Björklund, Anders

Working Paper
Unemployment and Mental Health: Some Evidence from Panel Data

IUI Working Paper, No. 120

Provided in Cooperation with:
Research Institute of Industrial Economics (IFN), Stockholm

Suggested Citation: Björklund, Anders (1984) : Unemployment and Mental Health: Some Evidence from Panel Data, IUI Working Paper, No. 120, The Research Institute of Industrial Economics (IUI), Stockholm

This Version is available at:
http://hdl.handle.net/10419/94916

Terms of use:
Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.
No. 120, 1984

Unemployment and Mental Health - Some Evidence from Panel Data

by

Anders Björklund

This paper was written while the author was visiting scholar at the Institute for Research on Poverty at the University of Wisconsin. The research was partially supported by the Institute.

This is a preliminary paper. It is intended for private circulation, and should not be quoted or referred to in publications without permission of the author. Comments are welcome.

February, 1984
Abstract

In this paper the effects of unemployment on mental health are analysed. A simple model where both the occurrence of and duration of unemployment are allowed to affect mental health is specified.

Panel data are used to control for "fixed effects," i.e., omitted variables that are constant over time. The main finding is that those who are unemployed seem to have worse mental health than others whereas no effects were found after having controlled for fixed effects.
Introduction

In most western countries there is a public concern about the individual welfare consequences of unemployment. A very common view, in particular during cyclical downturns, is that unemployment represents a suffering per se irrespective of the income losses that might be a consequence of a period of unemployment. Sometimes it is even argued that unemployment has severe impacts on mental health.

Still, there are very few studies that really can verify a causal mechanism from unemployment experiences to mental health. Consequently the knowledge of the existence of, and in that case, the quantitative magnitude of such impacts is very weak. This in turn probably reflects the methodological problems that are connected with causal analysis.

The purpose of this study is to exploit the opportunities that longitudinal data (or panel data) provide in this respect. The basic advantage with longitudinal data is that a common pitfall in all causal analysis can be avoided, namely the presence of unmeasured variables that influence both the dependent variables (in our case mental health) and the independent variable (in our case unemployment). This advantage has been exploited in several studies of the determinants of wages. The basic idea is to analyze changes in the dependent variable and thereby eliminate the potential bias from omitted variables that are constant over time. In this study a certain variant of this method, recently developed by Chamberlain (1980, 1982) will be used, since the dependent variables are qualitative instead of continuous.

The most important finding is that cross-section analyses indicate that those who are, or recently have been, unemployed have worse mental
health than other labor force members. However, when panel-data are used
to control for omitted variables that are constant over time (fixed
effects) we cannot reject the null hypothesis that unemployment has no
effect on mental health.

The Data

The data analyzed are from the Swedish Level of Living survey that
has been conducted three times, 1968, 1974, and 1981, by the Institute
for Social Research (see Vuksanović (1979)). These data are based on a
representative sample of the Swedish population between 15 and 75 years
of age. The sample size is about 6500 individuals.

The basic advantage with this data base for our purposes is that
questions about mental health were asked each time. Questions are asked
about symptoms of mental illness and about the use of medicine for mental
diseases. The questions about symptoms are: "Have you during the last
twelve months... (1) had difficulties with sleep; (2) had nervous
problems; (3) been deeply depressed." We define the variable "mental
symptom" to equal one if the answer to any of these questions is yes,
otherwise the variable is zero.

The questions about mental medicines are: Have you during the last
14 days used (1) tranquilizers (like meproban, valium and librium);
(2) sleeping pills. We define the variable "mental medicine" to equal
one if any of these medicines are used, otherwise the variable is zero.

Two types of unemployment information are available. First, the
respondents are asked whether they are unemployed, according to a stan-
dard search criterion, at the time of the survey or not, and in that case
how many weeks they have been unemployed. The surveys were in general conducted in May. Second, retrospective questions are asked about unemployment experiences during the whole preceding year; information about the number of unemployment weeks during the year is available.

Model Specification

How can unemployment affect mental health? There is no straightforward theory to rely on in this respect, but some general hypothesis might be worthwhile testing. There is no reason to believe that the unemployed constitute a homogeneous group as far as the effects on mental health are concerned. Instead it is likely that certain groups of unemployed suffer more than others. Actually this heterogeneity is of interest in itself because if the groups that suffer most can be easily identified, they can be made targets for labor market policies of various types.

One important distinction is between "occurrence-" and "duration-effects" of unemployment.\(^3\) By occurrence-effect we mean, in this context, that simply becoming unemployed represents a shock for the unemployed. By duration-effect, on the other hand, we mean that mental health deteriorates during the period of unemployment.

There are also strong reasons to believe that the reason for having become unemployed is crucial in this respect. The importance of distinguishing between quits and permanent lay-offs is obvious. Unfortunately our data do not include information of this type. However, descriptive statistics indicate that very few of the unemployed in Sweden have quit their former jobs (see Björklund (1981)).
It also seems reasonable to hypothesize that the mental effects depend on age, sex, and perhaps marital status; it might be more humiliating for a married prime-aged man with several children to become unemployed than for a teenager. A related interesting hypothesis is whether it is the income loss or unemployment per se that is important. Again, the data are a restriction for more detailed analysis—in particular the sample size is too small.

Taking these considerations and the available data into account it seems reasonable to argue that our measures of mental health can be affected not only by the labor market status at the time of the interview but also by the unemployment experiences back in time. If simply becoming unemployed is a shock for the individual (occurrence-effect) the mental health of those who were unemployed at the time of the survey or any time during the preceding year would have deteriorated. If mental health deteriorates during a spell of unemployment (duration-effect) the total number of unemployment weeks during the preceding year plus the weeks during the year of the interview would be an additional determinant.

Using the variable "mental symptoms in 1981," MS81, as an example, we have:

\[
MS81_i = f(PC_i, U8081_i, UW8081_i)
\]  

(1)

where \(PC_i\) denotes the personal characteristics of individual \(i\), \(U8081_i\) denotes unemployment experience at the time of the survey or during the preceding year, and \(UW8081_i\) the total number of unemployment weeks. The variables are presented in greater detail in Table 1.
We only include age (and age squared) among the personal characteristics in order to allow mental health to change over the life cycle. However, we will also run separate equations for men.

Finally we have to define the population to be analyzed. Because we want to emphasize the effect of unemployment versus employment we restrict the analysis to labor force participants. In so doing we hope to capture the effect of not having a job.

Econometric Specification and Estimation

It is obvious that estimates of equation (1) can be plagued by omitted-variable bias even if we could control for several variables representing personal characteristics. Let us introduce the presence of time-invariant omitted variables, so called fixed effects. We denote these variables $c_i$. In addition we suppress the variables presented above to a matrix $X_{81i}$ with coefficients $\beta$. Hence we can formulate the following model for our qualitative variable $MS_{81i}$:

\[ MS_{81i}^* = \beta'X_{81i} + c_i + \varepsilon_{81i} \]

\[ MS_{81i} = 1 \text{ if } MS_{81i}^* > 0 \]  \hspace{1cm} (2)

\[ MS_{81i} = 0 \text{ if } MS_{81i}^* < 0 \]

where $\varepsilon_{81i}$ is a random term.

But we also have:

\[ MS_{74i}^* = \beta'X_{74i} + c_i + \varepsilon_{74i} \]

\[ MS_{74i} = 1 \text{ if } MS_{74i}^* > 0 \]  \hspace{1cm} (3)

\[ MS_{74i} = 0 \text{ if } MS_{74i}^* < 0 \]
If the index of mental health, $MS^*$, were continuous and observable we could "get rid of" the omitted variable $c_1$ by simply differencing (2) and (3). Then the bias, caused by correlation between $X$ and $c$, is avoided. However, in our case the observed dependent variable is qualitative and another technique to avoid this potential bias, which is due to Chamberlain (1980, 1982), has to be used.

A logit model for our qualitative variable is assumed, i.e.:

$$\text{Prob}\left(\text{MS}_{81} = 1 \mid \beta'X_{81}, c_1\right) = F(\beta'X_{81} + c_1) = \frac{e^{\beta'X_{81} + c_1}}{1 + e^{\beta'X_{81} + c_1}} \quad (4)$$

where $F$ denotes the cdf of the logistic equation.

The basic idea of Chamberlain's technique is to focus only on those who have changed mental status between two subsequent surveys, i.e., those who have values $(0,1)$ and $(1,0)$ on the dependent variables at two surveys. All other observations are deleted from the estimation.

Next, consider the equation for the following probability:

$$\text{Prob}[(0,1) \mid (0,1) \text{ or } (1,0)] = \frac{\text{Prob}(0,1)}{\text{Prob}(0,1) + \text{Prob}(1,0)} \quad (6)$$

Because in our case $\text{Prob}\ (0,1)$ and $\text{Prob}\ (1,0)$ are equal to

$$\left(\frac{1}{1 + e^{\beta'X_{74} + c_1}}\right) \left(\frac{e^{\beta'X_{81} + c_1}}{1 + e^{\beta'X_{81} + c_1}}\right) \quad \text{and} \quad \left(\frac{1}{1 + e^{\beta'X_{74} + c_1}}\right) \left(\frac{e^{\beta'X_{81} + c_1}}{1 + e^{\beta'X_{81} + c_1}}\right)$$

respectively, it turns out that:
\begin{align}
\text{Prob}[(0,1) | (0,1) \text{ or } (1,0)] &= \frac{e^\beta (X_{81i} - X_{74i})}{1 + e^\beta (X_{81i} - X_{74i})} \\
&= \frac{e^\beta (X_{81i} - X_{74i})}{1 + e^\beta (X_{81i} - X_{74i})}
\end{align} \quad (7)

Hence the problematic omitted variables \( c_i \) have disappeared and we have a straightforward logit model to estimate. Given that mental health has changed between the two surveys our model (6) explains the probability that mental health has worsened. In so doing, however, we obtain estimates of the parameters of interest, purged of omitted-variable-bias created by time-invariant omitted variables.

**Results**

The analysis has been done on two basic samples, namely on the one hand those who were labor force participants in both 1967-68 and 1973-74 and on the other hand those who were labor force participants in both 1973-74 and 1980-81. The samples and variables used are defined in Table 1.

Actually, Table 1a and 1b reveal some interesting patterns. In the upper parts of the tables it appears that a higher fraction of the unemployed report symptoms of mental illness and use mental medicines. This pattern can be found in both samples.

In the lower parts of the tables descriptive data about the sub-samples with changes in mental health status are presented. First of all it is important to note that the sample sizes are reduced substantially, in particular only about 250 persons report changes in the use of mental medicine and only a fraction of them have been unemployed. Therefore we have to pay less attention to the latter variable.
Does it seem as though those whose mental health has improved have had better labor market development than those whose mental health has deteriorated? If we confine ourselves to "mental symptoms," it seems as though unemployment duration has decreased more for those whose mental health improved from 1968 to 1974 than for those whose mental health deteriorated (Table 1a). However, this pattern cannot be found in Table 1b. Here it rather seems as though the group with improved mental health has a favorable development of unemployment occurrence.

Next we turn to our logit estimates where we have controlled for age, age squared and fixed effects. We start by looking at the results from pure cross-section estimates where we only have controlled for age and age squared. As far as "mental symptoms" are concerned it appears that we have to reject the null hypothesis that, given age, the unemployed have the same mental health as the employed, at least at the ten percent level (Columns 1, 3, 5 and 7 in Table 2). This conclusion is drawn from the likelihood-ratio test that both unemployment variables are zero. However, the t-ratios for unemployment occurrence and unemployment duration respectively indicate that we cannot say whether it is only the long-term unemployed who have symptoms of mental illness or all unemployed.

Do these conclusions hold also after having controlled for fixed effects, i.e., in the "change equations" (columns 2, 4, 6 and 8 in Table 2) and columns 2 and 4 in Table 3. The answer is obviously no. In no case can we reject the null hypothesis that (change in) unemployment experience has an effect on (change in) mental health status. These results definitely illustrate the importance of fixed effects in problems like the one addressed in this paper.
Conclusions

The most important finding in this paper has been that fixed effects, i.e. omitted variables that are constant over time, are important in the analysis of effects of unemployment on mental health status. Whereas it seems as though unemployment tends to hit persons who have symptoms of mental illness, we have had to reject the hypothesis that unemployment experience has a deleterious effect on mental health.

However, I would not be surprised if more detailed analysis of the issue would give other results. The analysis done here can be improved in several ways. First, the samples of individuals with changes in mental health are rather small and only between 50 and 100 persons of them have been unemployed. If the severe mental effects are concentrated to certain subgroups of the unemployed, like the permanently laid off in certain regions, the power of the tests are probably rather low. It might also be that a more extended measure of unemployment—including e.g. discouraged workers—would be more appropriate.

Another problem has to do with the direction of causality. Does unemployment affect mental health and/or does mental illness create unemployment? Because unemployment experience was not significant in our "change equations" we did not have to bother about this problem. However, more detailed analysis of the issue would require information about the timing of changes in mental health and unemployment experience.

Taking the extremely high unemployment figures in the western countries into consideration, there seems to be an urgent need for more detailed analysis of the individual welfare consequences of unemployment.
Footnotes

1 A constructive discussion of the British evidence on the issue can be found in Stern (1981) and Gravelle et al. (1981).

2 This is actually the approach recommended by Stern (1981).

3 This distinction has also been made in other studies of the effect of unemployment (see, e.g., Björklund, 1981, chapter 5; and Borjas and Heckman, 1980).

4 To save parameters we assume that the β coefficients are constant over time even though it is not necessary for the technique used.

5 It would be possible to use a generalization of the technique presented in the preceding section and pool the observations from all three surveys. However, a disadvantage would be that attrition increases if we only can use observations who are labor force participants at all three time periods.
Table 1
Sample Characteristics

la. Sample A. Labor force participants in 1967-68 and 1973-74

<table>
<thead>
<tr>
<th>Sample size</th>
<th>With unemployment experience 1973-74</th>
<th>No unemployment experience 1973-74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental symptoms</td>
<td>145</td>
<td>2268</td>
</tr>
<tr>
<td>1973-74 (MS74)</td>
<td>44</td>
<td>540</td>
</tr>
<tr>
<td></td>
<td>(0.303)</td>
<td>(0.238)</td>
</tr>
<tr>
<td>Mental medicine</td>
<td>15</td>
<td>186</td>
</tr>
<tr>
<td>1973-74 (MM74)</td>
<td>(0.103)</td>
<td>(0.082)</td>
</tr>
</tbody>
</table>

Subsamples with changes in mental health status

<table>
<thead>
<tr>
<th>Mental Symptoms</th>
<th>Mental Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deterioration</td>
<td>Improvement</td>
</tr>
<tr>
<td>Improvement</td>
<td>Deterioration</td>
</tr>
<tr>
<td></td>
<td>Improvement</td>
</tr>
<tr>
<td>Sample size</td>
<td>312</td>
</tr>
<tr>
<td>Unemployment experiencea</td>
<td>23</td>
</tr>
<tr>
<td>1967-68 (U6768)</td>
<td>(0.074)</td>
</tr>
<tr>
<td>Unemployment weeks</td>
<td>16.4</td>
</tr>
<tr>
<td>1967-68 (UW6768)</td>
<td></td>
</tr>
<tr>
<td>Unemployment experiencea</td>
<td>23</td>
</tr>
<tr>
<td>1973-74 (U7374)</td>
<td></td>
</tr>
<tr>
<td>Unemployment weeks</td>
<td>14.8</td>
</tr>
<tr>
<td>1973-74 (UW7374)</td>
<td></td>
</tr>
</tbody>
</table>

lb. Sample B. Labor force participants 1973-74 and 1980-81

<table>
<thead>
<tr>
<th>Sample size</th>
<th>With unemployment experience 1973-74</th>
<th>No unemployment experience 1973-74</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental symptoms</td>
<td>156</td>
<td>3105</td>
</tr>
<tr>
<td>1973-74 (MS74)</td>
<td>46</td>
<td>680</td>
</tr>
<tr>
<td></td>
<td>(0.301)</td>
<td>(0.219)</td>
</tr>
<tr>
<td>Mental medicine</td>
<td>12</td>
<td>177</td>
</tr>
<tr>
<td>1973-74 (MM74)</td>
<td>(0.071)</td>
<td>(0.057)</td>
</tr>
</tbody>
</table>

-table continues-
Table 1, continued

<table>
<thead>
<tr>
<th></th>
<th>Mental Symptoms</th>
<th>Mental Medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size</td>
<td>372</td>
<td>459</td>
</tr>
<tr>
<td>1973-74 (U7374)</td>
<td>(0.054)</td>
<td>(0.078)</td>
</tr>
<tr>
<td>Unemployment experience</td>
<td>20</td>
<td>36</td>
</tr>
<tr>
<td>1973-74 (UW7374)</td>
<td>(0.054)</td>
<td>(0.078)</td>
</tr>
<tr>
<td>Unemployment weeks</td>
<td>17.4</td>
<td>13.5</td>
</tr>
<tr>
<td>1980-81 (U8081)</td>
<td>24</td>
<td>31</td>
</tr>
<tr>
<td>Unemployment experience</td>
<td>15.9</td>
<td>16.8</td>
</tr>
<tr>
<td>1980-81 (UW8081)</td>
<td>24</td>
<td>31</td>
</tr>
</tbody>
</table>

aTotally 49 persons of those with change in mental symptoms experienced changes in unemployment experience from 1967-68 to 1973-74.

bTotally 95 persons of those with change in mental symptoms experienced changes in unemployment experience from 1973-74 to 1980-81.

**Definition of Variables**

**Labor force participant, 1967-68:** A person who was employed or unemployed at the time of the survey (May 1968), or employed or unemployed any time during the preceding calendar year. The variables for 1973-74 and 1980-81 are defined analogously.

**Unemployment experience 1967-68 (U6768):** Equals one for those who were unemployed at the time of the survey or during the preceding year, zero otherwise. U7374 and U8081 defined analogously.

**Unemployment weeks 1967-68 (UW6768):** The total number of unemployment weeks until the time of the survey and the preceding year.

**Mental symptoms (MS74):** See text.

**Mental medicine (MM74):** See text.
Chi square for likelihood-ratio test that both unemployment coefficients are zero

<p>| | | | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.02</td>
<td>0.94</td>
<td>4.38</td>
<td>0.06</td>
<td>6.12</td>
<td>1.73</td>
<td>7.12</td>
</tr>
</tbody>
</table>

Asymptotic t-ratios in parentheses.

Critical chi-square values with two degrees of freedom: 4.61 (10%), 5.99 (5%), 9.21 (1%).

The variable MS74W (and MS81W) equals one if mental health (according to mental symptoms) has deteriorated and zero if it has improved.
### Table 2

Results on the Determinants of Mental Symptoms

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1) MS74</td>
<td>(2) MS74W</td>
</tr>
<tr>
<td>Dep. var.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample size:</td>
<td>2413</td>
<td>603</td>
</tr>
<tr>
<td></td>
<td>(men only)</td>
<td>(men only)</td>
</tr>
<tr>
<td>Indep. var.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-0.532</td>
<td>-0.211</td>
</tr>
<tr>
<td></td>
<td>(-0.89)</td>
<td>(-0.73)</td>
</tr>
<tr>
<td>Age</td>
<td>-0.039</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>(-1.39)</td>
<td>(1.005)</td>
</tr>
<tr>
<td>Age squared</td>
<td>0.0005</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(1.65)</td>
<td>(0.18)</td>
</tr>
<tr>
<td>U7374</td>
<td>0.056</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(0.20)</td>
<td></td>
</tr>
<tr>
<td>UW7374</td>
<td>0.017</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>(1.40)</td>
<td></td>
</tr>
<tr>
<td>DU7374</td>
<td>--</td>
<td>-0.191</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(-0.50)</td>
</tr>
<tr>
<td>DUW7374</td>
<td>--</td>
<td>0.018</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.94)</td>
</tr>
<tr>
<td>U8081</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>UW8081</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DU8081</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DUW8081</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

-table continues-
Table 3
Results on the Determinants of Mental Medicine

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MM74</td>
<td>MM74W</td>
</tr>
<tr>
<td>Dep. var.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample size:</td>
<td>2413</td>
<td>246</td>
</tr>
<tr>
<td>Indep. var.:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>-6.14</td>
<td>-1.00</td>
</tr>
<tr>
<td></td>
<td>(-5.45)</td>
<td>(-1.97)</td>
</tr>
<tr>
<td>Age</td>
<td>0.120</td>
<td>0.023</td>
</tr>
<tr>
<td></td>
<td>(2.42)</td>
<td>(2.18)</td>
</tr>
<tr>
<td>Age squared</td>
<td>-0.0008</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(-1.53)</td>
<td>---</td>
</tr>
<tr>
<td>U7374</td>
<td>-0.159</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(-0.32)</td>
<td>---</td>
</tr>
<tr>
<td>Uw7374</td>
<td>0.027</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>(1.63)</td>
<td>---</td>
</tr>
<tr>
<td>DU7374</td>
<td>---</td>
<td>-0.501</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(-0.78)</td>
</tr>
<tr>
<td>DUW7374</td>
<td>---</td>
<td>0.045</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>(1.54)</td>
</tr>
<tr>
<td>U8081</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Uw8081</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DU8081</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>DUW8081</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

-Table continues-
Chi-square for likelihood ratio test that both unemployment coefficients are zero 4.44 3.86 2.14 0.60

Asymptotic t-ratios in parentheses

Critical chi-square values with two degrees of freedom: 4.61 (10%), 5.99 (5%), 9.21 (1%).

*The variable MM74W (and MM81W) equals one if mental health (according to the use of mental medicine) has deteriorated and zero if it has improved.
References:


1976

1. Corporate and Personal Taxation and the Growing Firm
   by Ulf Jakobsson

7. A Micro Macro Interactive Simulation Model of the Swedish Economy,
   Preliminary model specification
   by Gunnar Eliasson in collaboration with Gösta Olavi

8. Estimation and Analysis with a WDI Production Function
   by Göran Eriksson, Ulf Jakobsson and Leif Jansson

1977

15. Pay Differentials between Government and Private Sector
    Employees in Sweden
    by Siv Gustafsson

1980

25. On Unexplained Price Differences
    by Bo Axell

34. Imperfect Information Equilibrium, Existence, Configuration
    and Stability
    by Bo Axell

1981

36. Energi, stabilitet och tillväxt i svensk ekonomi (Energy,
    Stability and Growth in the Swedish Economy)
    by Bengt-Christer Ysander

38. Utility in Local Government Budgeting
    by Bengt-Christer Ysander

40. Wage Earners Funds and Rational Expectations
    by Bo Axell

42. The Structure of the Isac Model
    by Leif Jansson, Tomas Nordström and Bengt-Christer Ysander

43. An Econometric Model of Local Government and Budgeting
    by Bengt-Christer Ysander

44. Local Authorities, Economic Stability and the Efficiency of
    Fiscal Policy
    by Tomas Nordström and Bengt-Christer Ysander
45. Growth, Exit and Entry of Firms
   by Göran Eriksson

   by Eva Christina Horwitz

56. Central Control of the Local Government Sector in Sweden
   by Richard Murray

59. Longitudinal Lessons from the Panel Study of Income Dynamics
   by Greg J. Duncan and James N. Morgan

1982

61. Var står den nationalekonomiska centralteorin idag?
    av Bo Axell

63. General Search Market Equilibrium
    by James W. Albrecht and Bo Axell
    General Equilibrium without an Auctioneer
    by James W. Albrecht, Bo Axell and Harald Lang

64. The Structure and Working of the Isac Model
    by Leif Jansson, Thomas Nordström and Bengt-Christer Ysander

65. Comparative Advantage and Development Policy Twenty Years Later
    by Anne O. Krueger

67. Computable Multi-Country Models of Production and Trade
    by James M. Henderson

69. Relative Competitiveness of Foreign Subsidiary Operations of a Multinational Company 1962-77
    by Anders Grufman

71. Technology, Pricing and Investment in Telecommunications
    by Tomas Pousette

72. The Micro Initialization of MOSES
    by James W Albrecht and Thomas Lindberg

75. The MOSES Manual
    by Fredrik Bergholm

76. Differential Patterns of Unemployment in Sweden
    by Linda Leighton and Siv Gustafsson

77. Household Market and a Nonmarket Activities (HUS)
    - A Pilot Study
    by Anders Klevmarken
78. Arbetslöshetsersättningen i Sverige
   - motiv, regler och effekter
   av Anders Björklund och Bertil Holmlund

1983

79. Energy Prices, Industrial Structure and Choice of
   Technology; An International Comparison with Special
   Emphasis on the Cement Industry
   by Bo Carlsson

81. ELIAS - A Model of Multisectoral Economic Growth
   in a Small Open Economy
   by Lars Bergman

84. Monopoly and Allocative Efficiency with Stochastic Demand
   by Tomas Pousette

86. The Micro (Firm) Foundations of Industrial Policy
   by Gunnar Eliasson

87. Excessive Government Spending in the U.S.: Facts and
   Theories
   by Edward M. Gramlich

88. Control of Local Authority Expenditure - The Use of Cash
   Limits
   by Noel Hepworth

89. Fiscal Containment and Local Government Finance in
   The U.K.
   by Peter Jackson

90. Fiscal Limitations: An Assessment of the U.S.
   Experience
   by Wallace E. Oates

91. Pricing and Privatization of Public Services
   by George E. Peterson

92. Export Performance of the Nordic Countries
   1965-82
   by Eva Christina Horwitz

94. Job Mobility and Wage Growth:
   A Study of Selection Rules and Rewards
   by Bertil Holmlund

95. Sweden's Laffer Curve:
   Taxation and the Unobserved Economy
   by Edgar L. Feige and Robert T. McGee

96. The Machine Tool Industry - Problems and Prospects
   in an International Perspective
   by Bo Carlsson
97. The Development and Use of Machine Tools in Historical Perspective
   by Bo Carlsson

99. An Equilibrium Model of Search Unemployment
   by James W. Albrecht and Bo Axell

100. Quit Behavior under Imperfect Information: Searching, Moving, Learning
     by Bertil Holmlund and Harald Lang

102. Collecting Data for Micro Analysis
     Experiences from the Hus-Pilot Study
     by N. Anders Klevmarken

103. The Swedish Micro-To-Macro Model
     - Idea, Design and Application
     by Gunnar Eliasson

104. De utlandsetablerade företagen och den svenska ekonomin
     av Gunnar Eliasson

105. Estimation of Wage Gains and Welfare Gains from Self-Selection Models
     by Anders Björklund and Robert Moffitt

106. Public Policy Evaluation in Sweden
     by Bengt-Christer Ysander

107. The Largest Nordic Manufacturing Companies
     by Lars Oxelheim

108. Entry, Industry Growth and the Microdynamics of Industry Supply
     by John C. Hause and Gunnar Du Rietz

109. Capitalist Organization and Nationalistic Response;
     Social Dynamics in Age of Schumpeter
     by William Parker

110. A Nonwalrasian Model of the Business Cycle
     by J.-P. Benassy

111. Disequilibrium Economic Dynamics -
     A Post-Schumpeterian Contribution
     by Richard Day

112. Schumpeterian Competition in Alternative Technological Regimes
     by Sidney Winter
113. The Industrial Finance Systems; Europe, U.S. and Japan
   by Tad Rybczynski

114. The Microeconomics of Organization and Productivity
   Change - The Use of Machine Tools in Manufacturing
   by Bo Carlsson

115. On the Behavioral and Rational Foundations of Economic
   Theory
   by Herbert Simon

116. Schumpeterian Dynamics
   by Erik Dahmén

117. A Dynamic Micro-to-Macro Model of an Industrial Economy
   by Gunnar Eliasson

118. The Initialization Process - The Moses Manual, Part 2
   by Fredrik Bergholm

1984

119. Forestalling the Demise of Empirical Economics: The Role
   of Microdata in Labor Economics Research
   by Frank Stafford

120. Unemployment and Mental Health - Some Evidence from
   Panel Data
   by Anders Björklund