longitudinal earnings data provided by the Virginia Employment Commission (VEC). The demographic and socioeconomic attributes available from the federal RSA 911 reporting form include the specific disability classification, gender, race/ethnicity, and whether the person was receiving a disability-related federal transfer payment such as Disability Insurance (DI) or Supplemental Security Income (SSI). Mean values for the sheltered and supported employment groups on selected variables are contained in Table 2. A brief discussion of each characteristic will be presented along with the results of a test detecting a statistically significant difference in means. When appropriate, results will be stratified by the level of cognitive disability (i.e., mild, moderate, or severe).

Pre-Program Earnings

People in sheltered and supported employment were first compared on pre-program earnings in order to assess their employment experiences prior to entering the VR program. Difference-in-means tests were performed to compare pre-program earnings three years, two years, and one year prior to entry into the VR program. The results are summarized in Table 2. The two entries for each of the three earnings periods provided in rows 1-3 are the percentage of individuals with earnings reported to the Virginia Employment Commission, and then the average annual earnings for only those with some (non-zero, or ">0 Only") earnings in the period. The distinction is important because while there are no statistically significant differences in any of the three pre-VR years using the "non-zero" mean value, differences were detected in the percentage of individuals with earnings reported to VEC. It should be emphasized that earnings from sheltered employment would not be reported to VEC. Therefore, the percentages in Rows 1-3 should be viewed as the percentage of individuals in each cells with earnings from competitive, integrated employment in jobs "covered" by VEC.

Statistically significant differences were found when earnings for all participants are compared for the three year (t-value = 1.95, $p < .05$), two year (t-value = 3.81, $p < .01$), and one year (t-value = 2.01, $p < .05$) time periods. In other words, persons in supported employment were statistically more likely to earn more in each of the three years prior to enrollment in vocational rehabilitation than their counterparts in sheltered employment. However, this difference is primarily caused by the fact that a larger percentage of individuals in sheltered employment had no earnings in one or more of the pre-program years. In instances where individuals in sheltered employment had VEC reported pre-program earnings, those earnings were statistically equivalent to the supported employment cohort.

Diagnostic Classifications

As indicated at the bottom of Table 2 on the following page, a Chi-square test of difference in proportions for the three cognitive disability diagnostic classification levels (mild, moderate, severe) reveals that there is a statistically significant difference across the two cohorts. While both groups had an equal number of individuals in the moderate diagnostic classification, members of the supported employment group were more likely to be classified with a mild cognitive disability and individuals in the sheltered employment group more likely to be classified with a severe cognitive disability. While the results were statistically significant, it should be noted that there was considerable overlap between the two groups. For example, over 21% of the supported employment group were classified with a severe cognitive disability, 18% of the sheltered employment group were classified with a mild cognitive disability, and over 50% of both groups were classified with a moderate cognitive disability.

**Table 2 -- Difference-in-Means Tests
Comparison of Sheltered and Supported Employment Participants**

Variable	Mean		t-value	p-value
	SE (n = 443)	SW (n = 427)		
% Earnings 3 yb	26.9%	13.7%	3.68**	.0003
Mean Earnings, if any	\$2,103	\$1,873	0.27	.7907
% Earnings 2 yb	33.2%	5.5%	3.68**	.0000
Mean Earnings, if any	\$2,312	\$1,668	1.13	.2615
% Earnings 1 yb	41.4%	16.4%	8.20*	.0000
Mean Earnings, if any	\$2,327	\$2,951	-0.50	.6209
Male	53.0%	52.5%	0.17	.8622
White	63.0%	69.3%	-1.98*	.0483
Age at Application	27.9	29.1	-1.70	.0904
SSI Recipient	48.8%	56.2%	-2.20*	.0279
SSDI Beneficiary	21.0%	17.6%	1.28	.2007
Welfare	5.4%	6.6%	-0.71	.4789
Diagnostic Label - Mild	24.8%	18.7%	Chi-Square 7.83*	.0199
Moderate	53.3%	52.5%		
Severe	21.9%	28.8%		

* Significant at 5%, two-tailed.

** Significant at 1%, two-tailed.

Gender Composition

A test of the difference-in-means for the proportion of the overall sheltered and supported employment cohorts that were male or female found no significant difference between the two groups. However, when the two cohorts are stratified by the diagnostic classification level (mild, moderate, severe), differences are uncovered (Table 3 below). Difference-in-means tests for each of the mild, moderate, and severe classification levels reveal a statistically significant difference in the proportion that are male for the mild classification level cohorts located in supported (60%) versus sheltered (45%) employment (t-value = 2.06, p < .05).

**Table 3 -- Gender of Sheltered and Supported Cohorts,
Sorted by Diagnostic Classification**

Gender		Supported Employment			Sheltered Employment		
		Mild	Moderate	Severe	Mild	Moderate	Severe
Female	#	44*	118	46	44*	110	49
	%	40.0	50.0	47.4	55.0	49.1	39.8
Male	#	66	118	51	36	114	74
	%	60.0	50.0	52.6	45.0	50.0	60.2
Total	#	110	236	97	80	224	123

* Significant at 5%

Racial and Ethnic Background

As described in the previous section, persons of diverse ethnic backgrounds participate less often in both sheltered and supported employment in comparison to their rate of participation in other programs operated by the vocational rehabilitation agency. Table 4 below examines the racial and ethnic backgrounds of the sheltered and supported employment cohorts stratified by diagnostic classification. The participation rate of African Americans steadily increases in each cohort through the mild, moderate and severe subgroups. While almost three-fourths of persons in supported employment with mild cognitive disabilities are white, the figure drops to slightly more than one-half for persons with severe cognitive disabilities. A similar pattern is found across the three subgroups of the sheltered employment cohort. Difference in means tests found significant differences only between the two subgroups of persons with severe cognitive disabilities. African-Americans were represented at a significantly higher rate in the supported employment group of persons with severe cognitive disabilities, as compared their counterparts in sheltered employment (t value = -2.00, p < .05 two tailed).

Table 4 -- Racial/Ethnic Background for Supported vs. Sheltered Employment Cohorts, Sorted by Diagnostic Classification

Race/Ethnic Background		Supported Employment			Sheltered Employment		
		Mild	Moderate	Severe	Mild	Moderate	Severe
Caucasian	#	81	147	51	62	153	81
	%	73.6	62.3	52.6	77.5	68.3	65.9
African-American	#	29	87	46*	18	66	40*
	%	26.4	36.9	47.4	22.5	29.5	32.6
Other	#	0	2	0	0	5	2
	%	0.0	0.8	0.0	0.0	2.2	1.5
Total	#	110	236	97	80	224	123

* Significant at 5%

Receipt of Transfer Payment Income

People receiving sheltered employment or supported employment services are far more likely to be recipients of SSDI or SSI than individuals participating in other vocational rehabilitation programs. As indicated in Table 2, difference of means tests conducted on the two cohorts found that persons in sheltered employment are statistically more likely to receive SSI benefits than supported employment participants; no similar difference was found in the direct comparison of the cohorts based on SSDI benefit status. Table 5 on the following page presents the percentage of individuals in each diagnostic level for both groups who received SSI and SSDI. Individuals in both groups are far more likely to receive SSI payments, as opposed to SSDI benefits.

As might be expected, persons with mild cognitive disabilities are generally less likely to receive SSI benefits than members of other subgroups. Individuals with severe cognitive disabilities are most likely to receive SSI benefits. The SSI-receipt rates are lower for the cohorts with mild and moderate cognitive disabilities in supported employment, compared to their counterparts receiving sheltered employment, 33.6% vs. 41.3%, and 45.8 vs. 57.1%, respectively. Difference in mean tests reveals that these variations are statistically significant for the group with moderate cognitive disabilities (t-value = -2.56, p < .05 two-tailed). Conversely, the receipt rate is higher, 73.2

vs. 64.2%, for the supported employment cohort with severe cognitive disabilities than for their counterparts in sheltered employment, although this difference was not found to be statistically significant.

The SSDI receipt status for the sheltered and supported subgroups, stratified by diagnostic classification, is also provided in Table 5. As with SSI, the SSDI-benefit receipt rate increases across the mild, moderate, and severe cognitive disabilities subgroups. Nearly one in four individuals diagnosed with severe cognitive disabilities and receiving supported employment receive SSDI; for comparable individuals receiving sheltered employment, the SSDI receipt rate is one in five. The receipt rate is 13.6% for the supported employment cohort with mild cognitive disabilities compared to only 8.7% for the comparable cohort receiving sheltered employment. The difference-in-means tests comparing these various cohorts did not detect statistically significant differences.

Table 5 -- SSI and SSDI Benefits Status, Sorted by Diagnostic Classification

Employment Option	Percentage Receiving SSI			Percentage Receiving SSDI		
	Mild	Moderate	Severe	Mild	Moderate	Severe
Sheltered Employment	41.3%	57.1%*	64.2%	8.7%	19.6%	19.5%
Supported Employment	33.6%	45.8%*	73.2%	13.6%	22.9%	24.7%

* Significant at 5%

Results

An outcomes-based analysis framework was used to compare the difference in earnings from a pre-VR and a post-VR period for the sheltered and supported employment cohorts. This type of analysis requires a stream of longitudinal earnings over multiple years. Moreover, the pre-vocational rehabilitation earnings streams for both groups are required to conduct the statistical tests to validate a potential comparison.

The first step in constructing pre- and post-program earnings streams is determining whether each sample member has the necessary earnings that would allow the person to be included in the analysis. The earnings profile is developed from quarterly earnings from the Virginia Employment Commission (VEC). The percentage of individuals reporting earnings rates are provided in Table 6 for the sheltered and supported employment cohorts, stratified by level of cognitive disability. As might be expected, both cohorts with severe cognitive disabilities had the lowest rates of reported earnings. However, the rate for individuals with significant cognitive disabilities in the supported employment cohort was not much less — at almost 95 percent — than for the other two subgroups. On the other hand, the percentage of individuals reporting earnings in the sheltered employment cohort with severe cognitive disabilities was only 54%. This rate is somewhat higher for the cohort of individuals with mild cognitive disabilities in sheltered employment, at roughly two-thirds. Finally, 74% of the cohort with moderate cognitive disabilities in sheltered employment reported earnings.

Pre- and Post-VR Longitudinal Earnings

The longitudinal earnings records were then aligned around the specific quarters during which application and closure from VR services took place. This process resulted in two time intervals – pre-enrollment and post-closure in vocational rehabilitation. The results of this procedure are presented in Table 7, which presents the earnings chronologies for the two primary cohorts. The second and third columns of the table report the percentage of individuals who potentially could have had VEC reported earnings in the given year that actually had VR earnings. In the three years prior to employment, 26% of the supported employment cohort had VEC reported earnings in the third year prior to enrollment, 32% in the second year prior to enrollment, and 41% in the year immediately preceding enrollment. In other words, the supported employment group was less likely to have reported earnings as the length of time prior to enrollment increases. In contrast, the sheltered employment group was less likely to have reported pre-employment earnings than the supported employment groups, and these earnings were much more stable over time, ranging from 13%-16%.

Table 6 -- Percentage of Sample Members with Earnings Reported to the Virginia Employment Commission, Sorted by Diagnostic Level

Employment Option		Supported Employment			Sheltered Employment		
		Mild	Moderate	Severe	Mild	Moderate	Severe
VEC	#	106	225	92	55	166	66
Reported Earnings	%	96.4	95.3	94.8	68.7	74.1	53.7

The VEC maintains a file of quarterly earnings records for persons working in “covered” employment. Covered employment refers to employment situations in which the person is eligible to receive unemployment insurance benefits should the need arise. Historically, about 80% of individuals receiving VR services in Virginia have been tracked by the VEC in at least one quarter when tracked over a ten-year interval. Examples of groups not covered by the VEC include workers employment outside state boundaries, workers in organizations with less than four employees, along with workers employed in Federal agencies, religious organizations, and certain non-profit organizations. In particular, Section 60.2-213 B3 of the Virginia Unemployment Compensation Act, 1998 exempts rehabilitation facilities with sheltered employment from covered employment. As such, the earnings records reported below do not include individuals who may have had earnings resulting from sheltered employment that were not reported to VEC.

Table 7 on the following page also provides annual earnings totals for both cohorts prior to and after participation in the vocational rehabilitation program. The figures in Table 7 represent the average dollar value of earnings, in the four-quarter period, for those individuals with any VEC reported earnings during the calendar year (i.e. a “non-zero” mean). For individuals in the supported employment cohort, pre-enrollment earnings ranged from \$2,100 to \$2,300 in the three years prior to enrollment in vocational rehabilitation. In the years after program participation, earnings immediately increased by approximately 50%, and then stabilized in the range from \$3,600 to \$3,800 annually. In contrast, earnings for members of the sheltered employment cohort range from \$1,600 to \$1,900 annually prior to enrollment. After program participation, the sheltered employment cohort’s earnings increased by approximately 10%-20% and then stabilized between \$2,000 and \$2,500 per year. Mean cumulative earnings of the supported employment cohort across the entire seven-year post-closure were \$18,945, compared to \$8,364 for the sheltered employment cohort.

Table 7 -- Earnings Chronology -- Pre and Post VR Program Participation - Total Sample

YEAR	Percentage Reporting Earnings		Mean Earnings	
	Supported	Sheltered	Supported	Sheltered
3rd Year Pre	26.9%	13.7%	\$2,103	\$1,873
2nd Year Pre	33.2%	15.5%	\$2,312	\$1,668
1st Year Pre	41.4%	16.4%	\$2,327	\$2,951
1st Year Post	77.1%	30.9%	\$3,674	\$1,667
2nd Year Post	71.5%	33.4%	\$3,649	\$2,066
3rd Year Post	66.4%	32.9%	\$3,737	\$2,085
4th Year Post	61.0%	29.0%	\$3,810	\$2,334
5th Year Post	56.3%	27.8%	\$3,840	\$2,199
6th Year Post	53.9%	29.4%	\$3,719	\$2,330
7th Year Post	53.5%	29.1%	\$3,651	\$2,576
Total Post Enrollment	88.1%	54.0%	\$18,945	\$8,364

Table 8 on the following page presents the mean annual earnings for the supported and sheltered cohorts, sorted by the three classification levels. In most cases the pre-enrollment VR earnings levels decline as expected across the three class classifications of mild, moderate, and severe cognitive disabilities. The pre-employment earnings levels are, on the whole, lower for the three sheltered cohorts when contrasted with their counterparts receiving supported employment.

The post-program earnings data contained in Table 8 vary significantly between the sheltered and supported employment cohorts. The amount of annual earnings varies little across the three supported employment cohorts during this interval. Not surprisingly, persons with mild cognitive disabilities have the highest VEC reported earnings in every period, followed by the individuals with moderate cognitive disabilities and persons with severe cognitive disabilities. The total earnings over seven years for these subgroups range from \$21,000 to \$19,000 to \$15,000.

A much different story emerges for the sheltered employment cohorts. The level of earnings is much lower than for the supported employment cohorts. There is also a relatively wider variation across the three disability classifications, with earnings again diminishing across the subgroups of individuals with mild, moderate and severe cognitive disabilities. Mean annual earnings for persons with mild cognitive disabilities range from \$2,300 to \$3,300 over the seven-year span, with no readily apparent pattern. Total earnings over the entire post-program interval average about \$11,000 and are some \$10,000 less than their counterparts in supported employment. The annual earnings for individuals with moderate cognitive disabilities are lower, ranging from \$1,700 to \$2,700, again with no apparent trend. The total earnings stream of roughly \$9,000 over the seven-year interval is more than \$10,000 less than the earnings for the comparable cohort in supported employment. Finally, individuals with severe cognitive disabilities had earnings ranging from \$600 to \$1,900, with an increasing trend over most of the seven-year period. The total earnings over the seven-year interval average only \$5,000, almost \$10,000 less than their counterparts in supported employment.

**Table 8 -- Mean Earnings - Pre and Post VR Program Participation
Sorted by Diagnostic Level**

YEAR	Mild Cognitive Disability		Moderate Cognitive Disability		Severe Cognitive Disability	
	Supported	Sheltered	Supported	Sheltered	Supported	Sheltered
3rd Year Pre	\$3,458	\$2,078	\$2,178	\$2,168	\$553	\$405
2nd Year Pre	\$2,653	\$2,734	\$2,540	\$1,662	\$928	\$715
1st Year Pre	\$3,241	\$2,691	\$2,416	\$2,067	\$853	\$759
1st Year Post	\$4,131	\$2,502	\$3,676	\$1,671	\$3,157	\$574
2nd Year Post	\$4,300	\$2,813	\$3,585	\$2,177	\$2,916	\$985
3rd Year Post	\$4,241	\$2,732	\$3,780	\$2,169	\$2,982	\$1,238
4th Year Post	\$4,146	\$2,255	\$3,888	\$2,620	\$3,204	\$1,813
5th Year Post	\$4,451	\$2,280	\$3,851	\$2,469	\$3,075	\$1,510
6th Year Post	\$5,334	\$2,528	\$3,335	\$2,695	\$2,991	\$1,439
7th Year Post	\$4,334	\$3,336	\$3,562	\$2,622	\$3,102	\$1,905
Total Post Enrollment	\$21,787	\$11,159	\$19,175	\$8,751	\$14,888	\$5,109

Testing for the Validity of Comparing Pre-Program Earnings for the Supported and Sheltered Employment Cohorts

The previous section reported the pre-and post VR earnings experiences of the sheltered and supported employment cohorts. The following sections develop and implement a framework for making direct comparisons of earnings outcomes between persons receiving sheltered vs. supported employment. A complete description of the procedures used to conduct the comparison analyses are reported elsewhere (Dean, Dolan & Schmidt, 2001)

The methodology employed is based on the usage of a "comparison group". In the typical application, a comparison group is chosen that is similar in all respects to the "treatment" group, with the exception that the former is not exposed to the treatment regimen. Tests are then undertaken to detect for the presence of "selection bias". The concern is that any treatment effects on post-program earnings may be contaminated by an unmeasured factor (such as motivation or level of functioning) that impacts on both the person's decision to participate in a job-training program and their subsequent vocational outcomes. Biased treatment effects on earnings result if selection bias is present and not sufficiently "controlled for" through the appropriate econometric correction.

In this situation involving vocational outcomes of persons receiving sheltered or supported employment, both have applied and been accepted for vocational rehabilitation and then exposed to some form of vocational services. However, there may be some programmatic screening by vocational rehabilitation counselors or other service providers that filters persons with certain measured and/or unmeasured traits into one program or the other. Thus, tests for selection bias can be used to determine if both groups are drawn from the same population in that they do not differ in terms of such observable and unobservable factors that influence their *pre*-program earnings. If the statistical tests involving the two groups are "passed", it is then defensible to compare their post-program earnings.

A series of “Hausman Tests” were performed to test the significance of a treatment binary on differences in pre-program earnings. The Hausman tests on pre-program earnings changes reveal almost no unobserved differences between the two groups participating in sheltered or supported employment. “Chow tests” were then used to determine whether the effect of pre-program variables (e.g. diagnostic level, education, etc.) is the same for both the sheltered and supported employment groups. The Chow tests for the third vs. second pre-program year are insignificant in five of the six gender/diagnostic label classifications, with only men with mild cognitive disabilities revealing statistically significant differences in the factors influencing pre-program earnings. The Chow tests for the second vs. first pre-program years were universally insignificant. Together, the Hausman and Chow results suggest that the sheltered employment cohort serves as a valid comparison group for the supported employment group within the Fixed Effects Modeling (FEM) analyses. A complete report of all comparison group tests is found in Dean, Dolan, and Schmidt (2001).

The FEM procedure is applied to a panel of five post-VR years for each individual. Consequently, there will be five separate treatment coefficients for each gender and diagnostic level that trace out a time path of the dollar value of the net impact of supported employment in comparison to sheltered employment. The Chow tests performed previously precluded the possibility of pooling the all persons with cognitive disabilities into a single earnings regression (i.e., not controlling for diagnostic classification). Additional tests were conducted to determine whether this single pooled regression, but now with separate binary designations for mild and moderate cognitive disabilities (using the subgroup of persons with severe cognitive disabilities as the reference group), adequately controlled for the impact of the severity of the disabling condition on earnings. Once again, Chow test results indicated that there were statistically significant differences in the influences of the various explanatory variables on post-intervention earnings depending on the severity of the mental retardation. In essence, the results of these tests reveal that pooling the cohorts of persons with cognitive disabilities with varying diagnostic levels in a single regression is not warranted. Accordingly, the correct specification of FEM earnings estimates stratifies the regression equations by gender and diagnostic level of cognitive disabilities.

There are six FEM estimates of supported employment earnings impacts presented in Table 9 on the following page, with separate reporting for women and men with either mild, moderate, or severe cognitive disabilities. The five rows contain the panel estimates for each of five post-program closure years. The reported values in each cell measure the dollar amount of earnings differences between cohorts receiving supported versus sheltered employment in a given year. T-ratios, with asterisks designating .05 and .01 levels of significance are reported in parentheses below each earnings coefficient. Thus, the “1824.11” figure in the first cell infers that women with mild cognitive disabilities in supported employment services had a statistically significant (at the .01 level) \$1,824 more in VEC-reported earnings than their counterparts in sheltered employment, after controlling for both varying and constant individual-specific and economy-wide factors. Moreover, the treatment effects in the first year after closure for both women and men (i.e., the results reported in the entire “1st” row) are positive and significant across all three diagnostic levels and range from \$1,437 to \$1,870.

The sustainability of these earnings gains for recipients of supported employment over the five years after closure from the program differs across cohorts. Earnings gains decline, and eventually become statistically insignificant, for women with either mild or moderate cognitive disabilities. On the other hand, earnings gains increase over time for women with severe cognitive disabilities. A different picture emerges for the men. Males with mild

cognitive disabilities experience stable earnings gains, while those with moderate and severe cognitive disabilities see declines in the earnings gains over the five years, although the gains are still statistically significant.

Table 9 -- Fixed Effects Modeling (FEM) Earnings Equations by Diagnostic Level Across Five Years of Post-Program Earnings

Year After Closure	Females			Males		
	Mild	Moderate	Severe	Mild	Moderate	Severe
1st	1824.11** (2.74)	1437.32** (4.90)	1479.62* (2.08)	1680.86** (2.85)	1558.51** (4.47)	1870.54** (5.18)
2nd	1296.89* (2.36)	930.36** (3.39)	1277.98** (3.48)	1901.74** (3.36)	1531.51** (4.31)	1496.92** (4.40)
3rd	605.13 (1.02)	893.17** (2.71)	1494.14** (3.87)	1624.13** (2.85)	1513.88** (4.20)	1399.54** (3.67)
4th	-205.90 (0.37)	818.37* (2.33)	2176.58** (3.34)	1582.47* (2.51)	1281.46** (3.01)	1072.08** (3.38)
5th	-1022.34 (1.90)	544.72 (1.51)	2659.61** (5.31)	1622.76* (2.22)	967.05* (2.26)	852.00** (2.65)

* Significant at .05

** Significant at .01

Discussion

The present study investigated the long-term earnings impact of sheltered and supported employment on two cohorts of individuals with cognitive disabilities served by a state VR agency. Data on demographic characteristics, pre- and post-program earnings, and local economic conditions were merged to allow a comprehensive examination of the earnings outcomes of individuals who receive various types of VR services. First, the cohorts of individuals in sheltered and supported employment were compared to other individuals with cognitive disabilities identified by the state VR agency as successfully rehabilitated. Second, the demographic characteristics and pre-program earnings of the two cohorts were compared to identify differences between the individuals served in the two programs. Third, post-program earnings histories were prepared and examined to discover trends in the post-program experiences of the two cohorts. Finally, a FEM analysis was used to examine the effect of the two services on post-program earnings while controlling for the influence of demographic factors, pre-program earnings, and changes in economic conditions. Several key findings emerged.

Persons served in sheltered and supported employment programs differ significantly from other individuals successfully served by the state VR agency. Members of the sheltered and supported employment cohorts were nearly twice as likely to be classified with a moderate or severe cognitive disability and five times more likely to be an SSA beneficiary than a comparison group of individuals with cognitive disabilities closed as successfully rehabilitated into Status 26. In addition, the sheltered and supported employment cohorts were more likely to be female and less likely to be African-American than the Status 26 group.

Individuals in supported employment were twice as likely their counterparts in sheltered employment to have worked in competitive, integrated employment settings prior to program entry. Three years prior to program entry, 26.9% of supported employment participants engaged in VEC covered employment. This employment rate rose to 41.4% in the year immediately prior to program entry. In contrast, the rate of participation in VEC covered employment for persons in the sheltered employment cohort remained quite stable, ranging from 13.7% to 16.4% in the three years prior to program entry.

As noted previously, individuals in sheltered workshops would generally not have their workshop earnings reported to VEC. It is highly likely that a large percentage of individuals in both cohorts not engaged in VEC covered employment were actually in some type of segregated employment setting at the time of program entry. It appears that the key difference between the two cohorts is that a larger percentage of the supported employment cohort was engaged in some type of competitive, integrated employment in the three years prior to program enrollment.

It is important to note that when annual earnings of the individuals in VEC covered employment were compared across the two cohorts, no statistically significant differences were found. It can be reasonably assumed that individuals in the two cohorts were working about the same number of hours per week in generally the same types of employment. The difference between the cohorts appears to rest in their engagement with the competitive labor force prior to program entry.

The comparison of the demographic characteristics of the sheltered and supported employment cohorts revealed subtle differences. When the entire sheltered and supported employment cohorts are directly compared, few differences are found. However, when subgroups of persons with mild, moderate and severe cognitive disabilities are examined, a number of significant differences are revealed.

- Persons with moderate cognitive disabilities comprise the majority of both groups, although the supported employment group had a higher percentage of individuals with mild cognitive disabilities and a lower percentage of individuals with severe cognitive disabilities.
- In the overall cohorts, no gender differences were found, although persons with mild cognitive disabilities in sheltered employment were more likely to be female than their counterparts in supported employment.
- No racial differences were found when subgroups with mild or moderate cognitive disabilities were compared. However, African-Americans were more heavily represented in the supported employment subgroup with severe cognitive disabilities than in the sheltered employment group.
- Persons in sheltered employment are generally more likely to receive Supplemental Security Income (SSI). However, in the subgroup of persons with severe cognitive disabilities, SSI receipt was actually greater among persons in supported employment. The two groups were equally likely to Social Security Disability Insurance (SSDI) benefits.

Earnings of the supported employment cohort were 250% greater than the sheltered employment cohort across the seven-year post-program period. In the years after program participation, earnings for supported employment participants increase approximately 50% and then become stable. For people in sheltered

employment, earnings increase from 10%-20% immediately after program participation and stabilize as well. Similar patterns were found across all subgroups of persons with mild, moderate and severe cognitive disabilities.

Results of the fixed effects modeling (FEM) procedure, which controls for differences in demographic characteristics, pre-program earnings, and local economic conditions, indicate that supported employment had a statistically greater impact on earnings when compared to participation in sheltered employment. For males with mild, moderate, or severe cognitive disabilities, and females with severe disabilities, these differences were significant across all five of the post-program years reviewed. For females with mild cognitive disabilities, significant differences were only found during the first two post-program years. For females with moderate cognitive disabilities, significant differences were found in the first four program years, but not in the fifth year.

Limitations

The present study possesses a number of limitations. First, and most significantly, the study investigated the outcomes generated by one public program (vocational rehabilitation) in a single state. The demographic characteristics of the VR applicant population, the policies and operational guidelines in effect during the service period, the fluctuating economic conditions, the availability of both sheltered and supported employment provider agencies, and numerous other factors unique to Virginia combined to influence the reported outcomes. As such, it is not possible to generalize the results of the investigation to all public vocational rehabilitation programs nationwide.

At the same time, during the period of the investigation, Virginia operated a statewide network of sheltered and supported employment programs that were nationally recognized for their size and quality. The individuals served in both programs differed substantially from other persons served through the vocational rehabilitation program. The availability of both sheltered and supported employment provider agencies in all areas of the state insured, to the extent possible, that decisions to serve individuals in a particular program were based on programmatic considerations, as opposed to the availability of only one type of program alternative in a specific community. While generalization the results is clearly not appropriate, Virginia may be viewed as an illustration of a vocational rehabilitation program providing “state-of-the-art” services in the late 1980s and early 1990s.

A second limitation relates to the extent to which the two groups were represented in the state Unemployment Insurance (UI) database (VEC covered employment). Virtually all members of the supported employment group (95%) were represented in the VEC UI database. A sizable number of individuals in sheltered employment were not found in the VEC data and were not included in the FEM analyses. This lack of representation was presumably due to the individuals not working in covered employment. Whatever the reason, the difference in the degree to which the two groups were represented in the UI database affected the overall analyses. However, it should be pointed out that if the reason an individual was not represented in the UI was because he or she had no earnings from competitive, integrated employment during the post closure period, excluding those individuals from the analyses served to *increase* the average earnings of the sheltered employment group. In reality, had it been possible to obtain accurate earnings profiles for the sheltered employment sample members not included in the UI database, the difference in long-term earnings between the two groups would have increased significantly.

A third limitation of the current study is that it describes the activities of a single vocational rehabilitation agency. Program applicants were not randomly assigned to the two service programs. Likewise, the sheltered and supported employment groups were not matched on various demographic characteristics. However, the two groups

were remarkably similar on a number of different demographic characteristics and together they differed significantly from all other individuals with cognitive disabilities served by the agency during the same time period. The demographic and functional characteristics of sheltered and supported employment participants in other states should be carefully investigated to determine the similarities and differences that exist between persons served in the two programs.

***Implications for the Present Study on the Future Design of Employment
Programs for Individuals with Cognitive Disabilities***

The combined results of the present investigation provide general support for the U.S. Department of Education's decision to amend the definition of employment outcome in the Federal-State VR program. There is little evidence to indicate that sheltered employment significantly enhanced the employment status or economic self-sufficiency of individuals with cognitive disabilities in the study sample. Less than one-third of the individuals placed into extended employment by the state VR agency engaged in VEC covered employment at any time after program participation. Annual earnings for those individuals who did participate in the competitive workforce after placement in sheltered employment averaged less than \$200 per month.

In amending the definition of employment outcome, the Department of Education stressed that for some individuals, sheltered or extended employment could serve an important transitional role as an interim step in an individual's path toward competitive, integrated employment. In the present study, the lack of significant movement into competitive employment on the part of the sheltered employment cohort gives only limited support to this assertion. Participation in competitive employment increased by only 10%-15% above pre-program rates for this group and earnings were quite low. While these gains should not be totally discounted, the present investigation does little to counter the claims of critics (Murphy & Rogan, 1995) who argue that sheltered employment programs generally fail to prepare individuals for future success in the competitive labor force.

The contrasting outcomes generated by sheltered and supported employment would be readily explained if the two programs served entirely different populations. In this study, a number of statistically significant differences were found between the two cohorts in comparisons of demographic characteristics and pre-program earnings. At the same time, there appears to be tremendous overlap between the two groups. For example, the majority of both groups were comprised of individuals with diagnostic labels of moderate cognitive disabilities, no significant differences were found in the pre-program earnings of individuals engaged in competitive, integrated employment, and members of the two groups were equally likely to be SSDI beneficiaries. When compared to other groups of individuals served by the state VR agency, individuals in sheltered and supported employment seem to be more alike than they are different. Future research efforts should further investigate the complex factors that determine whether an individual with cognitive disabilities participates in sheltered or supported employment.

In this study, the employment outcomes generated by supported employment significantly exceeded those of sheltered employment. However, when the employment participation rates and annual earnings of supported employment participants are viewed in absolute terms, two important shortcomings are revealed. First, the total post-program earnings of the supported employment cohort, while over twice those of the sheltered employment group, are quite low. Second, the rate of employment participation of the supported employment group declines over the seven-year post-program period, as individuals, for whatever reason, are unable to maintain their jobs in the competitive workforce.

It is important to note that a sizable majority of both cohorts are individuals who receive either SSI or SSDI benefits. In light of the significant disincentives to employment that existed in the SSI and SSDI programs during the period of investigation, it seems likely that many individuals' earnings were intentionally restricted, so as not to jeopardize their benefit status. Additional long-term investigations should be initiated to determine whether the large number of recent reforms to the SSA benefits programs will promote improved employment outcomes for individuals served in supported employment programs.

Future research and evaluation activities should focus particular attention on the impact of VR service programs on female clients. In the present study, females with mild cognitive disabilities were over represented sheltered employment. In addition, the positive earnings impact of supported employment participation declined over time for females with mild, as well as moderate, cognitive disabilities. Sufficient information is not available to explain these important differences. However, the disproportionate impact of supported employment on females, if replicated in subsequent evaluations, would be a matter of significant concern.

Conclusion

A significant amount of evidence indicates that integrated employment options improve consumer employment outcomes, cost less than other adult day programs, and generate savings for taxpayers. Benefit-cost analyses completed in the last ten years indicate that integrated employment options dramatically improve individuals' earnings and economic self-sufficiency (Cimera, 1998; Kregel & Wehman, 1997). Integrated employment options cost less than sheltered workshops, activity centers or other day support options for individuals with disabilities. Local employment programs can serve more individuals for the same amount of money, and achieve better outcomes, if they adopt an integrated employment approach. Integrated employment options also generate substantial savings for taxpayers. It has been repeated demonstrated that supported employment programs lead to a decrease in dependence on federal disability benefit programs, a reduction in the need for costly alternatives such as workshops or activity centers, and an increase in the taxes paid by workers with disabilities.

The present study added significantly to the body of evidences that documents the relative efficacy of supported employment in comparison to segregated, sheltered employment alternatives. The ten-year longitudinal analysis of 877 individuals with cognitive disabilities found that (1) supported employment options resulted in significant and sustained improvements in consumers employment and earnings outcomes, as compared to sheltered employment alternatives, and (2) surprisingly little difference exists in the demographic profiles of persons served in integrated versus sheltered employment settings. In other words, the decision to serve individuals in integrated or sheltered programs is often based on programmatic or funding concerns as opposed to the functional characteristics of the individual, often to the detriment of persons with cognitive disabilities.

This investigation attempted to contribute to the ongoing discussion of the appropriateness of the Department of Education's decision to modify the definition of employment outcome, as well as add to the body of research that compares the outcomes generated by sheltered and supported employment. The study is unique in a number of ways. First, it sought to reduce "selection bias" by evaluating differences in the two groups under comparison. Future investigations that promote the superiority of one program alternative over another should carefully and completely describe the characteristics of the populations being studied.

Second, the study used comprehensive analytical procedures that examined the impact of vocational rehabilitation services on post-program earnings, while controlling for the influence of demographic characteristics, socio-economic factors and local economic conditions. While the fixed effects modeling procedure proved appropriate for individuals with cognitive disabilities, its application to other disability populations requires further investigation.

Finally, the methodological framework employed in the study led to the construction and analysis of ten-year earnings profiles that allowed the comparison of both pre and post-program earnings. Investigations of the long-term effectiveness of various employment alternatives should refrain from reporting “snapshot” information from a single point in time. Post-program earnings should be compared to individuals’ pre-program earnings histories to more accurately measure the impact of a specific program. Perhaps most significantly, an individual’s annual or monthly total earnings should be the “unit of analysis” for program comparisons. Program outcome studies that report only hourly wages or total wages for a group of individuals fail to allow specific comparisons or account for an individual’s SSA benefit status on post-program earnings.

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