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Do labor market programs affect labor force participation?

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by

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Abstract

This paper estimates the macroeconomic effect of labor market programs on labor force participation. Labor market programs could counteract business-cycle variation in the participation rate that is due to the discouraged-worker effect, and they could prevent labor force outflow. An equation that determines the participation rate is estimated using panel data (1986-1998) for Sweden's municipalities. The results indicate that labor market programs have relatively large and positive effects on labor force participation. If the number of participants in labor market programs increases temporarily by 100, the labor force increases by around 63 persons. The effect is temporary so the number of participants in the labor force returns to the old level in the next period. If the number of participants in programs is permanently increased, the labor force

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increases by around 70 persons. The results indicate that programs prevent labor force outflow because participants who would have left the labor force in the absence of programs are now participating because of the programs. Income and vacancies have positive long- and short-run effects on participation rate. Open unemployment, job destruction rate, and proportion of persons between ages 18-24 and 55-65 have negative long-run effects on the participation rate.

Keywords: labor supply, labor market programs, dynamic panel data
JEL code: E64, J68, J22

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1 Introduction

Sweden's labor force participation rate (number of persons in the labor force relative to the number of persons in the working-age population) decreased sharply in the 1990s, from on average 84% during the late 1980s to 79% in the 1990s. This decrease in participation rate occurred while the unemployment rate, measured in terms of the working-age population, increased from on average 2% to almost 6%. A large increase in the number of persons participating in labor market programs paralleled the rise in unemployment. The number of participants in labor market programs in relation to the working-age population rose from about 1% in the late 1980s to more than 3% in the 1990s.

Part of the large increase in labor market programs has been evaluated; see the Calmfors, Forslund and Hemström (2002) overview. Often, it is difficult to find positive effects from vocational training on the participant's probability of getting a job. Positive effects are found for some job creation programs, while displacement effects from these programs are large. Results from studies of macroeconomic effects of labor market programs on Sweden's labor market indicate that labor market programs affect labor demand. For example, Dahlberg and Forslund (1999) find significant direct displacement effects on regular employment from use of labor market programs. The results in Forslund and Kolm (2000) indicate that the number of labor market programs participants does not affect wage setting. This study focuses on effects of programs on labor supply. This question has been more important the recent years, when labor shortage has been a problem – and not high unemployment as in the early 1990s. One potential positive effect of labor market programs is that they could prevent labor force outflow, which could be important because Sweden's labor force is expected to decrease because of the demographic structure.

Labor market programs may affect labor force participation in several ways: (1) programs could affect income of the unemployed. For some programs, program participants are paid more than the unemployment benefits; (2) programs could result in a higher job-offer probability, by, for example, affecting participants' qualifications and thus increasing future income; (3) programs have been used to qualify for new periods of unemployment benefits. Taken together, programs could increase labor force participation, because they directly or indirectly could increase income and thus the value of labor force participation. Labor market programs have been used extensively in Sweden, so their effect on participation could be non-negligible.

Labor force participation data have a clear pattern, where changes in the participation rate are strongly and positively correlated with changes in employment, which indicates strong business-cycle variation in the participation rate. Flows between nonparticipation and employment are also procyclical. Business-cycle variation in real wages in Sweden is relatively small, so shocks to real wages could not be the only explanation behind procyclical movements of the participation rate. The discouraged-worker effect is a candidate for explaining business-cycle fluctuation in the participation rate. According to the discouraged-worker effect, the participation rate will decrease when it is difficult to get a job and increase when it is easy to find a job so that people move in and out of the labor force – depending on the state of the business cycle. Labor market programs can reduce variation in the labor force participation that is due to the discouraged-worker effect because programs are typically countercyclical. And if an unemployment shock lasts for a long time, the risk of marginalization of dropouts could be severe, and labor market programs could have potentially important effects if they prevent labor force dropout.

Empirical studies indicate that the discouraged-worker effect is present. The effect of labor market programs on labor force participation has not been studied internationally, but some attempts were made on Swedish data. Using Swedish time series data (1964-1992), Wadensjö (1993) finds that the change in unemployment and the proportion of the labor force that is participating in labor market programs affect the change in the labor force participation. Labor market programs have a positive effect and unemployment has a negative effect on labor force participation. He concludes that more studies must be done because the estimated sizes of the effects are sensitive to the specification and to the included trend term in the equation. Using Swedish time series data (1970-1992), Johansson and Markowski (1995) estimate an equation for labor force participation rate with the change in regular employment and the change in labor market programs – divided by the change in the working-age population. Both employment and labor market programs have a positive effect on labor force participation. Dahlberg and Forslund (1999) estimate the direct displacement effect of labor market programs in Sweden, and their results indicate that labor market programs are increasing labor force participation, because the estimated displacement effect is larger when employment is divided by labor force than when divided by the population. Taken together, empirical results on Swedish data indicate that the state of the business cycle and labor market programs have effects on labor force participation.

1.1 Purpose

This paper estimates the macroeconomic effect of labor market programs on labor force participation. Theoretically, we would expect that labor market programs affect labor force participation. Swedish empirical results, regarding the effect of labor market programs on labor force participation, are either obtained indirectly, as in Dahlberg and Forslund (1999), or obtained using time series data. In this study, the focus is on effects on the participation rate during the extreme labor market situation in the 1990s. The data set is richer than those used by Johansson and Markowski (1995) and Wadensjö (1993), and instrument variables are used in the estimation.

If the discouraged-worker effect is present, then effects on unemployment, wages and prices, for example, affect the macroeconomic outcome. Because Sweden expects a decrease in the labor force for demographic reasons, the future labor supply situation could be less severe if programs are found to have positive effects on the labor force. Because labor market programs were used extensively in Sweden, the potential effect could be non-negligible.

The rest of the paper is organized like this: Section 2 presents the theoretical background for the estimations. Section 3 contains a description of the data, and Section 4 contains the estimation results. Section 5 presents a discussion of the results.

2 The theoretical background

This section presents the theoretical background for how the labor force participation decision is determined. In the empirical analysis, the theoretical implications are used to suggest which variables to include in the estimation and to determine the theoretical effects on participation rate. The labor force is the sum of regular employment, open unemployment, and the number of participants in labor market programs. The participation rate is the number of persons in the labor force – divided by the number of persons in the working-age population. Johansson (2001) presents a formal description of the theoretical model. The model is based on Holmlund and Lindén (1993) and Calmfors and Lang

(1995), and extended with endogenously determined labor force participation, as in Pissarides (1990).

Individuals compare the value of nonparticipation with the value of labor force participation – when deciding whether or not to participate in the labor force. The value of nonparticipation consists, for example, of the value of leisure, the value of education, or the values of other activities in which nonparticipants are engaged. For example, age, number of children, and supply of day-care services could affect the value of nonparticipation. Nonparticipants decide to participate in the labor force if the value of participation is greater than the value of nonparticipation. Likewise, participants decide to leave the labor force if the value of nonparticipation is greater than the value of participation. More people will participate in the labor force if the value of participation increases. The number of participants in the labor force is the number of persons with a value of nonparticipation that is equal to or lower than the value of participation. Variables that increase the value of participation will increase the participation rate, and variables that increase the value of nonparticipation will decrease the participation rate.

Labor force participants could be employed, openly unemployed, or participating in a labor market program. Figure 1 describes the states and flows in the labor market for labor force participants.

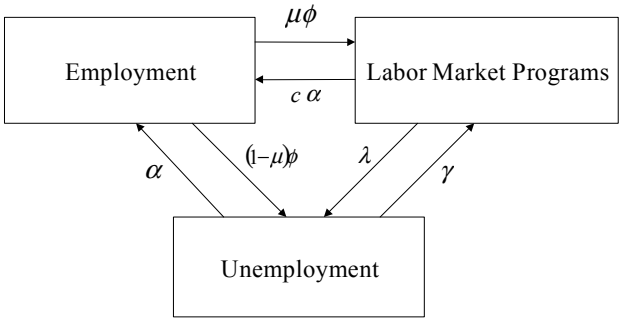

Figure 1. The state and flows in the labor market for labor force participants

ϕ represents exogenously given negative shocks to the firms that result in decreased regular employment. A fraction $(1-\mu)$ of the number of persons that is separated from a job become unemployed, and a fraction μ is placed in a

program[1]. The probability of getting a place in a program if openly unemployed is γ, and the probability of being unemployed after program participation is λ.

The firms are opening vacancies, and the openly unemployed and participants in labor market programs search for vacant jobs. Vacant jobs and searchers are matched, and the number of matches depends on the number of searchers and the number of vacancies. The probability of getting a job offer, α, increases with the number of vacant jobs and decreases with the number of searchers, that is, the number of openly unemployed and participants in labor market programs.

The probability of getting a job differs between the unemployed and the participants in labor market programs; the c parameter captures this difference. If c is greater than one, labor market programs have positive effects on the job-offer probability for the program participants compared to the openly unemployed. If c is less than one, program participants have smaller chances of getting a job offer than the openly unemployed. One reason could be that the program participants search less than openly unemployed.

The value of labor force participation could be computed as the discounted income in each state (employment, program participation, and unemployment) – accounting for the probability of changing state and income in the new state. The value of labor force participation depends on wages, w, the job-offer probability, α, policy parameters that describe the flow into and out of labor market programs, λ, γ, and μ, the replacement ratios ρ_r, and ρ_u, the job separation rate, ϕ, the discount factor, δ, and on the c parameter that reflects relative effectiveness of the programs. The effect on the participation rate is the same as the effect on the value of labor force participation.

Table 1 displays effects on participation rate from changes in the above model's variables.

[1] It is possible to go directly from regular employment to a program. This is so because sometimes only a short period of unemployment was required to be eligible to participate in a program.

Table 1. Effects on the labor force participation rate

Change in		Effect
w	wage	+
v	vacancies	+
u	open unemployment	-
r	participants in labor market programs	+
ϕ	negative employment shocks	-
ρ_u, ρ_r	level of unemployment benefits	+

An increase in wages, w, increases the value of participation and thus increases the labor force participation rate.

The value of being employed is higher than the value of being unemployed or in a program. So the value of labor force participation is increased if it is easy to find a job. An increased number of vacancies, v, increases the probability of finding a job and is expected to have a positive effect on labor force participation. An increased number of openly unemployed, u, increases the number of persons searching for jobs, and for a given number of vacancies, it is more difficult to find a job. So an increase in open unemployment is expected to have a negative effect on the labor force participation rate.

The number of participants in labor market programs, r, which in the model is formulated in terms of flows, is expected to have a positive effect on labor force participation, since participating in a program is better than, or at least as good as, being openly unemployed. It will be better to participate in a program than to be openly unemployed if obtained benefits are higher when in a program than when openly unemployed. This has been the case for some programs. Often, participants in job creation programs are paid more than the unemployment benefit, while participants in training programs receive the unemployment benefit. And the labor force participation rate is expected to increase if programs become more effective so that the program increases the job-offer probability. Furthermore, if programs are used to qualify for new periods of unemployment benefits, the value of labor force participation is also increased. These direct effects of programs are positive. There will also be an indirect negative effect from labor market programs. An increased number of participants in programs increases the number of job-searchers for a given number of vacancies and openly unemployed. This is expected to decrease the labor force participation rate because the probability of getting a job decreases. The last

negative indirect effect is probably small, so that direct, positive effects of programs will dominate.

An increased number of negative employment shocks, ϕ, increases the probability of being openly unemployed. This is expected to have a negative effect on the labor force participation rate because the probability of getting a lower income has increased because unemployment benefits are lower than wages.

ρ_u and ρ_r are the *replacement ratios*, which are the proportion of income that is obtained when openly unemployed or participating in a program. An increased level of unemployment benefits is expected to increase the labor force participation rate in the same way as increased wages.

To summarize, we would expect that higher wages, an increased number of vacancies, an increased number of labor market programs participants, and a higher level of unemployment benefits positively affect the labor force participation rate. Increased unemployment and negative employment shocks are expected to decrease labor force participation.

3 Data

The previous section concludes that these variables should affect the participation rate: wages, vacancies, open unemployment, the number of labor market programs, negative employment shocks, and unemployment benefits.

3.1 The data set

The data set is a panel consisting of yearly observations from 1986 to 1998 for Sweden's municipalities. Employment, population by age, and annual labor income are obtained from Statistics Sweden. Observations on employment are November figures, based on a register called RAMS. Data on the number of persons unemployed and in labor market programs in November is obtained from the National Labor Market Board (Ams). Data on employment at the plant level, used to calculate the job destruction rate, are obtained from a database at IFAU.

3.2 Definition of variables

The number of persons in the labor force is calculated as the sum (using two different data sources) of the number of persons employed, unemployed, and in labor market programs. Nonparticipants are the working-age population, ages 18-65, excluding those in the labor force. With this definition, all participants in labor market programs are in the labor force[2].

The wage, w, is measured by the real average annual labor income, for those employed, in each municipality.

Unemployment, u, is measured as the number of unemployed who are registered at an employment office.

The number of vacancies, v, is measured by the total number of vacancies reported to the labor market office. The empirical measure of the number of vacancies covers only a part of the total number of vacancies.

The number of labor market program participants, r, is measured as the total number of persons in labor market programs, excluding participants in programs directed toward people with disabilities. The number of participants in labor market programs measures two effects: (1) a direct positive effect because the value of labor market participation increases with the number of persons in programs; and (2) an indirect negative effect through job-offer probability, whereby an increased number of participants in labor market programs will increase the number of searchers, which will have a negative competition effect for a given number of vacancies.

The negative shock to employment, ϕ, is measured by the job destruction rate. The job destruction is defined as the absolute sum of negative employment changes in the plants in each municipality. The job destruction rate is calculated as the job destruction divided by the average employment at each plant in period t and $t-1$.

Data on the level of unemployment benefits (ρ_r and ρ_u) are not available at the municipality level. So time dummies in the estimation capture the effect of unemployment benefits.

Some demographic variables are also included in the estimations. These variables are the number of persons between ages 18-24 and 55-65, in relation to the number of persons in the working-age population, ages 18-65. These age groups have lower participation rates than the average, which reflects the large

[2] This is a difference compared to the labor force surveys, where participants in some programs are defined as students and thus outside the labor force.

number of students among the younger group and that the likelihood of early retirement and sickness pension increases with age.

4 Empirical results

The labor force participation rate is the dependent variable in the estimation, and it is allowed to be affected by wages, the number of vacancies, open unemployment, the number of labor market program participants, the job destruction rate and the number of persons between 18-24 and 55-65 year. The labor force, vacancies, unemployment, and the number of persons in labor market programs are divided by the lagged number of persons in the working-age population – to account for the fact that the explanatory variables could affect migration between the municipalities. For example, if the number of vacancies increases both labor force and population, the estimated effect on the participation rate will be lower than the effect on labor force, because population is also increased. If migration is affected, the estimated coefficients will be a mixture of two effects when the variables are divided by the current population, since both the numerator and the denominator of the dependent variable will be affected. The demographic variables are divided by the current working-age population, and they are included as lagged one period. All variables are measured in November each year. Table 2 summarizes definitions of the variables in the estimations.

Table 2. Variable definitions

Variable	Definition
lf	no. of persons in the labor force / pop.1865_{t-1}
w	average annual income for employed
v	no. of vacancies / pop.1865_{t-1}
u	no. of unemployed / pop.1865_{t-1}
r	no. of persons in labor market programs / pop1865_{t-1}
jdr	job destruction rate
p1824	no. of persons ages 18-24_{t-1} / pop.1865_{t-1}
p5565	no. of persons ages 55-65_{t-1} / pop.1865_{t-1}

Lagged variables are included in the estimation to allow for time to adjust labor force participation. The dynamic panel data model that should be estimated takes this form:

$$lf_{i,t} = \sum_{j=1}^{j=p} a_{1j} lf_{i,t-1} + \sum_{j=0}^{j=p} a_{2j} w_{i,t-1} + \sum_{j=0}^{j=p} a_{3j} v_{i,t-1} + \sum_{j=0}^{j=p} a_{4j} u_{i,t-1} + \sum_{j=0}^{j=p} a_{5j} r_{i,t-1}$$
$$+ \sum_{j=0}^{j=p} a_{6j} jdr_{i,t-1} + a_7 p1824_{i,t} + a_7 p1824_{i,t} + k_i + k_t + \varepsilon_{i,t},$$

where k_i is an unobserved municipality specific effect, and k_t is a time-varying aggregate effect. The model is differenced before estimation, allowing all variables to be correlated with the unobserved municipality-specific fixed effect, k_i.

The GMM estimator for dynamic panel data models suggested by Arellano and Bond (1991) is used in the estimation. The demographic variables are assumed to be exogenously determined. The economic variables are endogenously determined, mainly through the definition of labor force as the sum of employed, openly unemployed and participants in labor market programs.

Lagged economic variables and current and lagged demographic variables are used as instruments in the estimation. Actually, the rules for how Sweden's Labor Market Board allocates money to the local level imply that lagged unemployment and lagged number of program participants affect spending on labor market programs; see the discussion in Dahlberg and Forslund (1999). So use of lagged variables as instruments for the coefficients on the policy variable (number of participants in labor market programs) is justified by the allocation of spending. One extra instrument that captures municipality-specific employment shocks is used in the estimation. The extra instrument is calculated by applying the average aggregate change in employment at each two-digit industry level, on each industry share of employment in each municipality, lagged two periods.

4.1 Estimation results

First, a preliminary model, in which all variables are included with two lags, was estimated. Insignificant variables, at the 10% level, were then deleted from the preliminary model. Table 3 displays the estimation results[3].

First we can note that the Sargan statistic and the correlation tests accept the model and that the estimated coefficients are almost the same in the first- and second-step estimation. The second lag of the dependent variable is not significant, but it is included because otherwise the AR(2) test indicates serial correlation. The estimated adjustment coefficient is 0.59.

As expected, the effect of income is positive. The number of vacancies enters lagged one period, and as expected, the effect is positive. The estimated contemporaneous coefficient on unemployment is positive, and the lagged coefficients are negative. According to the theoretical model, the effect of unemployment is expected to be negative. One major unemployment shock is dominant during the sample period and it turns out that the time dummies in the estimation partly capture this common shock[4]. If the model is estimated without the time dummies, the coefficients on unemployment are affected. It seems to be the case that the time dummies somewhat capture a common unemployment shock, so the estimated coefficients on unemployment can not be interpreted as the effect of unemployment. It is not possible to obtain a reasonable empirical model without the significant time dummies. So the size of the discouraged-worker effect can not be determined empirically. The discouraged-worker effect is present in the data, because vacancies and unemployment affect the participation rate, but it is not possible to measure the size of the discouraged-worker effect. The immediate effect of the number of participants in labor market programs is positive, the lagged effect is negative, and the long-run effect is positive, as expected. . The immediate and lagged effects of the job destruction

[3] The standard errors and the *p*-values for the second-step estimation are calculated using the small sample correction suggested by Windmeijer (2000). The differences between the first- and the second- step parameter estimates and standard errors are very small. Time dummies and a constant are included in the estimations. The instrument matrix contains the endogenous variables at time *t-2* up to *t-4*, the exogenous demographic variables at *t* up to *t-4*, and the municipality specific shock at *t*. The DPD package for Ox is used in the estimation, see Doornik, Arellano, and Bond (2001). The correlation tests are the m_1 and m_2 statistics, suggested in Arellano and Bond (1991). The differencing of the model, due to the fixed effect, will introduce a moving average error. So the AR(1) test should indicate correlation, while the AR(2) test should not. It is assumed that the level equation has serially uncorrelated errors.

[4] The time dummies capture all variation in data that is common for the municipalities.

Table 3. Estimation results

	First step estimation			Second step estimation		
Variable	**Coeff**	**p-val**	**SE**	**Coeff**	**p-val**	**SE**
lf_{t-1}	0.362	0.000	0.039	0.361	0.000	0.039
lf_{t-2}	0.035	0.114	0.022	0.035	0.137	0.023
w_t	0.004	0.071	0.002	0.004	0.083	0.002
v_{t-1}	0.177	0.032	0.082	0.176	0.042	0.086
u_t	0.487	0.000	0.059	0.483	0.000	0.058
u_{t-1}	-0.549	0.000	0.053	-0.547	0.000	0.056
u_{t-2}	-0.153	0.000	0.042	-0.138	0.002	0.044
r_t	0.624	0.000	0.066	0.634	0.000	0.069
r_{t-1}	-0.214	0.000	0.058	-0.212	0.000	0.059
jdr_t	-0.121	0.000	0.021	-0.121	0.000	0.021
jdr_{t-1}	-0.012	0.046	0.006	-0.012	0.042	0.006
$p1824_t$	-0.417	0.000	0.056	-0.409	0.000	0.057
$p5565_t$	-0.158	0.001	0.049	-0.150	0.002	0.049
const	-0.005	0.000	0.001	-0.004	0.000	0.001
t1990	-0.002	0.215	0.002	-0.002	0.256	0.002
t1991	-0.020	0.000	0.002	-0.021	0.000	0.002
t1992	-0.008	0.006	0.003	-0.009	0.007	0.003
t1993	-0.024	0.000	0.003	-0.025	0.000	0.003
t1994	0.029	0.000	0.003	0.029	0.000	0.003
t1995	0.008	0.000	0.002	0.007	0.002	0.002
t1996	-0.005	0.000	0.001	-0.006	0.000	0.001
t1997	-0.007	0.000	0.002	-0.007	0.000	0.002
t1998	0.011	0.000	0.002	0.011	0.000	0.002
Sargan	743.0	0.000		268.6	0.343	
AR(1)	-10.46	0.000		-8.10	0.000	
AR(2)	2.38	0.018		1.55	0.122	

rate are negative, as expected. And the effect of the demographic variables, the proportion of persons ages 18-24 and 55-65 are negative, as expected.

Table 4. Immediate and long-run effects

Variable	Immediate	Long run
w	0.004 [0.008 0.002]	0.007 [0.012 0.003]
v	-	0.291 [0.526 0.056]
u	0.483 [0.579 0.388]	-0.332 [-0.013 –0.677]
r	0.634 [0.747 0.521]	0.699 [1.081 0.317]
jdr	-0.121 [-0.087 –0.155]	-0.219 [0.162 –0.601]
p1824	-0.401 [-0.316 –0.502]	-0.676 [-0.265 –1.087]
p5565	-0.150 [-0.069 –0.230]	-0.247 [0.225 –0.720]

Table 4 presents the immediate and long-term effects, together with 90% confidence intervals[5]. The effect of income is positive and significant in the short and long run. The long- term effect of income corresponds to an income elasticity of 0.049. The long-term effect of the number of vacancies is significantly different from zero. The point estimate indicates that if the number of vacancies is permanently increased by 100, the number of participants in the labor force increases by 29 persons in the long run. The estimated long-run coefficient on unemployment is negative (-0.33), but it does not measure the total effect of unemployment. The estimated long-term effect of labor market programs is slightly higher than the immediate effect. If the number of participants in labor market programs is increased permanently by 100, the labor force increases immediately by 63 persons and by 70 persons in the long run. The estimation results indicate that labor market programs are reducing the business-cycle variation in the labor force, because the effect is positive and programs are counter-cyclical, that is, they tend to be increased when unemployment is high. The long-term effect of an increased number of persons in programs is positive, which means that labor force participants who would have left the labor force in absence of programs are now participating because of the programs. The estimation results suggest that if the number of labor market program participants is permanently increased, it will have a relatively large effect on labor force participation. The immediate negative effect of the job destruction rate is smaller than the long-run effect, -0.12 compared to -0.22. If the number of destroyed jobs is increased with 100, 22 persons will leave the labor force in the long run. The long-run effect of the job destruction rate is not sig-

[5] The calculation is based on the adjusted standard errors in the second step estimation.

nificantly different from zero. And the long-run effects of the demographic variables are negative and larger than short-run effects. The long-run effect of the proportion of 55 to 65 years old is not significantly different from zero, while the long-run effect of the proportion of 18 to 24 years old is significant.

To summarize, the estimated long-run effects are of the expected signs, and the largest effects are found for labor market programs and the proportion of persons between ages 18 and 24. The changes in the estimated coefficients are small if the variables are divided by the current population instead of the lagged population. The changes in the estimated coefficients indicate that wages, vacancies, and programs increase the municipal population and that unemployment and job destruction decrease the municipal population. The estimation results are not sensible to exclusion of the largest and smallest municipalities. And the results do not change if the model is estimated allowing the errors to be correlated between municipalities in the same labor market region.

The estimation results also imply an indirectly estimated displacement effect. If open unemployment is held constant, and labor market programs increase by 100, the labor force increases immediately by 63 persons, according to the estimated coefficient. Then, regular employment must decrease by 37 persons, implying a short-run displacement effect of 0.37. In the long run, the implied displacement effect is 0.30. Dahlberg and Forslund (1999) estimate immediate, direct, displacement effects to be about 0.65 and the long-run effect to be around 0.75 for programs with subsidized employment. They also found that the displacement effect of training programs is insignificant, which could partly explain the difference, because training programs are included in the measure of labor market programs that is used in this study. This comparison relies on the assumption that labor market programs do not affect open unemployment.

Table 5. Immediate and long-run elasticities

Variable	Immediate	Long run
w	0.030	0.049
v	-	0.003
u	0.029	-0.020
r	0.019	0.021
jdr	-0.016	-0.029
p1824	-0.073	-0.121
p5565	-0.032	-0.052

In Table 5, the estimates are converted into elasticities, evaluated at the mean of the variables. In general, the estimated elasticities are small and at the same time, the average percentage change in the labor force participation rate is small, -0.6%.

To illustrate the sizes of the estimated effects, an experiment is carried out, where the variables are increased permanently with one standard deviation. A one standard deviation shock is selected because it measures the size of a typical shock during the sample period. In the experiment, employment and the number of persons in the working-age population are assumed to be constant.

Table 6. Effects of changes with one standard deviation

Variable	Immediate	Long run
w (9%)	12 196	20 226
v (46%)	-	6 752
u (53%)	70 333	-48 295
r (50%)	43 325	47 744
jdr (20%)	-14 195	-25 755
p1824 (4%)	-14 439	-23 883
p5565 (3%)	-4 461	-7 366

From Table 6, we can note that the standard deviations are low for the population ratios, implying that "normal" shocks are relatively small. The standard deviations for the number of vacancies, unemployment, and labor market programs are around 50%, which reflect the huge increase in unemployment during the early 1990s. The variation in the job destruction rate and income are about 20 and 10%, respectively. Results from the experiment indicate that in the long run, the labor market programs and unemployment have about the same effect but with different signs. Even though the estimated coefficients on open unemployment do not measure the total effect of unemployment, results from the experiment indicate that the programs could offset a permanent increase in open unemployment. The effects of the job destruction rate, the number of young people, and income are also about the same size.

4.2 Comparison with other studies

Large effects from labor market programs are also found in other studies. Dahlberg and Forslund (1999) use the same data set as in this study but with a

shorter sample period. In their estimation, the implied short-run effect on labor force participation from labor market programs is about 0.60, which is about the same magnitude as results obtained here. The estimates in Johansson and Markowski (1995), who use Swedish time series data between 1970-92, indicate that a 50% increase of the number of participants in labor market programs causes an immediate[6] increase in the labor force with 27 300 persons, evaluated at the mean of the sample used here. The effect is smaller than the one obtained here (43 000 persons); see Table 6. Wadensjö (1993) obtains the result that a 1% increase in labor market programs increases the labor force with slightly more than 1%. This effect is much larger than the results obtained here, where long-run elasticity is estimated to 0.02; see Table 5. He notes that the sizes of the estimated effects are sensitive to the specification of the equation.

5 Discussion of the results

The estimated coefficients on labor market programs suggest that they have relatively large, positive, long- and short-run effects on the participation rate. The positive effects from programs are robust against different specifications, different choices of the instrument matrix, and different estimation methods[7].

The positive effects on the labor force participation rate indicate that labor market programs reduce business-cycle variation in labor force participation because programs are counter-cyclical. A permanent increase in the number of persons in labor market programs during a downturn in the economy prevents people from dropping out of the labor force, because participants who would have left the labor force in the absence of programs are now participating because of the programs.

In practice, labor market programs have been used to qualify unemployed for new periods of unemployment benefits, which causes difficulties in interpreting estimation results. The true effect of labor market programs on the effective labor force is probably less than the estimated coefficients indicate, because we do not know the extent of dropouts in absence of labor market pro-

[6] The long-run effect from labor market programs is restricted to zero in the estimation.
[7] The model was also estimated with the estimator suggested by Blundell and Bond (1998).

grams used for renewal of benefits periods[8]. And it should be pointed out that the estimation results do not measure the effect of programs on the effective labor force, because we do not know if labor force participants, who chose to remain in the labor force because of labor market programs, search for jobs to the same extent as other labor force participants. If they search less, the effect on the effective labor force will be smaller than the estimated coefficients indicate. Furthermore, the estimated coefficients measure the partial effects on the labor supply, so it is impossible to conclude that an increased number of labor market programs is an effective way to increase labor force participation. For this to be done, programs' costs, for example, must be accounted for.

Unfortunately, it is not possible to empirically determine the size of the discouraged-worker effect because the time dummies capture part of the common unemployment shock, so the coefficients on open unemployment do not measure the total effect of unemployment. Therefore, effects from an experiment, where persons are moved from open unemployment to labor market programs, could not be computed.

Because labor force participation is increasing in labor market programs participation, the bookkeeping relationship between employment, unemployment, labor market programs, and labor force should not be used when forecasting the labor market situation. For example, political targets for open unemployment, which have been used in Sweden, are harder to reach by increasing the number of labor market programs because open unemployment is not reduced by the same amount.

[8] Benefits from unemployment insurance are larger than the social allowance.

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