

Incidence of disability by sector of industry: An explanation

*By Frans A. J. van den Bosch
and Carel Petersen*

Assistant Professors, Faculty of Economics, Erasmus University Rotterdam, The Netherlands.

Introduction

The increasing number of disability awards is a widespread cause for concern. In a number of countries, among them the Netherlands, this escalation has led in recent years to a sharp increase in disability benefit costs.¹ At the same time there is stagnation in economic development. To what extent can the growth in the number of disabled persons be accounted for by the deteriorating economic situation?

Research at a *macro* level has indicated that a relationship exists between the deteriorating situation of the labour market, which finds expression in increasing unemployment, and the sharp increase in the disability incidence rate, i.e. the number of disability awards per annum as a percentage of the total number of insured persons (hereafter referred to as the disability incidence rate).²

The question being studied here is: which factors are responsible at a *meso* level (sectors of industry) for the variation in the annual number of disability awards in the private sector? In order to gain some insight into the matter, an analysis was made of the disability incidence rate by sector of industry for the period 1968 to 1979. Table 1 shows that for 1968 various sectors of industry showed considerable variation in the disability incidence rate and that, moreover, there was a sharp divergence in increases in the period 1968 to 1979.

The problem is approached by posing two questions. Firstly, which factors explain the considerable differences in the disability incidence rate between the different sectors of industry in 1968? Secondly, to which factors can be attributed the widely diverging development of the disability incidence rate in the various sectors of industry in the period 1968 to 1979?

The legal structure

The structure of the Dutch disability insurance system will first be described briefly.³

In the event of illness or accidents, workers in the private sector are granted a sickness benefit on the basis of the Sickness Benefit Act for a

Table 1. Number of disability awards expressed as a percentage of the total number of insured persons (disability incidence rate) for certain sectors of industry, 1968-1979^(a)

Sector of industry	Disability incidence rate		
	1968	1979	Increase 1968-1979
Construction	2.0	3.0	1.0
Metal and electrical industry	1.2	2.6	1.4
Metal crafts	0.9	1.9	1.0
Chemical industry	1.5	2.5	1.0
Food, beverages and tobacco industry	1.1	2.6	1.5
Retail trade and crafts	0.7	1.6	0.9
Banks and insurance companies	0.8	1.4	0.6
All sectors covered by the Disability Security Act ^(b)	1.2	2.1	0.9

Notes:

^(a) Only sectors of industry in which the number of insured persons accounts for more than 2 per cent of the total number of persons insured under the Disability Security Act (DSA). Three sectors of industry which do meet this criterion have not been taken into account in view of the very specific group of insured persons in these sectors which would complicate comparison with other sectors of industry.

^(b) The over-all disability percentage, i.e. the total number of disability beneficiaries, irrespective of year of award, expressed as a percentage of the total number of insured, increased from 5.3 per cent in 1968 to 13.1 per cent in 1980. This figure should be distinguished from the disability incidence rate.

Source: Annual reports of industry associations, the Disabled Persons Fund and the Joint Medical Service.

maximum of one year. If the disability in the performance of one's work persists longer than one year, and also exists with regard to other "appropriate" work, irrespective of the cause of disability the worker is granted a benefit on the basis of the Disability Security Act (DSA), which came into being in mid-1967. Depending on the degree of disability, the maximum benefit amounts to 80 per cent of the last wage earned.

The minimum degree of disability required is only 15 per cent. There is no maximum duration of the benefit. In addition, when determining the amount of the benefit, no account is taken of the length of time a person has worked. The benefit is terminated either in the case of death, or when the worker attains the age of 65, or on recovery.

Workers in the public sector (government and non-profit making organisations) are insured under a separate disability benefit system. If a worker in the public sector is unable to work on account of illness, his salary continues to be paid by his employer. Only when it has been established that the disability is permanent does the worker retire; he then receives a disability benefit from the General Public Pension Fund. The criteria for establishing the amount of the benefit are the same as those adhered to in the private sector.

The influence of the economic situation

The following factors make it possible that the deteriorating economic situation exerts an influence on the ability to obtain a disability benefit in the private sector.

In the first place, the minimum required degree of disability to become eligible for a benefit is 15 per cent; this is very low. In view of the fairly well established relationship between increasing age and deterioration in health, older workers are especially likely to meet this criterion. In the second place, the lessened chance of finding work as a consequence of a disability is also taken into account when determining the degree of disability on which the amount of the benefit is based. In combination with the deteriorating economic situation, this has meant that approximately 84 per cent of disabled persons receive a benefit which is equivalent to 80 per cent of the last wage earned. Consequently, in the Netherlands many persons who are entitled to a benefit for maximum disability are in fact quite likely to be in possession of a considerable capacity for work.⁴

This implies that the development of the number of disabled persons is to some degree influenced by economic factors.

The degree to which these factors exert an influence by sector of industry will be analysed in this article. To this end, a disability incidence rate model is presented below. On the basis of this model an analysis is then made of the factors which can explain the diverging *levels* of disability incidence rates in 1968, the first year of the period being studied. An explanation is then sought for the differences in the *increase* in the disability incidence rate by sector of industry in the period 1968 to 1979. Finally, a summary and conclusions are presented.

The disability incidence rate model

In the literature, the importance of economic factors, often brought into play by an unfavourable labour market situation (unemployment) or a deterioration in capital returns in industry, has already been stressed as an explanation for the number of disability awards.⁵ However, in addition to the influence of these factors, the model which we have designed also contains non-economic factors. For instance, it seems obvious that variables such as state of health and type of work performed will affect the likelihood of disability, independently of the influence of economic factors.

The specification of the model is as follows:

$$DR = f(H, PH, O, E, LS, S)$$

where DR = disability incidence rate, H = state of health, PH = perceived health, O = type of work, E = economic factors, LS = legal structure, and S = distribution according to sex. The following comments will serve to elucidate the model.

The dependent variable is the disability incidence rate (DR). A deteriorating state of health (H) of the insured population will result in an increase in the disability incidence rate. Data relating to state of health are scarce. Often, however, the mortality rate is employed as an objective indicator of state of health.

The second independent variable is perception of health (PH). By this is understood the pattern of norms and values, which is subject to change, and concerns the personal and social definition of health. This concept is difficult

to operationalise. However, a concept of illness, which under the influence of social trends is expanded increasingly to recognise as illness psychological impairments in addition to physical handicaps, will exert a positive influence on the disability incidence rate. It would appear reasonable to assume that the altered perception of health is an over-all social phenomenon and that this trend does not differ significantly by sector of industry.

The third independent variable (O) has been included to show the influence of type of work on the disability incidence rate. Since some jobs are more demanding physically (e.g. in the construction sector) or psychologically than other jobs, the importance of this factor should definitely be recognised.

The economic factors (E) represent the influence of the labour market situation (unemployment) and depending on this, the employer's assessment of the profit and loss resulting from the employment of a worker. In view of downward wage rigidity, in those sectors of industry where profits show signs of deterioration, employers will be inclined to shed the least productive workers (among whom are mostly older workers with or without a handicap).⁶ In view of the possibilities offered by the DSA, as explained in the introduction, the deterioration of the labour market and of the economic situation consequently exert a positive influence on the disability incidence rate.

The legal structure (LS), (especially the criteria for granting disability awards and the factors which determine the amount of these awards), is also a determining factor in the explanation of the disability incidence rate by sector of industry although the same legal structure applies in all sectors of industry. Besides, since the disability incidence rate for men, corrected for age, is on average lower than for women, a correction for distribution according to sex (S) should be made by sector of industry.

The variables discussed above represent the most important determinants of the disability incidence rate according to sector of industry.

Disability by sector of industry in 1968

The disability incidence rate model serves as a frame of reference when analysing the factors accounting for the considerable differences in the disability incidence rates between sectors of industry in 1968. We shall analyse the extent to which the variables which explain the disability incidence rate by sector of industry have exerted an equal or a diverging degree of influence. Factors which exert the same degree of influence on the disability incidence rate cannot be held responsible for differences in disability incidence rate by sector of industry. For this reason, we shall first take a closer look at this group of factors.

As we remarked earlier, it seems reasonable to assume that the variables of perceived health (PH) and legal structure (LS) exert an equal influence on the disability incidence rate in all sectors of industry.

Analysis of the state of health (H) focuses on the average age of insured persons by sector of industry. With increasing age, health deteriorates and the

Table 2. Disability incidence rate, occupational risk and developments in employment at the end of the 1960s, for selected sectors of industry^(a)

Sector of industry	(1) Disability incidence rate 1968 (%)	(2) Disability incidence rate resulting from occupational accidents or occupational diseases 1968 (%)	(3) Employment index in 1967 (1965 = 100)	(4) Average unemployment rate 1966-1967 (%)
Construction	2.0	0.07	98	2.9
Banks and insurance companies	0.8	0.01	117	0.3
Retail trade and crafts	0.7	0.01	114	0.3
All sectors covered by the DSA	1.2	0.02	110	0.8

^(a) Sectors of industry from table 1 in which the disability incidence rate shows a deviation of more than 30 per cent from the average disability incidence rate.

Source: Annual reports of industry associations, the Disabled Persons Fund and the Joint Medical Service.

disability incidence rate increases sharply. For instance, in 1979 the number of disability awards per 100 insured persons for all persons insured under the DSA in the age groups 20-24 and 60-64 was 0.9 and 9.5 respectively. In addition, in view of the increasing risk of death which accompanies increasing years, age has been chosen as a proxy for (somatic) state of health.⁷ Elimination of differences in distribution according to sex and age by sector of industry has been achieved by standardisation of the disability incidence rates. It was found that, taking the period as a whole, on average the disability incidence rates standardised for age and sex did not differ significantly from the non-standardised disability incidence rates. From this may be drawn the important conclusion that state of health (H) and distribution according to sex (S) do not provide an explanation for the differences in disability incidence rates by sector of industry in the period under study.⁸

However, it would seem reasonable to assume that the influence of the variable (O), which represents the type of work or occupation, can vary according to sector of industry. In the absence of a more reliable indicator, the disability incidence rate as a consequence of occupational accidents and occupational diseases has been employed to test this assumption. Table 2 (column 2) shows that this indicator does vary according to sector of industry, but makes no significant contribution to the explanation of the differences in disability incidence rates.

The final independent variable is the influence of economic factors (E) on the disability incidence rate. In table 2, developments in employment and the unemployment rate by sector of industry have been employed as proxies for economic factors. It has been assumed that a declining share of profits in net output, declining employment and an increasing unemployment rate are proxy variables for a deteriorating economic situation which, other things being equal, exerts a positive influence on the disability incidence rate.⁹

Table 2 shows that the highest disability incidence rate is found in the construction sector where the economic situation has deteriorated by com-

parison with developments as a whole. Banks and insurance companies as well as the retail trade and the crafts industry show the lowest disability incidence rate, a circumstance which may be explained by favourable economic developments. The relationship between the development of economic factors (here developments in employment and the unemployment rate) and the disability incidence rate is thus clear.

Summarising, it may be concluded that on the basis of the model the differences in disability incidence rates in 1968 can be explained by the differences in types of work, but especially by diverging economic developments in the years prior to 1968.

Development of the number of disability awards by sector of industry during the period 1968 to 1979

In this section we shall deal with the diverging development presented by disability incidence rates by sector of industry. For the sake of brevity, in table 3 only those sectors of industry have been included in which the absolute increase in the disability incidence rate varies significantly from the average increase. The categories of food, beverages and tobacco as well as the metal and electrical industry show the largest absolute increase, while the category banks and insurance companies shows the smallest absolute increase. In order to explain these striking differences, we shall examine the extent to which the influence of the independent variables on the disability incidence rate has altered during the period 1968–1979.

As explained above, the disability incidence rate corrected for age and sex by sector of industry does not differ significantly from non-corrected disability incidence rates in the period under study. On the basis of this finding, we conclude that state of health (H) and sex distribution (S) do not furnish an explanation for the diverging increases of disability incidence rates.

Table 3. Increase in disability incidence rate, employment and profits in selected sectors of industry, 1968–1979^(a)

Sector of industry	(1) Absolute change of disability incidence rate (%) 1968–1979	(2) Employment index in 1978 (1968 = 100)	(3) Index of share of profits in net output in 1978 (1968 = 100)
Food, beverages and tobacco industry	1.5	90	12
Metal and electrical industry	1.4	81	43
Banks and insurance companies	0.6	136	103
All sectors covered by the DSA	0.9	114	40

^(a) Sectors of industry from table 1 in which the absolute change in the disability incidence rate in the period 1968 to 1979 differs more than 30 per cent from the increase in the average disability incidence rate.

Source: As in table 1, plus data provided by the Central Planning Office, The Hague.

This finding also applies with respect to the variables type of work (O) and legal structure (LS). We have assumed that the influence of type of work on disability incidence rates is constant. Consequently, this variable provides no explanation for the diverging increases.¹⁰ Moreover, the legal structure regarding criteria for the granting of disability awards and determination of the amount of the award has in essence remained unchanged.¹¹

The remaining independent variables are thus: influence of economic factors (E), which may differ according to the sector of industry, and the altered perception of health, which is assumed to exert an equal influence on the disability incidence rate in all sectors of industry. The influence of economic factors is clear from table 3. Both sectors of industry which show the greatest increase in disability incidence rates are characterised by a sharp decline in the share of profits in net output and, coupled with this, a clear decline in employment.¹²

By contrast with macro-economic developments, the sector of industry with the smallest increase retained high profits, while employment has expanded considerably.

Earlier studies would appear to indicate that the increase in the disability incidence rate in the public sector can only be explained by the variable perception of health.¹³ By contrast with the private sector, it is assumed that in the public sector economic factors exert no influence on the disability incidence rate. This is plausible, since in the public sector profit-making is not a goal, and consequently it is difficult to assess the costs of labour as against monetary yield.

Since the altered perception of health is an over-all social phenomenon, this variable exerts an equal influence on the disability incidence rate in both private and public sectors. From this it follows that the increase in the disability incidence rate in the public sector from 0.5 per cent in 1968 to 1.1 per cent in 1979 (+0.6%), is a proxy variable for the influence of the altered perception of health on the disability incidence rate in various sectors of industry.

On the basis of this assumption, it may be concluded that the increase in the disability incidence rate by sector of industry consists of two components. The first of these is an increase in all sectors of industry of approximately 0.6 per cent as a consequence of the altered perception of health (PH). The second component is the influence of economic factors (E) which varies considerably by sector of industry, so that the net increase in the disability incidence rate by sector of industry shows wide variations.¹⁴ For instance, the influence of economic factors on the disability incidence rate of banks and insurance companies was nil in the period under review. On the other hand, deteriorating economic developments have exerted a strongly positive influence on the disability incidence rates of the other two sectors of industry mentioned in table 3.

Summary and conclusions

In this article, with the aid of a disability incidence rate model, we have analysed which factors can explain the diverging development trends in disability awards per 100 insured persons (the disability incidence rate) by sector of industry in the Netherlands in the period 1968 to 1979. It has been established that differences in state of health by sector of industry cannot provide a suitable explanation. Neither can an explanation be found in the legal criteria for determining awards, which have not basically altered in the period under review. It has, however, been found that differences in the disability incidence rates in 1968 may be attributed to differences in type of work between the sectors of industry, as well as to the influence of diverging trends of economic development in the various sectors of industry in the period prior to 1968.

The diverging pattern of increase in disability incidence rates in the period 1968 to 1979 can be explained by an altered perception of health which leads to an over-all increase in all sectors of industry, as well as by the influence of economic developments which vary according to the sector of industry, and which finds expression in the share of profits in net output and in employment. The conclusion may thus also be drawn that the growth in the number of disabled persons may to a large degree be attributed to the deteriorating economic situation.

Consequently, the success of a policy aimed at applying a brake to the rapid growth in the number of disabled persons is dependent on economic developments to a great extent.

Notes

¹ See for example: International Labour Office, *The costs of social security*, Geneva, 1979; Victor Halberstadt and Robert Haveman (eds.), *The cross-national disability policy study*, forthcoming in 1982; and for recent data for the EEC: *Express Bulletin*, Eurostat, 30 November 1980.

² See for example: John C. Hambor, *Unemployment and disability: An econometric analysis with time series data*, Staff Paper No. 20, 1975, US Department of Health, Education and Welfare, Social Security Administration, Office of Research and Statistics; Mordechai E. Lando, Malcolm B. Coate and Ruth Kraus, "Disability benefit applications and the economy", *Social Security Bulletin*, Vol. 42, October 1979, pp. 3-9; Han Emanuel, Victor Halberstadt and Carel Petersen, "Disability policy in the Netherlands", in Halberstadt and Haveman, *op. cit.*; and Frans A. J. van den Bosch and Carel Petersen, *Hidden unemployment and disability*, Discussion Papers Series 7913/G, Erasmus University Rotterdam, Institute for Economic Research, Rotterdam 1979.

³ See further: Social Security Administration, US Department of Health and Human Services, *Social security programs throughout the world 1979*, Washington, 1980; Han Emanuel, "Factors in the growth of the number of disability beneficiaries in the Netherlands", *International Social Security Review*, Vol. 33, No. 1, 1980, pp. 41-60; and Emanuel, Halberstadt and Petersen, *op. cit.*

⁴ For an estimate of numbers in the Netherlands, see: van den Bosch and Petersen, *op. cit.*

⁵ See for instance: Bernhard M. S. van Praag and Victor Halberstadt, "Towards an economic theory of non-employability: A first approach", in K. W. Roskamp (ed.), *Public choice and public finance*, Proceedings of the 34th Congress of the International Institute of Public Finance.

⁶ For a further explanation, see: van den Bosch and Petersen, *op. cit.*

⁷ For a similar approach, see: N. A. Doherty "National insurance and absence from work", *The Economic Journal*, Vol. 89, March 1979, pp. 50-65; and Donald O. Parsons, "The Decline in Male Labor Participation", *Journal of Political Economy*, Vol. 88, February 1980, pp. 117-134.

⁸ For instance, the difference between disability incidence rates standardised for age and sex and non-standardised rates is approximately 4 per cent.

⁹ Data are available regarding the share of profits in net output before 1968, but these have not been employed in table 2, partly on account of the difficulty of making comparisons with data after 1968.

¹⁰ There are indications that labour has become physically and psychologically more demanding and also indications to the contrary. In the absence of an objective and reliable criterion, it has consequently been assumed that the demands which go hand in hand with a certain type of job have remained constant for all sectors of industry in the period under review.

¹¹ In so far as the interpretation of certain articles (particularly those concerning the determination of degree of disability) has been extended, this implies an equal influence on the disability incidence rate for all classes of industry.

¹² Unlike table 2, developments in unemployment have not been used here as an indicator. The reason is that officially registered unemployment is no longer a reliable indicator for developments in unemployment, since if the employee has a choice between unemployment and a disability benefit, the latter is preferred. This means that the actual development of unemployment is underestimated.

¹³ See van den Bosch and Petersen, *op. cit.*, and F. A. J. van den Bosch and C. Petersen, "Disability as economic concept", paper presented at the Arne Ryde Symposium on the Economics of Social Insurance, 27–28 August 1981, at the University of Lund, Sweden. Proceedings of the conference are forthcoming.

¹⁴ In "An explanation of the growth of social security disability transfers" (paper presented at the Symposium on Some Economic Aspects of Disability, held on 27 October 1971, at Erasmus University Rotterdam), the authors tested the model with the aid of regression analysis. A combination of cross-section and time-series analysis was used, both in weighted and unweighted form. The number of observations was 176. On average, the results appeared to be statistically significant. The (adjusted) correlation coefficient ranged from 0.87 up to 0.92, depending on the specification.