

Applying Concepts from Mill and Sen to the Standard of Living for Disabled People

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Abstract

An important policy issue relates to how governments make expenditure decisions (income transfers or in-kind goods or services) to assist people subjected to various levels of disability. This is an issue often discussed by relatives/friends/carers of people with disability: such discussions are often characterised by anger at government decisions of one kind or another. Although this policy issue is of substantive economic importance, there is no theoretical and/or empirical literature that addresses the problem. This paper is concerned with applying some economic concepts associated with the nineteenth century English philosopher/economist, John Stuart Mill, and the 1998 Nobel Laureate in Economics, Amartya Sen. Mill's general conception of how government should behave in treating citizens (the general notion of equality) has subsequently been spelt out in detail in the public finance literature on principles of taxation, viz. fiscal equity. More specifically, the relevant concepts are those of horizontal equity and vertical equity, where the former value judgement involves "the equal treatment of equals" and the latter "the unequal treatment of unequals". These principles are combined with Sen's recent discussion of the issue of "conversion handicap", in his general framework of capabilities and/or functionings as the central concepts to be considered in any discussion of the standard of living. This paper, while providing an immanent critique of random and/or arbitrary distribution systems of assistance to handicapped people, indicates the key variables to which governments should direct their attention to achieve both horizontal and vertical equity in the provision of assistance to disabled citizens.

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Introduction

In a recent paper Amartya Sen, Nobel Laureate in Economic Science for 1998, directed attention to the issue of societal justice and disabled citizens (Sen, 2004). Essentially, his argument was that various theories of justice have neglected the issue of “justice to the disabled”, and that this neglect “had tended to bias practical policies in the direction of inaction, and has even contributed to ... the failure to take a responsible view of the social obligation to the disabled” (p.1). Sen’s objective in his paper is to put “fairness to people in divergent circumstances” in a central position on the policy agenda.

He begins by making a distinction between “two types of handicap that tend to go with disability”, *viz.* the “earnings handicap” and the “conversion handicap”. Thus disability can impose a double disadvantage which is referred to as a “coupling of disadvantages” (Sen, 1999, p.88). This paper is concerned only with the latter concept which arises from the fact that “to do the same things as an able-bodied person, a person with... disability may need more income than the able-bodied person.” That is to say, a given income does not “go as far”, given additional expenditures on paid carers, wheelchairs, ramps etc. “The conversion handicap refers to the disadvantage that a disabled person has in converting money into good living” (p.3). Elsewhere Sen (1992, 1999) has argued that there are a number of differences between individuals which involve a conversion handicap as well as personal heterogeneities such as mental or physical differences, *viz.* environmental diversity, economic setting, social norms and intra-household distribution.

This paper is concerned with an analysis of the implications of the “conversion handicap” for the income support component of disability policy for people with zero earnings from labour markets. Thus we are concerned with the severely and profoundly disabled. In other words we do not address how government should treat disabled persons with non-zero earnings. Also it is recognised that there are numerous definitions of disability and/or handicap as discussed, *inter alia*, by Annison, Jenkinson, Sparrow and Bethune (1996), Cocks (1998) and Hahn (2004).

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Furthermore, we recognise also that different conceptions and interests underlie these terminological disputes (Oliver, 1990). In this paper we will define disability as a reduction in health capital such that a person's daily activities, whether market-based or otherwise, are reduced. Handicap is manifested in two functional ways, *viz.* via decreased earnings in a labour market and the need for additional income for a disabled person to have the same standard of living as a non-disabled person. Note also that the concern here is with disability *per se* without any reference to the cause or medical condition underlying the disability. For an indication of the relative importance of different causes of disability, ranked by years of life disabled, see Mathers, Vos and Stevenson (1999, Annex Table G).

The economic literature on disability, as with any specific research interest, can be categorised into empirical or descriptive studies, and normative or prescriptive work: economic analysis can describe the economic world or prescribe for it. Although descriptive economics can provide an important component or foundation for normative analysis, work with a focus on policy generally fits within the second category. In this context it is useful to recall Mishan's (1981) statement of the role of normative economics: "normative or welfare economics can be defined as the study of criteria for ranking alternative economic situations on the scale of better or worse." These distinctions can be illustrated by considering the economic literature on disability, e.g. empirical or positive analyses which document the extent to which earnings (and other labour market outcomes) are lower for disabled compared to non-disabled people. There are numerous studies that describe the economic world of disability: these will be briefly considered below. However, some policy-oriented work in disability policy is of a normative nature. For Haveman and Wolfe, disability policy, in general, can be conceived of as having three foci, *viz.* income support, rehabilitation, and prevention. This trichotomy is elaborated in several places (Haveman and Wolfe, 2000, p.1012, p.1021, p.1041). It is relevant to note that disability policy is fraught with difficulties: Haveman and Wolfe (2000, p.1012, n.33) write that "all countries struggle with the difficulties [associated with] work disincentives and public costs" applicable to income

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support. It is interesting to observe that elsewhere (p.1041) they suggest that the difficulties in this area of policy may arise from poor information: “we do not know how to design successful sets of programs to simultaneously (*sic*) achieve all of the three objectives.”

The Australian economic literature on disability policy is quite small, and is confined to empirical analyses. The first study was that by Bradbury, Norris and Abello (2001) which documented the relationship between severe disabilities (for Australia and Victoria) and various socio-economic variables (age, education, income etc). Subsequently Brazenor (2002) estimated earning equations for males and females, using demographic, economic and disability variables. He finds that disability has a negative effect on earnings, but that the effect is non-uniform across disability types and gender (for example, male earnings of the disabled are 83 percent of those without disabilities and the comparable figure for females is 76 percent): A more detailed study is Wilkins (2004) who has analysed the effect of disability on four labour market outcomes, *viz.* labour force non-participation, unemployment, part-time and full-time employment. The data on disability enable disaggregation by severity, type of impairment and age of disability onset. It should be emphasised that these studies are concerned with all disability, irrespective of the reason for disablement.

There are also several studies that have analysed only a particular source of disability, *viz.* mental illness. See Flateau, Galea and Petridis (2000) and Butterworth, Crosier and Rodgers (2004).

All these studies have a common concern with **describing** the effect of disability on some labour force outcome or other. As such they reflect a large North American literature, conceiving of disability in an analogous framework to race and gender-type discrimination. See, for example, Stern (1989), Baldwin and Johnson (1994), Hum and Simpson (1996) and Ettner (2000).

The only other economic studies of disability in Australia are those by Cai, who has undertaken various analyses of the Disability Support Pension, a major income-support program for disabled people in Australia. See for example, Cai (2003), Cai and Gregory (2003, 2004).

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This paper is not an empirical analysis of some aspects of disability: rather it is concerned with drawing out the implications of what the content of the income-support component of disability policy should be. Thus this paper is unambiguously normative in content/procedures.

The structure of the paper is as follows. The next section introduces some important concepts such as Sen's conceptions of functionings and capabilities, the value judgements about justice in taxation, and an important framework for relating the standard of living, income and disability. The following section is then concerned with an elaboration of the content of a policy that would achieve equity for people subject to disability. The final section provides a brief conclusion.

Some concepts

Functionings and capabilities

In 2004, at the World Bank in Washington DC, Amartya Sen presented a paper entitled *Disability and Justice* (Sen, 2004). His conceptions of disability can be traced to earlier works concerned with the standard of living, e.g. (Sen, 1984, 1985, 1987). His point of departure from the dominant approach in economics is that there is more to "the standard of living" than comparing one basket of commodities with another basket, in a utility or opulence framework. Rather his concern is with "the *actual living* that people manage to achieve" (Sen, 1999, p.73). The emphasis is thus taken away from what people consume or their incomes. The concepts of capabilities and functionings are introduced in these early works. Functionings are conceived of as achievements, what an individual manages to do or to be, for example, being in good health, being sheltered from the elements, moving freely, being employed, being educated. In fact Sen takes the view that "... the well-being of a person is best seen as an index of the person's functionings." This is not conceptually different from Aristotle's (1953, p.29) statement of "living well or faring well". On the other hand, Sen's "capabilities" refer to "the alternative combinations of functionings that are feasible for [people] to achieve" (Sen, 1999, p.75). In other words, capability has a dimension of freedom: "the substantive freedom to achieve alternative functioning combinations or ... the

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freedom to achieve various lifestyles.” Sen often quotes Adam Smith in this context by referring to “the ability to appear in publick (*sic*) without shame”. Smith writes as follows: “[a]creditable day-labourer would be ashamed to appear in publick without a linen shirt ... or leather shoes” (1776, p.870). Sen’s point is that the concept of “functionings” has a long history in the development of economic theory. In fact Sen (1999, p.13) argues that the issue was discussed earlier in a Sanskrit text *Brihadaranyaka Upanishad* in the eighth century BC, as well as by Aristotle in the *Nicomachean Ethics*. To quote the latter: “wealth obviously is not the good we seek, for the sole purpose it serves is to provide the means of getting something else” Aristotle (1953, p.31).

This conception by Sen of the relationships between commodities, capabilities, functionings and utility can be illustrated algebraically (Sen, 1985, pp.7-10) and geometrically (Muellbauer,1987, pp.39-41).

Justice and/or equity

Attention is now directed to a discussion of justice and the related concept of equality. Classic statements on these issues come from Mill, which are but a manifestation of his advocacy of utilitarianism in general. Although utilitarianism is often discussed in two different contexts, i.e. as a decision rule for personal morality and as a normative theory of public choice, it is only the latter that concerns us here. Despite the utilitarian emphasis in Mill, some reflection indicates that utilitarianism has no monopoly on a concern for equality (Williams,1962). For example, the much-discussed difference principle, or more generally the “justice as fairness” theory associated with Rawls (Rawls, 1972) also employs the concept of equality. In this context it is relevant to observe that Rawls’s *The Theory of Justice* is an application of social contract theory, associated with contractarian theorists such as Locke, Rousseau and Kant.

The reason we turn now to equality is because it is a political value judgement that Sen (1992) regards as important, but the question is as follows: “what geometric space is the most ethically appropriate one in which to apply the equality concept?” Not surprisingly Sen’s

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suggestion is “capabilities space”, although Nussbaum (2003) criticises Sen for not formally specifying a list of capabilities that are necessary for social justice.

In economics, the concept of equality has been analysed at length in the normative theory of taxation in the public finance literature. The genesis of “justice” in taxation, according to Musgrave (1959), can be found in essays by Guicciardini and Bodin in the sixteenth century. People who argued for justice in taxation included priests, humanists, utopians, socialists (e.g. Adolph Wagner) and Manchester Liberals such as John Stuart Mill. For Mill it was clear that justice or ethics required that all people should be treated equally under the law: for Mill the essence of justice is “a right residing in an individual” (Mill, 1861, p.73). But equality was a central feature of justice as it (equality) “enters into not only the conception but also the practice of justice” and “constitutes its essence” (Mill, 1861, p.57).

Although it can be argued that in Europe, historically, equality first involved the fall of legal privilege, as described by (say) Tawney (1952, p.91), there was a long-standing discussion of “just taxation”. The classic statement on this is from Mill (1848): all people are to be treated equally under the law. He begins Book V of the *Principles of Political Economy*... with a discussion of “The Functions of Government in General” and then moves immediately to the “General Principles of Taxation”. The chapter begins approvingly with Smith’s (1776) oft-quoted four maxims of taxation, the first being that “equality of taxation” is a central value judgement. Mill then asks the following question: “For what reason ought equality to be the rule in matters of taxation?” His answer is unequivocal:

For the reason that it [equality] ought to be so in all affairs of government. As a government ought to make no distinction of persons or classes ..., whatever sacrifices it requires from them should be made to bear as nearly as possible with the same pressure upon all, which ... is the mode by which least sacrifice is occasioned on the whole (p.155).

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Although these concepts (equality etc) had various origins in European intellectual traditions (the Renaissance, the Enlightenment, utopian and socialist thought, etc), Mill's stature was such as to have these notions seem to be the sole province of English Utilitarian thought: as a result the broad outline (and detail) of taxation theory was sketched by English utilitarians such as Edgeworth, Marshall, Pigou and Dalton.

Central to "equality of taxation" are the dual criteria of "horizontal equity" and "vertical equity". The former value judgement requires that people in equal economic positions should be treated equally, and the latter value judgement is that people in unequal economic positions should be treated unequally. Subsequent to the early developments, Buchanan (1950) reformulated the two value judgements in terms of the "fiscal residuum" (i.e. the difference between taxation paid and benefits received from government expenditure), and pointed to the difficulties associated with a multi-level system of government. Needless to say, one has to address the usual conceptual problems of specifying, the measure of sacrifice, the index of equality (or the tax base), the tax-paying unit etc.

The argument here is that these two value judgements can be applied in making decisions as to the distribution of transfers to people subject to disability. The reformulation of horizontal equity applied here is that people in equal disability positions should be treated equally in terms of assistance, whether the income support is in money or in-kind. In like manner, the vertical equity value judgement can be stated as follows: people in unequal disability positions should be treated unequally in terms of assistance, whether income support is in money or in-kind.

However, it should not be thought that, prior to Sen, there was no economic literature on the standard of living for disabled people.

The prior literature on disability and the standard of living

There is a small economic literature that is concerned with measuring the extra costs of disability. Berthoud (1991) reviews various early (and simple) attempts at quantification, and outlines how three different (and relevant) phenomena (the standard of living, income and disability) can be

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conceptually related. This conceptual framework has been outlined in other places, e.g. Berthoud, Lakey and McKay (1993). See Fig.1 which makes clear that the standard of living is not synonymous with income.

(Fig. 1 – here)

If a simple assumption is made that disability is a dichotomous variable, then two lines in Fig.1 apply, one for the disabled and the other for the non-disabled. However, if disability is regarded as a continuous variable, multiple lines for the disabled would exist in Fig.1. The non-disabled line in Fig.1 indicates that a person's standard of living rises with his/her income. However, for the disabled, at all income levels, the income-standard of living relationship will lie below that for a non-disabled person. Thus any income produces a lower standard of living for the disabled, in comparison with the non-disabled for any given income. For the income level Y (in Fig.1), $S_{N-d} > S_D$, where S_{N-d} and S_D are the standards of living of non-disabled and disabled persons at Y respectively. This outcome can be understood in terms of Sen's concept of "the conversion handicap".

There is, however, an alternative way of considering Fig.1. We now ask the following question: "what level of income is necessary to give the disabled person the same standard of living as a non-disabled person?" In the particular case in Fig.1, the answer is given by finding the point on the disabled person's income-standard of living curve, where the standard of living (S_{N-d}) is the same for both people. Thus the income level Y_1 is necessary to achieve this outcome. Thus YY_1 is the income needed to compensate the person for the disability. YY_1 can be conceived of as the "cost of disability", i.e. the extra income needed by a disabled person to produce an equivalent standard of living to the non-disabled.

It should be recognised that Fig.1 involves some simplifications. First, it indicates that extra costs/ expenditure are a fixed amount irrespective of income level. Empirically, such an outcome is but one case: one needs to consider also the cases of proportionality and diminishing

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returns to income, where the latter involves non-linearity. These other cases are not considered here.

More recently, a number of studies have produced some empirical estimates of the costs associated with disability, *viz.* Jones and O'Donnell (1995), Kuklys (2004) and Zaidi and Burchardt (2005). It is relevant to observe that to take account of such differences is not unique: there is a long-standing practice in poverty/income distribution studies to take account of differences in household size and composition, thus calculating income levels that recognise family equivalence scales. (In this context dependents are analogous to disability). There are numerous such scales, e.g. Organisation for Economic Co-operation and Development (1982), and those reviewed in Buhmann, Rainwater, Schmaus and Smeeding (1988) and Browning (1992).

Attention is now directed to stating distribution schemes which meet the dual equity criteria discussed above.

Some equitable distribution schemes for disabled people

Let TO_{BUR} be the total outlay of the disability bureaucracy. This measure might be commonly thought of as “the department’s budget” or “the budget of the bureaucracy”, as allocated in the overall “government budget” in a parliament. Not all of TO_{BUR} is available for allocation or distribution to services for disabled persons: any bureaucracy will incur administrative costs (AC_{BUR}) associated with operating the bureaucracy. Thus the funds available for allocation to disabled people are less than TO_{BUR} . Thus we may write

$$Exp_{DIS} = TO_{BUR} - AC_{BUR} \tag{1}$$

where Exp_{DIS} represents the funds available for distribution to people with disabilities.

Thus we can also write

$$Exp_{DIS} = G_{DIS}^1 + G_{DIS}^2 + \dots + G_{DIS}^n \tag{2}$$

where G_{DIS}^1, \dots is the disability grant to person 1, 2, ..., n.

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Let us consider a distribution of grants to eight persons (A,B,...,H) as indicated in Figure 2. The line \overline{DD} indicates that disability is bounded at a particular level (\overline{D}), i.e. disability is not open-ended. For the moment ignore all notation on the Figure other than the eight points for the eight persons. Disability is measured (cardinally) on the X-axis and grants (measured in \$s) are on the Y-axis. As indicated, there are two persons at each of the four disability levels D_1 , D_2 , D_3 and D_4 . Person A receives a grant of \$10 000 and person B a grant of \$2 500, despite having the **same** level of disability D_1 . Similarly persons C and D, having the same level of disability, D_2 , receive grants of \$12 500 and \$2 500 respectively. Similar comments can be made of the grants to the other four persons, E, F, G and H. These comments are based on the comparisons between people with equal levels of disability. This distribution of grants is summarised in Table 1, columns (i), (ii), (iii) and (iv).

(Figs 2, 3, 4 and 5 – here)

(Table 1 – here)

From the previous discussion, we can say that the distribution of grants to persons A and B is horizontally inequitable, in that it violates the equity norm that people with equal disability should be treated equally in terms of grants. Similar comments can be made about the distribution to C and D, E and F, and G and H. Furthermore, on the basis of comparisons of equal grants to people with **different** levels of disability (say B and D with equal grants of \$2 500, or A and H with equal grants of \$10 000, or C and F with equal grants of \$12 500, or E and G with equal grants of \$25 000) we can also say that this distribution violates the notion of vertical equity. This is because people in unequal positions of disability are being treated equally in terms of grants. Given that this distribution of grants violates both horizontal and vertical equity, it is not unreasonable to describe this distribution of grants as “arbitrary/random”, as in the title of Fig.2, and the heading of column (iv) in Table 1.

It might be argued that it is easy to criticise this distribution, but what is an alternative distribution that meets the dual equity criteria, without exceeding the assistance budget (Exp_{DIS})?

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Such a distribution is indicated in Figure 2 by the disability-expenditure relationship indicated by the heavy line segments $OD_0G-H(Lin)$. Examination of this relationship indicates that both A and B (with the same disability level D_1) receive equal grants of \$5 000, and persons C and D (with equal disability of D_2) receive equal grants of \$10 500. Similar comments can be made of persons E and F, and G and H. This alternative distribution is indicated by the four points A-B(Lin), C-D(Lin), E-F(Lin) and G-H(Lin) in Fig.2. This distribution, summarised in columns (i), (ii), (iii) and (v) of Table 1, thus meets the criterion of horizontal equity.

Some reflection also indicates that this distribution of grants also meets the value judgement of vertical equity. On the segment $D_0G-H(Lin)$ of the disability-expenditure relationship each point (representing a different level of disability) involves a different, **and rising**, grant level for the disability. Thus it meets the criterion of vertical equity.

At a general level, we may write the following algebraic expression for the disability-grant relationship in Fig.2:

$$G_{DIS} = \alpha_1 D \quad (D > D_0) \quad (3)$$

where G_{DIS} is the government-provided grant for disability,

D is the level of disability, and

α_1 is the slope of the segment $D_0G-H(Lin)$ of the disability-grant relationship.

Note that the constraint $(D > D_0)$ indicates that when the level of disability is less than D_0 , the grant for disability is zero. This is a manifestation of the fact that D_0 is the level of disability at which disability is regarded as being policy-relevant. When disability is less than D_0 , disability is regarded as so small that it is ignored in terms of assistance. Thus D_0 can be regarded as the policy-relevant “threshold” level of disability. Put otherwise $D_0\bar{D}$ is the policy-relevant region of disability. Of course, D_0 may be determined to be the origin in Fig.2.

Several points about the alternative distribution of grants A-B(Lin), C-D(Lin), E-F(Lin) and G-H(Lin) are relevant. First, the total budget is exactly the same as for the arbitrary/random distribution of grants represented by the separate points A, B, ..., H. Second, the general statement

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of vertical equity (that people in different positions should be treated unequally) indicates nothing about the degree of unequal treatment: the linear relationship is but one of a number of relationships that is consistent with the vertical equity value judgement. Third, a movement from the arbitrary/random distribution to the equitable distribution in Fig.2 may not be without some administrative/political pain, in that such a move creates “winners” and “losers”: the sound and fury of the losers may well exceed the approbation of the winners. Fourth, to devise such a distribution scheme to reflect equity (as defined) requires the decision-makers (bureaucrats and/or politicians) to specify only two variables, *viz.* D_0 and α_1 , assuming that the total budget has been exogenously determined.

The previous comment about the linear equitable distribution being but one of a number of distributions that meet the dual equity value judgements will now be considered. Fig.3 presents the same arbitrary/random distribution of grants to the eight persons A, B,..., H as in Fig.2, and columns (i), (ii) and (iii) of Table 1. As before, this distribution of grants is subject to the criticism that it fails both the horizontal and vertical equity criteria.

Consider now the distribution A-B(Non-Lin), C-D(Non-Lin), E-F(Non-Lin) and G-H(Non-Lin), points which lie on the (non-linear) segment of the disability-grant relationship $OD_0G-H(Non-Lin)$. Consider the point A-B(Non-Lin): this point meets the horizontal equity criterion in that persons A and B (who have the same, D_1 , level of disability) receive equal grants of \$5 000 each. In like manner, the other points C-D(Non-Lin), E-F(Non-Lin) and G-H(Non-Lin), relating to the different levels of disability D_2 , D_3 and D_4 , also meet the horizontal equity value judgement. Note that this distribution also meets the vertical equity value judgement in that people in unequal (disability) positions are treated unequally in terms of grants.

At a general level we may describe this grant-distribution scheme as follows:

$$G = \alpha_1 D + \alpha_2 D^2 \quad (D > D_0) \quad (4)$$

Equation (4) is, of course, a quadratic.

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The non-linear equitable scheme in Fig.3 differs from the linear scheme in Fig.2 in terms of concentrating the grants on the more disabled people, and allocating smaller grants to the less disabled individuals, such as A and B. As before, decision-makers must determine the value of D_0 (when disability is less than D_0 , disability is so low that there is “no case” for government grants for assistance), and the rate at which grants increase as disability rises, i.e. α_1 and α_2 .

It is useful now to compare the arbitrary/random distribution of grants (A,B,..., H) to an **administratively simple** distribution of grants. This alternative system involves decision-makers determining only the minimum policy-relevant level of disability, i.e. D_0 , and, with knowledge of the number of people with disability exceeding D_0 and total funds available, providing equal per capita grants to individuals with disability levels exceeding D_0 . As indicated in column (vii) of Table 1, each disabled person would receive a grant of \$15 000. See Fig.4.

This distribution scheme, involving a discrete split of the population into the policy-relevant disabled and the non policy-relevant disabled, is indicated in Fig.4 by the disability-grant relationship $OD_0X\bar{G}\bar{H}$. It is clear that grants equal zero up to disability level D_0 , and are then constant (at \$15 000) for all disability levels exceeding D_0 . This distribution scheme meets the horizontal equity value judgement that people with the same level of disability receive the same grant. Consider persons A and B with D_1 disability level. Under the PC-D scheme, both A and B would be at the point $\bar{A}\bar{B}$, receiving \$15 000 each. In like manner, the points $\bar{C}\bar{D}$, $\bar{E}\bar{F}$, $\bar{G}\bar{H}$ meet the horizontal equity value judgement. However this scheme does not meet the vertical equity value judgement, as people with unequal disability receive equal grants.

At a general level this distribution scheme can be described as follows:

$$G = \beta_1 H$$

$$\text{where } H = \begin{cases} 1, D \geq D_0 \\ 0, D < D_0 \end{cases} \quad (5)$$

The individual (average) level of grant, β_1 , is determined as follows:

$$\beta_1 = \text{Exp}_{\text{DIS}} \div n \quad (6)$$

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where n is the number of people with a policy-relevant disability: β_1 can be described as the (equal) per capita grant for disability, or the mean grant for disabled people.

Given the simplicity of this distribution scheme, the administrative costs (AC_{BUR}) of running this system (a few administrators with an abacus), would fall, *ceteris paribus*, thus making more funds available for distribution to people with a disability. Let AC_{BUR}^0 be the new (lower) administrative costs. Thus, equation (1) can now be re-written as follows:

$$Exp_{DIS}^0 = TO_{BUR} - AC_{BUR}^0 \quad (1a)$$

where $AC_{BUR}^0 < AC_{BUR}$. Hence, $Exp_{BUR}^0 > Exp_{DIS}$. Thus, $\beta_0 > \beta_1$,

where β_0 is the new (higher) level of average grant to disabled people.

Fig.5 depicts this case where the two levels of administrative costs (AC_{BUR} and AC_{BUR}^0) produce a situation in which there are different levels of funds available for distribution to disabled people. In the first case the average grant is β_1 , and after the administrative costs fall, the average grant rises to β_0 . The new disability-grant relationship is indicated by the dotted relationship in Fig.5. Thus there are two conclusions that can be drawn from this analysis. First, this increase in the average grant does nothing to alter the equity characteristics of the discrete distribution scheme: the new relationship meets the horizontal equity value judgement but still violates the vertical equity criterion. Second, it is clear that there is a trade-off between administrative costs (and simplicity) and obtaining an equitable distribution of grants to the disabled.

Conclusion

This paper has not addressed all issues that are relevant to the application of economics to disability. More specifically, no contribution has been made to the positive or descriptive economic analysis of disability: rather the focus has been on a particular normative aspect of disability policy when earnings are zero. In addition, issues arising when earnings are positive

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have not been addressed. In fact, the motivation for this paper has been the recent paper by Sen entitled *Disability and Justice*.

Taking Sen's distinction between an "earnings handicap" and "conversion handicap" as a point of departure, we have applied the twin notions of horizontal and vertical equity in the normative theory of just taxation to the problem of specifying the distribution of grants to people with varying levels of disability. An important statement of justice in taxation is from the nineteenth century utilitarian John Stewart Mill. Mill's notions were subsequently developed in the public finance literature in a utilitarian framework. However, as now formulated, the twin value judgements of fiscal equity are independent of any particular school of thought.

The conversion handicap refers to the situation in which the standard of living for people subject to disability (obtained from a given level of income) is less than that obtained from the same level of income by non-disabled people. It is shown here that to implement schemes of financial assistance that recognise this handicap, as well as varying levels of disability, requires that decision makers specify two parameters. The first is the policy-relevant level of disability at which financial assistance is first made, and the second is the rate at which financial assistance rises as disability increases.

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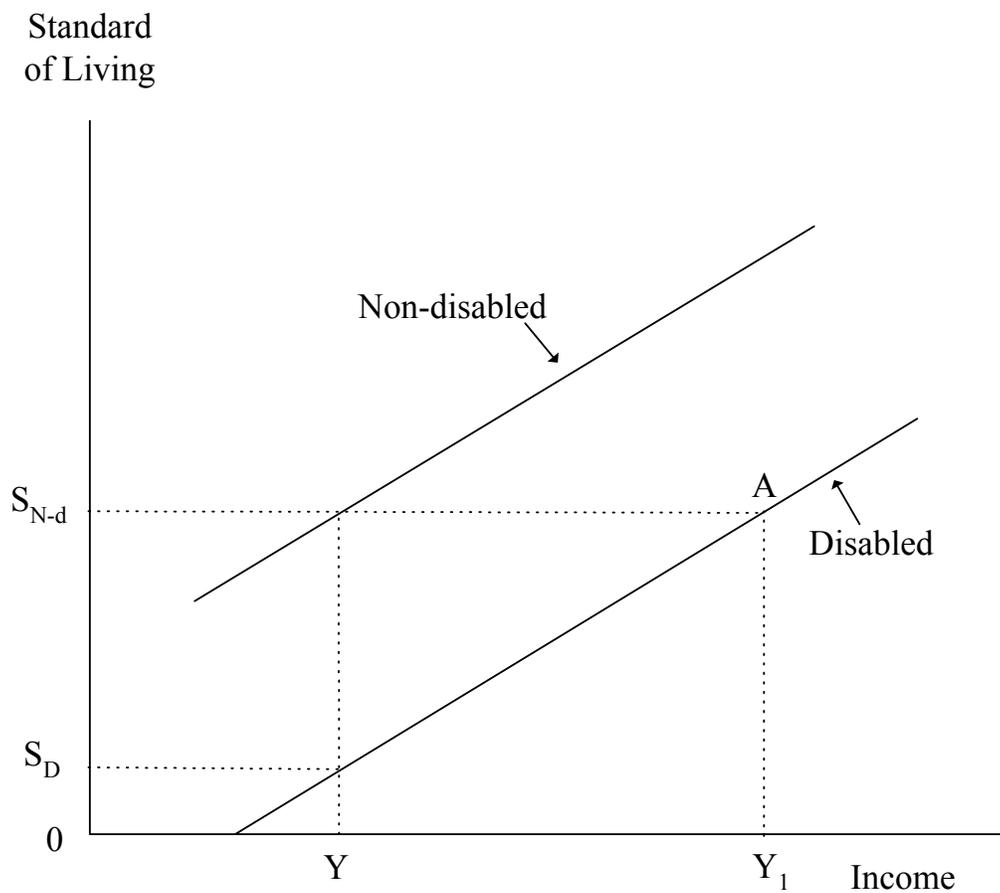


FIGURE 1. The relationship between income, standard of living and disability

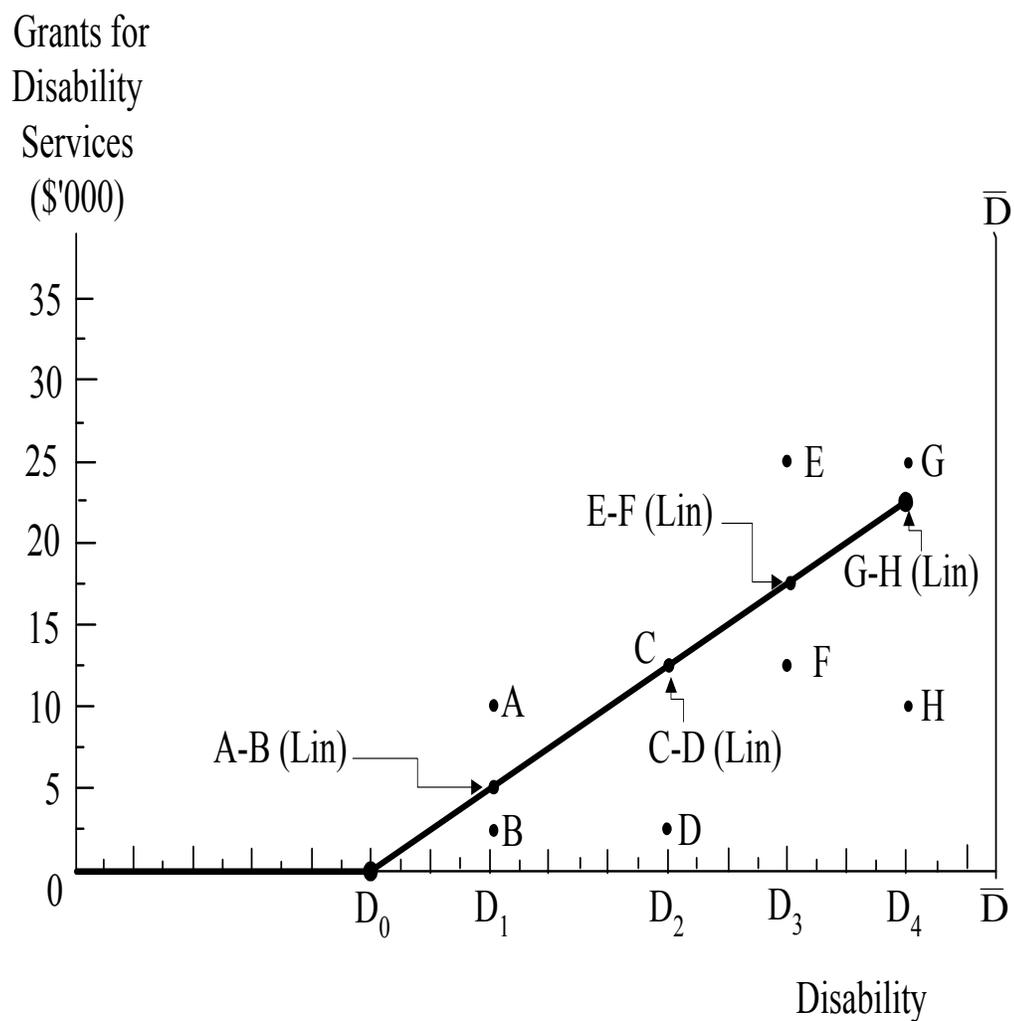


FIGURE 2. Two distributions of grants to individuals, one being arbitrary or random, the other exhibiting a linear disability-grant relationship

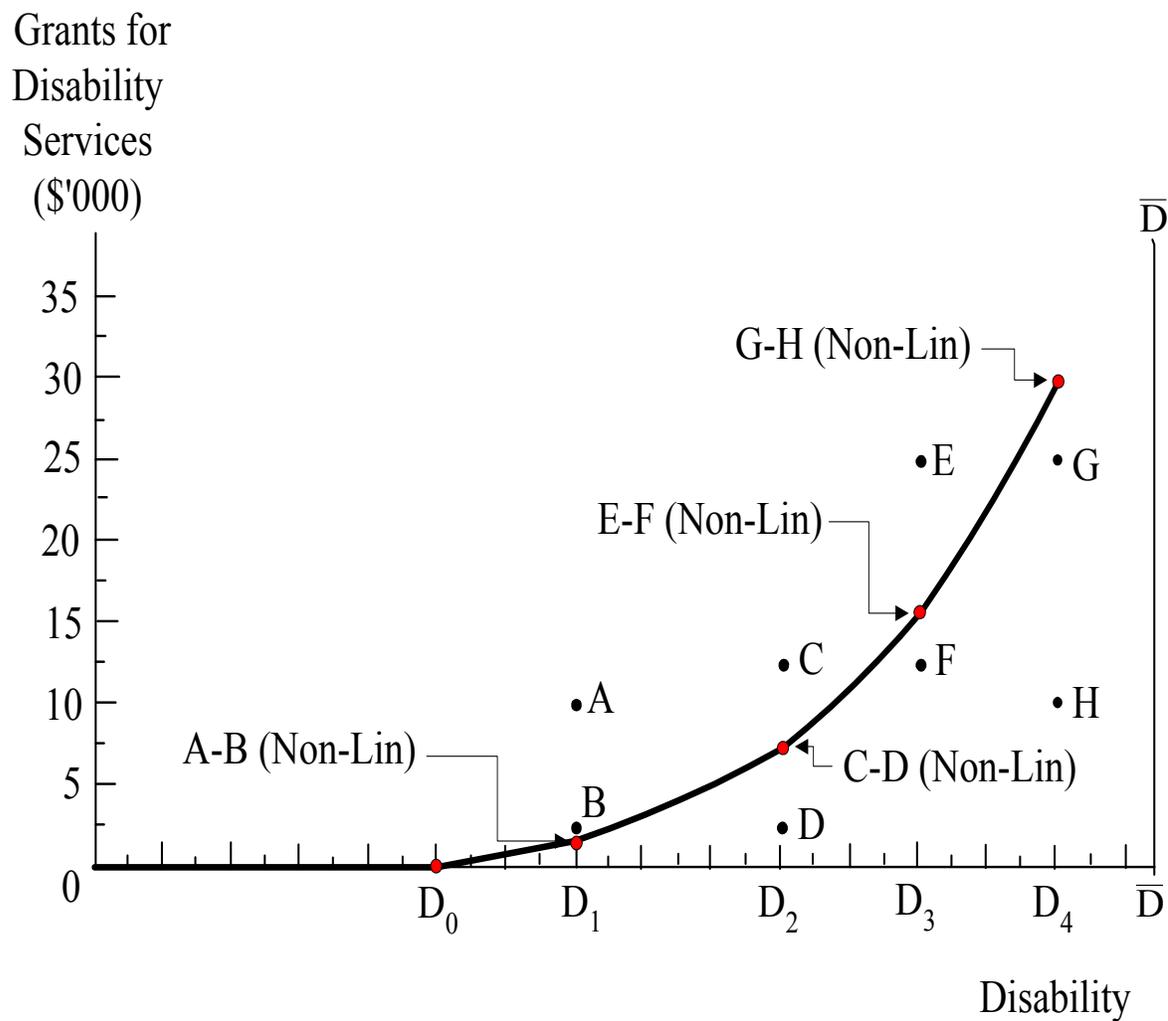


FIGURE 3. Two distributions of grants to individuals, one being arbitrary or random, the other exhibiting a non-linear disability-grant relationship

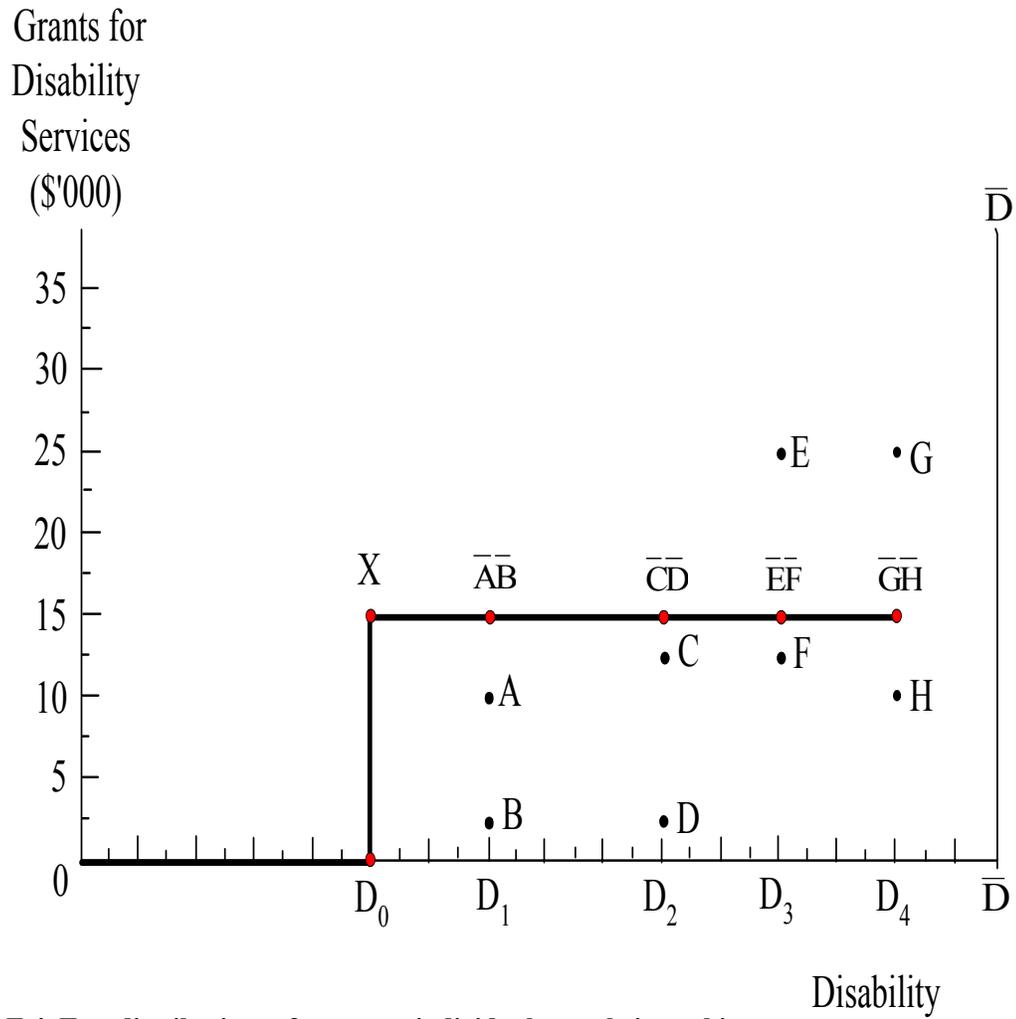


FIGURE 4. Two distributions of grants to individuals, one being arbitrary or random, the other exhibiting a discrete disability-grant relationship

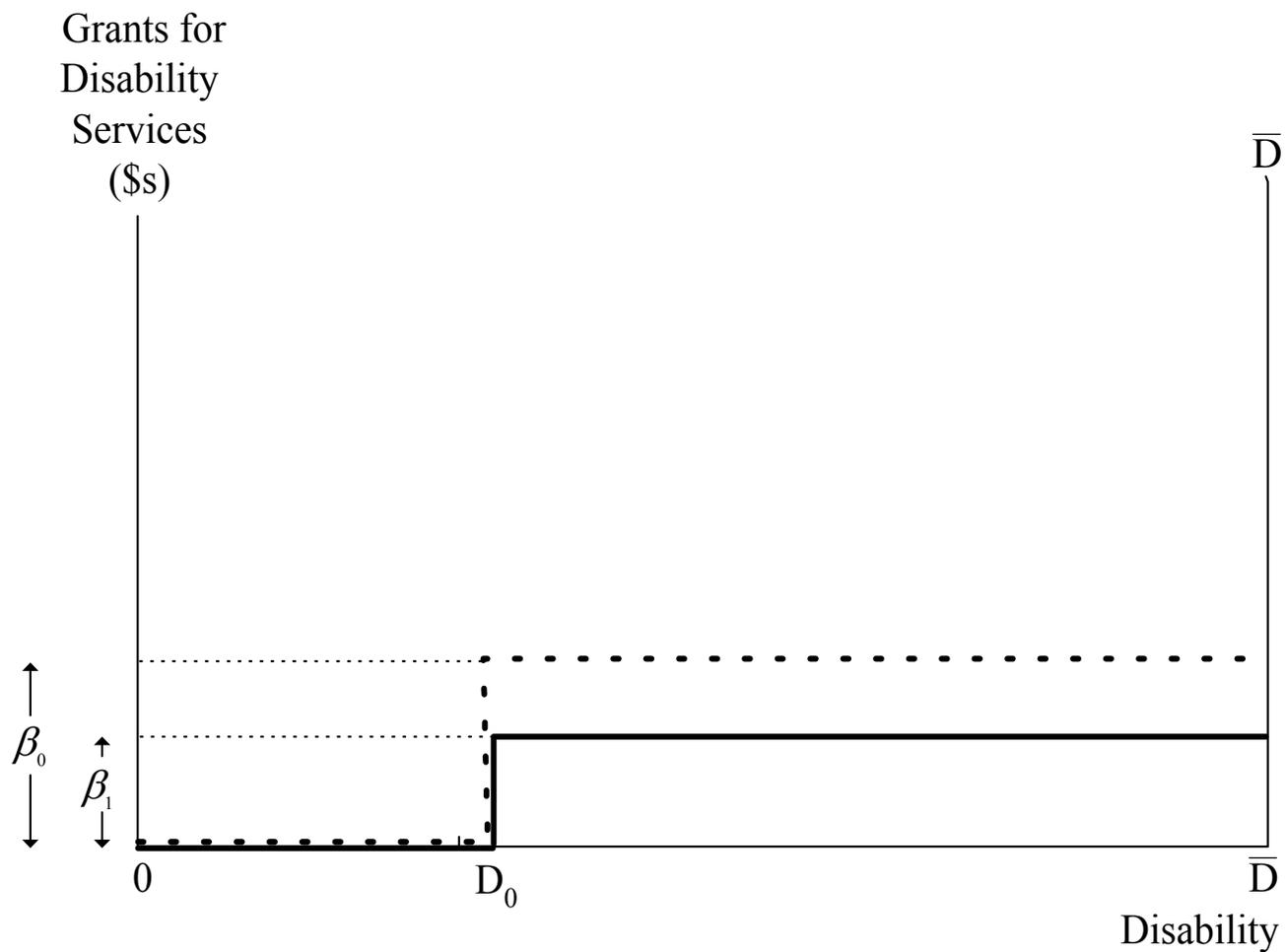


FIGURE 5. Two discrete disability-grant relationship with different bureaucratic/administrative costs

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Table 1. Outcomes of different distribution schemes for government grants to an hypothetical eight-person group with disability

Disability Level	Number of Persons	Identity of Persons	Distribution of Grants, Scheme (A/R)	Distribution of Grants, Scheme E (Linear)	Distribution of Grants, Scheme E (Non-Linear)	Distribution of Grants, Scheme (PC-D)
(i)	(ii)	(iii)	(iv) (\$)	(v) (\$)	(vi) (\$)	(vii) (\$)
D ₁	2	A , B	10 000 , 2 500	5 000 , 5 000	1 000 , 1 000	15 000 , 15 000
D ₂	2	C , D	12 500 , 2 500	10 500 , 10 500	8 000 , 8 000	15 000 , 15 000
D ₃	2	E , F	25 000 , 12 500	17 500 , 17 500	16 000 , 16 000	15 000 , 15 000
D ₄	2	G , H	25 000 , 10 000	22 500 , 22 500	35 000 , 35 000	15 000 , 15 000
	$\Sigma = 8$		$\Sigma = 120\ 000$	$\Sigma = 120\ 000$	$\Sigma = 120\ 000$	$\Sigma = 120\ 000$

Note: The notation A/R is suggestive of an arbitrary or random distribution of grants, E is suggestive of an equitable distribution of grants, and PC-D refers to an equal per capita scheme that recognises only a discrete difference between ‘the disabled’ at a threshold level of disability. Put otherwise, disability is regarded as a dichotomous variable rather than a continuous variable.