

SOCIAL INSURANCE

*Papers presented at the 5th Arne Ryde Symposium
Lund, Sweden, 1981*

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1983

NORTH-HOLLAND
AMSTERDAM · NEW YORK · OXFORD

DISABILITY AS AN ECONOMIC PHENOMENON: A FIRST APPROACH TO ESTIMATE HIDDEN UNEMPLOYMENT AMONG DISABILITY BENEFICIARIES

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1. INTRODUCTION

In many countries the number of people who withdraw from the labor market as a consequence of becoming entitled to disability benefits has grown very rapidly. In table 1 some key figures are shown for different countries. Although a direct comparison is difficult on account of differences in legal structure, eligibility criteria etc. of the disability programs, these figures indicate the relative importance of the volume and growth rate of disability recipients.¹

Table 1. Key figures with respect to disability programs
for some selected countries.

	Average annual growth rate of the number of disability recipients 1968-1978	The number of disability recipients expressed as a percentage of the employed 1978
Netherlands	11.3	13.0
Sweden	3.3	11.9
United Kingdom	2.0	7.8
United States	7.0	14.7
West Germany	2.5	11.0 ^a

^a estimated

Source: Victor Halberstadt and Robert Haveman.

Here we will examine the determinants of the growth of the number of disability recipients at a macro level.² To this end we present a conceptual

framework in section two. This framework enables us to estimate the share of disability awards in the private sector of the economy which is granted solely as a consequence of economic factors. Consequently, the hidden unemployment among disability beneficiaries can be estimated. This is done in section three. Finally section four gives some concluding comments.

2. THE CONCEPTUAL FRAMEWORK

In various studies (Lando (1974), Lando et. al. (1979), Hambor (1975), Emanuel, Halberstadt and Petersen (forthcoming)) the importance of economic variables, notably the unemployment rate, in explaining the number of disability recipients has been stressed. We have developed a more extended framework by introducing non-economic variables:

$$DR = f(H, PH, OS, E, LS) \quad (1)$$

where DR stands for the disability incidence rate, i.e. the number of disability awards per year per 100 insured, H for health, PH for perceived state of health, OS for occupational structure, E for economic factors and LS for legal structure.

Other things being equal a worsening of the state of health (H) of the insured population implies a larger number of disabled persons. The perceived state of health (PH) reflects the whole set of norms and values with respect to whether it is socially and personally acceptable to feel oneself entitled to a benefit. It is commonly agreed that this set of norms and values changes over time, and can partly explain the increase of the disability rate.³ As some occupations are of a more physically (e.g. the building sector) or of a mentally demanding nature than others, it is obvious that account should be taken of a possible changed occupational structure (OS). The economic factors (E) stand for the effects of economic determinants on the development of the disability incidence rate. We have assumed that the profit-maximizing behavior of employers constitutes a suitable basis for analysing the link between economic variables and the disability incidence rate. For, given the rigid wage structure, employers will be inclined if the need arise to dismiss those employees first who are least productive e.g. because they are handicapped (see e.g. van Praag and Halberstadt (1980)). Since a disability benefit is generally more attractive, both financially and from the point of view of social acceptance, than an unemployment benefit (at least in the Netherlands), potential unemployed will, if possible, prefer a disability to an unemployment benefit. The legal structure (LS), notably criteria governing eligibility and benefit determination, may also contribute to the explanation of the level of the disability incidence rate.

It will be clear that it is difficult to find the appropriate empirical counterparts for the explanatory variables introduced above. However, it is not necessary to measure each of these variables separately since our analysis is based on a comparison between the disability incidence rate in the private sector and the public sector. According to our framework, any numerical difference between the two disability incidence rates must be attributed to different values of the explanatory variables. At first sight, the variable (E) differs remarkably between the two sectors. To be precise, it can be assumed that profit maximizing behavior of employers is significant only for the explanation of the level of the disability incidence rate in the private sector. In the public sector arguments other than the profit

criterion are used when expansion or contraction of the number of employees is considered. Hence the basic idea is to make the disability incidence rates in both sectors comparable in such a way that the remaining difference between the disability incidence rate in the private sector and the disability incidence rate in the public sector can be attributed only to economic factors. Consequently it will be possible to calculate that part of the disability volume in the private sector, which may virtually be considered as hidden unemployment.

3. THE APPLICATION TO THE NETHERLANDS

In this section some basic features of the Dutch Disability Programs will be described. Secondly, we will illustrate the application of the framework, and thirdly some results will be presented and discussed.

A. The Dutch Disability Programs

In the Netherlands employees in the private sector receive a benefit under the Sickness Benefit Act during the first year of disability because of illness or accident. After one year of disability the Disability Security Act (DSA), introduced July 1967, comes into effect. Depending on the degree of disability the DSA benefit amounts to a maximum of 80% of the previous earnings up to an income ceiling. There is no maximum benefit duration. The required minimum degree of disability is only 15%. As aging is usually correlated with a worsening state of health, this means that especially the older employees will rather easily meet this eligibility criterion. Besides, by the determination of the benefit percentage not only the health status counts, but also the reduced chance on the labour market because of the handicap must be taken into account (see for a discussion of this e.g. van de Water (1979) and, with respect to the Netherlands, Emanuel (1981)).

Employees in the public sector are covered by a separate disability scheme. The only difference between this scheme and the DSA is the period between the first day of absence and the moment when a disability is awarded (the so-called waiting period). In the public sector this waiting period is variable, because only when it is almost certain that the disability will be permanent is a disability benefit awarded.

In 1968 the disability incidence rates in the private and the public sector amounted to 1.1% resp. 0.5%. Both rates have increased rapidly and reached in 1980 the level of 2.2% and 1.3% respectively.

B. The application of the conceptual framework

In the following the explanatory variables of the disability incidence rate are discussed for the Netherlands. Our aim is to isolate the variables that are on the one hand responsible for the growth of the disability incidence rate in the both sectors and on the other for the discrepancy between them.

The development of the state of health (H) is, because of a lack of more appropriate data, approached by the development of mortality rates (see for a similar approach Doherty (1979) and Parsons (1980)). These mortality rates (standardized for age and sex) have, in the considered period, slightly improved. Because in addition the average age of both insured pop-

ulations has somewhat declined, we must conclude that the state of health does not contribute to the explanation of the rise of the disability incidence rate in either the private or the public sector. To eliminate the influence of different age structures of the insured populations of both sectors on the respective incidence rates, we have made both rates comparable by standardizing for age.⁵

Appropriate data about the second variable, the perceived state of health (PH) are difficult to obtain. We will return to this shortly. It is however plausible that the gradual evolution of this attitude is an overall social phenomenon and has thereby contributed to the increase of the disability incidence rate in both sectors in the same way.

Because in the period under consideration the occupational structure (OS) has not significantly changed in either the private or public sector, this variable does not contribute to the explanation of the increase in the disability incidence rate.⁶ However, the difference in the occupational structure between the private and public sector can partly explain the difference between the disability incidence rates in both sectors, since the average occupation in the private sector is thought to be of a more demanding nature as far as health conditions are concerned. The estimated correction factor which eliminates this influence decreases the disability incidence rate of the private sector only slightly.⁷ This is in accordance with an analysis of the disability incidence rate per occupation, where it has been found that the difference in the disability incidence rates per occupation keeping economic factors constant, can largely be explained by different age structures of the occupational groups.⁸

As was pointed in section 2, economic factors (E) are only significant for the explanation of the disability incidence rate in the private sector.⁹ As we already mentioned above, the longer waiting period in the public sector is the only significant difference between the legal structures (LS) of the two sectors.¹⁰ To make the disability incidence rates of the two sectors comparable with respect to this variable, we have to take account of the number of people in the public sector whose disability lasts longer than one year, but who are not awarded a disability benefit because the disability is clearly temporary. We have estimated a correction factor to eliminate this difference.¹¹

Finally, it should be remarked that no evidence has been found that other factors are substantial in explaining either the increase in both disability incidence rates, or the discrepancy between the disability incidence rates in the two sectors.

Summing up, the above implies that only the changed perceived state of health (PH) and the development of the economic variables (E) are considered to be the prime factors in explaining the increase of the disability incidence rate in the private sector. The only factor held responsible for the growth of the disability incidence rate in the public sector is the changed perceived state of health.

We have tested these findings with regression analysis for the period 1968-1980. The disability incidence rate in the private sector (DR1) is explained by the disability incidence rate in the public sector (DR2), as a proxy for the change in the perceived state of health (PH) - as mentioned above an overall societal phenomenon - and the real labor cost per unit of output (LCUO). This last variable, which has steadily increased in the pe-

riod under consideration, is assumed to be a proxy variable for the economic factors (E). It is assumed that as LCUO increases, which implies that real wages increase faster than labor productivity, the average profitability of employees decreases (see also Morley, 1979). By implication the least productive employees, such as the handicapped, will be the first to be confronted with the possibility of dismissal. In this situation these employees will be inclined to apply for a disability benefit.

The first equation of table 2 shows that the empirical findings are in accordance with the theoretical setting because both DR2 and LCUO have the expected signs and are statistically significant. Another way to test the model is with the so called economic disability incidence rate in the private sector (EDR1). This rate is defined as the difference between the disability incidence rate in the private sector (corrected for OS) and the disability incidence rate in the public sector (corrected for LS and the difference with respect to the age distribution). Consequently we get an estimation of that part of the disability incidence rate in the private sector which is solely related to economic factors. Equation (2) in table 2 shows that the relationship between EDR1 and LCUO is statistically significant too. The remaining two equations try to explain EDR1 by unemployment rates. Equation (3) contains the official unemployment rate (U) as explanatory variable. Anticipating of the results presented below, equation (4)

Table 2. Estimates of the disability rate model (1968-1980).

Independent Variable	Dependent Variable			
	(1) DR1 _t	(2) EDR1 _t	(3) EDR1 _t	(4) EDR1 _t
Intercept	-2.201 (-2.14)	-1.772 (-3.25)	0.655 (7.21)	0.677 (11.24)
DR2 _t	0.866 (3.23)			
LCUO _{t-1}	0.028 (2.61)	0.024 (4.92)		
U _{t-1}			0.074 (3.02)	
UHU _{t-1}				0.043 (4.40)
R ²	0.920	0.681	0.405	0.607
S.E.	0.104	0.101	0.133	0.108
D.W.	1.818	1.648	1.071	1.271

Note: The t-values are shown in parentheses.

shows the results if U includes the hidden unemployment among disability beneficiaries. This gives the much higher unemployment rate UHU. It appears that UHU explains a larger proportion of the total variation in EDRI in comparison with U. This can be explained by the fact that the official unemployment rate is an underestimation of the development of unemployment.

C. The method of calculation and some results

The method can be explained as follows. For each year we have calculated the economic disability incidence rate. Multiplying this rate by the number of insured yields the annual number of disability awards for economic reasons, the so-called hidden unemployment. Next, the total volume of hidden unemployment can be calculated on the basis of some assumptions with respect to termination pattern of hidden unemployed.¹² The cumulated result is a volume of about 200,000 man-years of hidden unemployment in 1980. This equals 43% of the total volume of disability beneficiaries (also expressed in manyear) in the private sector.¹³ Table 3 shows the importance of these findings by relating hidden unemployment to officially registered unemployment. It appears that the official unemployment rate considerably underestimates the development of unemployment.

Table 3. Hidden unemployment and officially registered unemployment rate, (The Netherlands, 1968-1981).

	1968	1974	1980	1981 ^a
(1) Hidden unemployment among DSA beneficiaries ^b	0.3	2.7	4.7	4.9
(2) Officially registered unemployment ^{b,c}	1.9	3.3	5.6	6.5
(3) Total unemployment (3) = (1) + (2)	2.2	6.0	10.3	11.4

^a Projection is based on the assumption that the disability rates remain at their 1980 level and that the insured population remains constant.

^b Expressed as a percentage of the labor force.

^c These data are based on: Central Economic Plan 1980, and Macroeconomic Projections 1981 (1980), Central Planning Bureau, The Hague (in Dutch).

4. CONCLUDING REMARKS

It is commonly agreed that the worsening economic conditions have positively influenced the number of disability beneficiaries. It is therefore reasonable to conjecture that there may be hidden unemployment among the

disability beneficiaries. In this paper we have developed as a first approach a conceptual framework to examine this influence. We have applied this framework to the Dutch Disability schemes and have found a considerable volume of hidden unemployment among disability beneficiaries. This means that the disability program partly fulfils the function of an unemployment scheme. Consequently a trade-off between unemployment and disability arises.

It follows that, to a considerable extent, disability is becoming an economic phenomenon. Like other results of research pertaining to the social security system, see e.g. Martin Feldstein (1978), this must have implications for the optimal redesign of social insurance.

FOOTNOTES

*) Erasmus University Rotterdam. The authors wish to thank Victor Halberstadt, Joop Hartog, Pieter Korteweg, and Dick Wolfson for their comments on an earlier draft of this paper. Further we are indebted to Christina Jonung for comments on a draft of this paper during the Arne Ryde Symposium, and to an anonymous referee who provided important suggestions.

1) See for more data Victor Halberstadt and Robert Haveman, (forthcoming), International Labour Office (1979), Social Security Administration (1980).

2) See for an explanation of the growth of the volume of disability beneficiaries per branch of industry, which differs remarkably, at least in the Netherlands, van den Bosch and Petersen (1982) and (1983).

3) This will be due to both a learning process and the fact that as the volume of beneficiaries increases the stigma attaching to the status of beneficiary usually decreases, see Lando (1974) and Schechter (1981).

4) See also Levy, (1980), especially p. 13.

5) The average age in the public sector is approximately 5 years higher than in the private sector. By standardizing with the age distribution of the private sector the disability incidence rate in the public sector decrease about 30%. See for further details of this and the following correction factors: van den Bosch and Petersen (1979).

6) Assuming that jobs in the service sector are of a less demanding nature as far as health conditions are concerned, the slightly increased share of employment in the service sector with respect to total private sector employment means that this could have a negative influence on the private sector disability incidence rate leading to an underestimation of the results reported below. Furthermore, there is no indication available that the type of work per branch of industry was on the average more demanding in 1980 than it was in 1968. See also van den Bosch and Petersen (1982).

7) The calculation of this correction factor is based on data pertaining to injury at work and industrial disease. This correction lowers the disability incidence rate in the private sector by 0.05 percent.

8) This analysis was entirely based on data pertaining to the disability

incidence rate by occupation within the public sector. Consequently according to our assumptions the effect of economic factors on the disability incidence rate per occupation is nil.

9) If the awarding of public sector disability benefits is to some extent influenced by economic factors (e.g. by measures reducing the budget), this could lead to an underestimation of our results.

10) It has to be remarked that the variable PH also incorporates the effects of a possible change of the implicit eligibility criteria used by the awarding boards of both sectors, due to social trends with respect to social and personal acceptability to feel oneself entitled to a benefit.

11) This correction factor is based on an estimation of the number of DSA awards, of which the duration of the disability status was only temporary. Consequently the remaining number of DSA awards is permanent and thus comparable with the public sector awards. For the sake of convenience, we have applied this correction factor to the disability incidence rate in the public sector, (increasing this rate with approximately 30%).

12) We have assumed that the termination percentages (τ) of hidden unemployment equal the overall termination percentages. We can illustrate the method of calculation as follows. Let $HU_i(t)$ the hidden unemployment in the year (t) among persons who received an award in year (i), $i =$ vintage 1968, 1969,; $t =$ 1968, 1969,; $HU(t)$ the total hidden unemployment in year (t); $EDR1$ the economic disability incidence rate; IP the number of DSA-insured; $\tau(t)$ the percentage of the initial awards whose benefit has been terminated (t) years after entry. So we can define:

$$(1) HU_i(t) = EDR1_i \cdot IP_{i-1} \cdot (100 - \tau(t))$$

$$(2) HU(t) = \sum_{i=1968}^t HU_i(t).$$

13) This means that we have estimated the capacity of work of the total number of disability beneficiaries. It follows that 200,000 man-years corresponds with a considerable higher number of partial hidden unemployed persons.

REFERENCES

- Bosch, F.A.J. van den and Petersen, C. (1979), Hidden unemployment and disability, Discussion Paper Series 7913/G, Erasmus University Rotterdam, Institute for Economic Research, Rotterdam.
- Bosch, F.A.J. van den and Petersen, C. (1982), Incidence of Disability by Sector of Industry: An Explanation, *International Social Security Review* 35, 196-204.
- Bosch, F.A.J. van den and Petersen, C. (1983), An Explanation of the Growth of Social Security Disability Transfers, *De Economist* 131, 66-78.
- Doherty, N.A. (1979), National Insurances and Absence from Work, *The Economic Journal* 89, 50-65.
- Emanuel, H., Halberstadt, V., Petersen, C., Disability Policy in the Neth-

erlands, in Halberstadt, V. and Haveman, R.H. (eds.), *The Cross-National Disability Policy Study*, forthcoming.

Emanuel, H. (1981), Factors in the growth of the number of disability beneficiaries in the Netherlands, *International Social Security Review* 33, 41-60.

Feldstein, M. (1978), The Effect of Unemployment Insurance on Temporary Layoff Unemployment, *American Economic Review* 68, 834-846.

Halberstadt, V., and Haveman, R.H. (eds.), *The Cross-National Disability Policy Study*, Cornell Un. Press, forthcoming.

Hambor, J.C. (1975), *Unemployment and Disability: an Econometric Analysis with Time Series Data*, U.S. Department of Health, Education, and Welfare, Social Security Administration, Office of Research and Statistics, Staff paper no. 20.

International Labour Office (1979), *The Costs of Social Security*, Geneva.

Lando, M.E. (1974), The Effect of Unemployment on Application for Disability Insurance, *Proceedings of the American Statistical Association*, (Business and Economics Statistics section), 438-442.

Lando, M.E., Coate, M.D. and Kraus, R. (1979), Disability Benefit Applications and Economy, *Social Security Bulletin* 42, 3-9.

Levy, J.M. (1980), Demographic Factors in the Disability Determination Process: A Logistic Approach, *Social Security Bulletin* 43, 11-16.

Morley, R. (1979), Profit, Relative Prices and Unemployment, *The Economic Journal* 89, 582-600.

Parsons, D.O. (1980), The Decline in Male Labor Force Participation, *Journal of Political Economy* 88, 117-134.

Praag, B.M.S. van and Halberstadt, V. (1980), Towards an Economic Theory of Non-Employability: a First Approach, in Roskamp, K.W. (ed.), *Proceedings of the 34th. Congress of The International Institute of Public Finance*, Hamburg, 1978, Paris.

Schechter, E.S. (1981), Commitment to Work and the Self-Perception of Disability, *Social Security Bulletin* 44, 22-30.

Social Security Administration (1980), U.S., Department of Health and Human Services, *Social Security Programs Throughout the World 1979*, Washington.

Water, P.N. van de (1979), Disability Insurance, *American Economic Review* 69, 275-278.