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Progressivity, horizontal equity and reranking in health care finance: a decomposition analysis for the Netherlands

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Abstract

This paper employs the method of Aronson et al. (1994) to decompose the redistributive effect of the Dutch health care financing system into three components: a progressivity component, a classical horizontal equity component and a reranking component. Results are presented for the health care financing system as a whole, as well as for its constituent parts. A final section sets out to uncover the relative importance (in terms of their effects on progressivity, horizontal equity and reranking) of the key institutional features of one component of the Dutch system – the AWBZ social insurance scheme. © 1997 Elsevier Science B.V.

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1. Introduction

The OECD (1992) has suggested that amongst the policy objectives shared by a number of its members is the goal of income protection. This, it suggests, involves protecting patients from payments for health care which threaten income suffi-

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ciency, and relating payment for such protection to individuals' ability to pay. [1] Recent events suggest a continuing support amongst policy-makers for this objective. In the late 1980s, the British government decided not to abandon the tax-financing of the National Health Service (NHS) on the grounds that it was felt to be fair that under the NHS the better-off pay more for their health care than the worse-off. The US government, by contrast, in the mid-1990s did attempt to reform the American health care financing system partly because it was felt to be both horizontally inequitable (because of gaps in cover and the emphasis on out-of-pocket payments) and vertically inequitable (people on fairly low incomes paying large proportions of their income in health insurance premiums). The Dutch health care reform package, proposed by Dekker in the late 1980s and never fully implemented, was motivated in part by a desire to reduce the horizontal inequities between the privately insured and the publicly insured. The recent reforms in Germany, aimed at increasing the degree of choice of sickness fund and trying to ensure open enrolment, were motivated partly by a desire to reduce the differences in contribution rates across sickness funds. [2] Concerns over the horizontal and vertical inequities in health care finance are apparent in other countries too.

Protection against out-of-pocket payments can be provided via taxation, social insurance and private insurance. However, the degree to which each links payments for protection to ability-to-pay is likely to vary. Risk-rated private insurance, for example, is unlikely to score highly on this criterion: it is likely that those who are least able to pay will end up being charged the highest premiums (vertical inequity), since the age-adjusted probability of requiring health care is likely to vary inversely with income; furthermore, premiums are likely to vary amongst persons on a given income (horizontal inequity), since although income and premiums will be correlated, the correlation will be imperfect, and hence a host of factors such as pre-existing conditions, lifestyle, etc. are likely to be used as risk indicators. Tax finance and social insurance are likely to link payment for protection against out-of-pocket payments more closely to ability-to-pay. Under social insurance, contributions are linked not to risk factors but to earnings. Insofar as earnings are correlated with income (which is likely to be the better measure of ability-to-pay), the better-off will make larger contributions, thereby contributing towards vertical equity, and insofar as contributions are linked solely to earnings, the variation in social insurance contributions at a given income level is likely to be relatively small, thereby contributing towards horizontal equity. Under tax finance, payments for health care are linked to whatever tax bases are used.

[1] It is interesting, though not our purpose here, to speculate why these principles seem to command such widespread support. See Culyer (1993) for some thoughts on the issue.

[2] Von der Schulenburg (1994) notes that the rates ranged from 10.8% to 16.4% of payroll in the early 1990s.

Whether tax finance links payments for protection more closely to ability-to-pay than social insurance depends on the details of the two schemes. Income tax has the advantage over social insurance that it is levied on income rather than earnings. From a horizontal equity perspective, it has the advantage of being one scheme applying to everyone. Social insurance, by contrast, often involves several schemes with different contribution schedules. But, of course, income tax has its own horizontal inequities (mortgage interest tax relief, for example) and in any case tax finance relies not just on income tax but also on other taxes, many of which will be only marginally linked to ability-to-pay, if at all.

Our concern in this paper is to explore empirically the impact of health care financing on the distribution of income, in the hope that our analysis may shed light on the question of how well different forms of finance perform in terms of the income protection objective. As the seminal paper by Aronson et al. (1994) (hereafter AJL) on the redistributive effect of income tax makes clear, the redistributive effect of a particular health care financing system will depend not only on its progressivity, but also on the extent of any horizontal inequity associated with the system and on the extent of any reranking resulting from it. The first of these issues has received a good deal of attention recently in the literature on health care financing (cf. Hurst, 1985; Gottschalk et al., 1989; Wagstaff et al., 1989; Wagstaff and van Doorslaer, 1992; van Doorslaer et al., 1993b). The second and third issues, by contrast, have received virtually no attention in this literature. [3]

This is a serious omission. Depending on the extent of horizontal inequity and reranking involved in health care finance, a progressivity analysis can give a misleading impression about the income redistribution associated with the financing system. For example, the introduction of differential treatment of households on similar equivalent incomes will tend to reduce the redistributive effect of a progressive financing system. Conversely, introducing differential treatment into a regressive system will tend to increase its redistributive effect. Knowing only the progressivity characteristics of the financing system thus means that one has only a partial picture of the income redistribution associated with the financing system in question.

Our purpose in this paper is to show how the AJL method can be applied to health care financing so as to allow the overall redistributive impact of a financing system – and its constituent parts – to be decomposed into progressivity, horizontal equity and reranking components. Section 2 contains a brief summary of their approach. Section 3 contains a brief description of the Dutch health care financing system – the system to which we apply their methods. Section 4 outlines

[3] A couple of reports (in Dutch) describe the horizontal inequities in Dutch health care financing but do not seek to measure them. For an early attempt to measure horizontal inequity in the Dutch and Italian health care financing systems, see Wagstaff et al. (1990).

our data and variable definitions, and describes the computational methods used. Our principal results are reported in section 5. Section 6 contains some micro-simulation detective work. In it we try to identify the relative importance of the various sources of differential treatment in the AWBZ component of the Dutch health care financing system (the social insurance component providing cover for "catastrophic" medical expenses). We conclude that most of the redistributive effect associated with the differential treatment involved in the AWBZ scheme is attributable to the exemption of pensioners.

2. Decomposing redistributive effect: the AJL method

The redistributive impact associated with a tax can be measured by the reduction in the Gini coefficient caused by the tax. Thus:

$$RE \equiv G_X - G_{X-T} \tag{1}$$

where G_X and G_{X-T} are the pre-tax and post-tax Gini coefficients respectively. In a world where everyone faces the same tax schedule, irrespective of their non-income characteristics (e.g. whether or not they are married, whether or not they own a home, etc.), we have

$$RE = \left(\frac{g}{1-g}\right) K_T \tag{2}$$

where g is the share of income taken in tax and K_T is Kakwani's (Kakwani, 1977) index of tax progressivity.

Suppose now that people do not face the same tax schedule and that the tax liability of household h is equal to

$$T^h = T(x) + \epsilon^h(x) \tag{3}$$

where $T(x)$ is the common amount of tax paid by all households with income x and $\epsilon^h(x)$ is household h's deviation from this amount. It is assumed that these deviations average to zero across all households – as AJL put it, "on average, at each x, the tax system gets it right". The presence of $\epsilon^h(x)$ in Eq. (3) means that households with the same income x can end up paying different amounts of tax. This is the classical notion of *horizontal inequity*. Only if $\epsilon^h(x)$ is zero for all h and x, is the tax system horizontally equitable. Furthermore, the presence of $\epsilon^h(x)$ in Eq. (3) may result in households moving up or down the income distribution after they have paid their taxes. There may, in other words, be *reranking* as one moves from the pre-tax income distribution to the post-tax distribution.

These two possibilities are illustrated in Fig. 1, which shows the relationship between post-tax income, $x - T^h$, and pre-tax income, x, for a progressive tax.

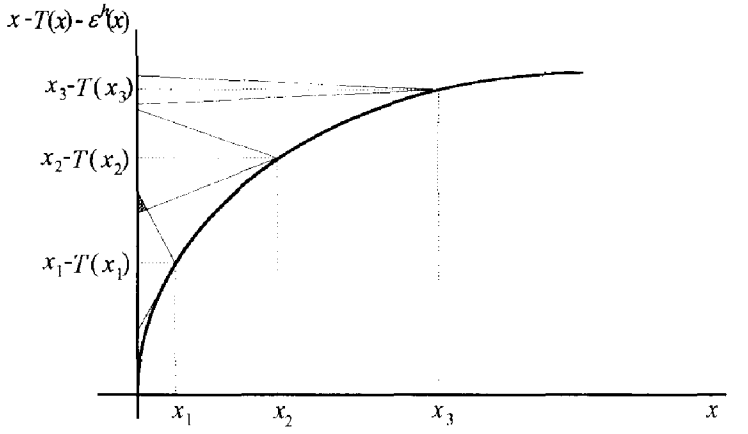

Fig. 1. Horizontal inequity and reranking.

The "fans" show the effect of differential tax treatment – for example, households starting off with pre-tax income x_3 will, on average, end up paying $x_3 - T(x_3)$ in tax, but there will be variation about this amount reflecting the presence of $\epsilon^h(x)$ in Eq. (3). The existence of fans thus indicates the presence of horizontal inequity. If the fans overlap (as they do in the case of households starting out with pre-tax incomes of x_1 and x_2), then reranking occurs – the shaded region of the fans indicate that the household that was richer before tax has become the poorer after tax.

The presence of differential tax treatment means that Eq. (2) is no longer valid. AJL show [4] that it can be replaced by

$$RE = \left(\frac{g}{1-g}\right) K_T - \Sigma \alpha_x G_{F(x)} - [G_{X-T} - C_{X-T}] \tag{4}$$

where K_T is the Kakwani index computed on the assumption that everyone faces the same tax schedule, α_X is the product of the population share squared and the post-tax income share of households with income x, $G_{F(x)}$ is the Gini coefficient for post-tax income for households with pre-tax income x and C_{X-T} is the

[4] Cf. also Lambert and Aronson (1993) (p. 1223). As Lerman and Yitzhaki (1995) make clear, there is an index number problem in decompositions such as Eq. (4). Implicitly, K_T weights the income changes in the move from the pre-tax to the post-tax distributions by the pre-tax rankings. An alternative way of measuring progressivity, developed by Lerman and Yitzhaki, would involve weighting the income changes by the post-tax rankings. Using this approach would give rise to a different (though similar) decomposition from that in Eq. (4). Which is preferable is unclear. It might be argued, on the one hand, that the pre-tax ranking (and hence the AJL decomposition) is inappropriate since one of the functions of the tax in question might be to generate a more equitable ranking of taxpayers than that arising before taxes. But, on the other hand, weighting by the post-tax ranking is open to the objection that one then simply assumes that the post-tax ranking is actually the one that was intended to emerge.

post-tax concentration index obtained by ranking households first according to their pre-tax income and then within each group of pre-tax equals by their post-tax income. The first term, which AJL call V, measures the inequality reduction that would have obtained if there had been no differential tax treatment. The second term, which AJL call H, measures the extent of classical horizontal inequity – i.e., the unequal treatment of equals – by taking a weighted sum of the Gini coefficients $G_{F(x)}$ of the fans. These Gini coefficients are zero only if the $\epsilon^h(x)$ are zero for all x and h. The third term, which AJL call R, measures the extent of reranking in the move from the pre-tax distribution to the post-tax distribution by comparing the post-tax Gini coefficient with the post-tax concentration coefficient. [5] If there is no reranking, R is zero.

The decomposition in Eq. (4) helps – at least on the face of it – to clarify the distinction between horizontal inequity and reranking. This distinction has become blurred over the years as a result of several researchers insisting that the former can usefully be equated to the latter. [6] As AJL emphasise, however, horizontal inequity refers to the (unequal) treatment of *equals*, whilst reranking refers to the treatment of *unequals*. As Fig. 1 makes clear, horizontal inequity (the existence of fans) does not necessarily give rise to reranking (the existence of fan overlap). Furthermore, if reranking is to be deemed inequitable, then it must be on the basis of *vertical* equity considerations *not* horizontal equity considerations. [7] A measure of horizontal inequity that is based on reranking is not a measure of horizontal equity in the classical sense of the term. Evidently H in Eq. (4) *is*. [8] This much is

[5] This is similar to the measure of reranking proposed by Atkinson (1980) and Plotnick (1981).

[6] Advocates of this view include Atkinson (1980), Plotnick (1981, 1982) and King (1983). Feldstein (1976) is also often considered as an advocate of this view – but see Lambert and Yitzhaki (1995).

[7] It may, of course, be the case, that some rerankings are considered (vertically) equitable. To assume that any reranking must be inequitable is to accept that the initial ranking is fair. As Le Grand (1987) points out, this may not be the case. As he puts it: "surely the aim of most of the tax-transfer policies whose horizontal inequity is being assessed ... is precisely to correct some at least of the inequities in the original income distribution? In that case, it is perfectly possible that some rank reversals may be equitable; and in which case the extent to which rank reversals occur may be an indication of the policy's *success* in equity terms rather than an indication of its failure" (p. 433). Cf. Lerman and Yitzhaki (1995) on this point. Of course, if one accepts that some reranking may be (vertically) equitable, one would presumably not regard as equitable the equal treatment of persons with the same pre-tax income.

[8] There are other indices of horizontal equity available which are not based on the notion of reranking. The measure proposed by Berliant and Strauss (1983, 1985) counts the number of instances where households in the same income class face different tax rates. This is not dissimilar to the approach suggested by Aronson et al. Kaplow's (Kaplow, 1989) measure is based on the changes in distances separating households before and after a reform. A reform is regarded as horizontally equitable if the distance (in terms of income) separating all pairs of households remains unchanged after the reform. This is clearly directed at the issue of vertical equity rather than horizontal equity. The same is true of Slesnick's (Slesnick, 1989) measure in which a reform is classed as being horizontally equitable if all households experience the same change in utility. This is, of course, JS Mill's "equal absolute sacrifice" rule of vertical equity (cf. Musgrave and Musgrave, 1984, p. 240).

clear. Things get less clear when one considers the possible *sources* of reranking. In Fig. 1 the only possible source of reranking is the existence of differential treatment – i.e. the fans. Thus an occurrence which offends the principle of *vertical* equity – if it offends any equity principle – can arise solely through the existence of *horizontal* inequity. As AJL point out, there is, however, another possible source of reranking – a marginal tax rate in excess of 100%. [9] This could cause reranking even if everyone faces the same tax schedule.

The decomposition of *RE* in Eq. (4) can be rewritten in another way which aids diagrammatic interpretation, namely:

$$RE = [G_X - G_0] - \Sigma \alpha_x G_{F(x)} - [G_{X-T} - C_{X-T}] \qquad (4')$$

where G_0 is the post-tax Gini coefficient that would have obtained if everyone with pre-tax income x had paid the same tax. The decomposition of *RE* is shown diagrammatically in Fig. 2. [10] The pre-tax Lorenz curve is shown as L_X. The curve labelled L_0 is the post-tax Lorenz curve that would have been observed in the absence of unequal tax treatment. The first term on the RHS of Eq. (4') – i.e. V – thus corresponds to the move from L_X to L_0. It shows what the redistributive effect would have been in the absence of differential tax treatment. If such differential treatment occurs, L_0 is not the Lorenz curve where one ends up – the effect of differential tax treatment is to reduce the redistributive impact of the tax and hence push downwards the post-tax Lorenz curve. This reduction in redistribu-

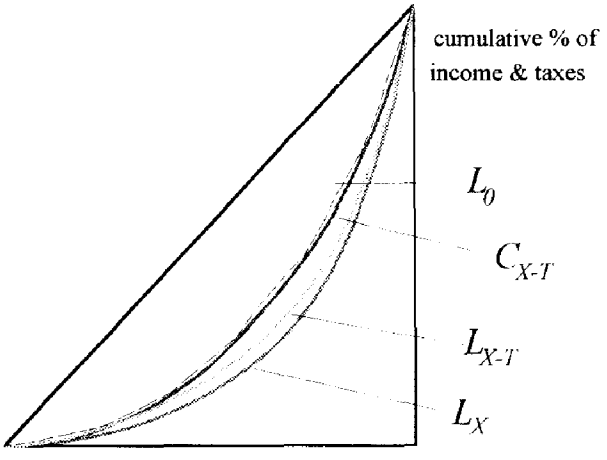

Fig. 2. Redistributive effect and configuration of Lorenz and concentration curves.

[9] This would give rise to a downward-sloping section of the relationship between x and $x - T(x)$ and may result in a household to the left of the peak swapping places with a household to the right of the peak in the move from the pre-tax distribution to the post-tax distribution.

[10] Cf. also Lambert and Aronson (1993) (p. 1223).

tive effect can be broken down into two stages. The first entails the creation of inequality in post-tax incomes amongst groups of pre-tax equals (i.e., horizontal inequity) and corresponds to the second term on the RHS of Eq. (4′) – i.e., H. Diagrammatically it corresponds to the move from L_0 to C_{X-T}, the latter being the concentration curve for post-tax income where households have been ranked first according to their pre-tax income and then within each group of pre-tax equals by their post-tax income. The second stage entails households moving up or down the income distribution as one moves from the pre-tax distribution to the post-tax distribution (i.e., reranking) and corresponds to the third term in Eq. (4′) – i.e. R. Diagrammatically it corresponds to the move from C_{X-T} to L_{X-T}. Note that L_{X-T} can never lie above C_{X-T}, which in turn can never lie above L_0. Thus H and R are always non-negative.

Fig. 2 shows the case of a progressive tax. In the case of a regressive tax – i.e., one that involves pro-*rich* redistribution and therefore negative values of RE and K_T – the ordering of the various curves is different. Specifically, whilst it is still the case that L_{X-T} lies on or below C_{X-T}, which in turn lies on or below L_0, L_X now lies *above* L_0. Thus in this case, differential tax treatment *increases* the redistributive effect of the tax.

3. The Dutch health care financing system

In what follows, we apply the AJL method to an analysis of the Dutch health care financing system. Like most health care financing systems, the Dutch system draws revenues from four sources: taxation, social insurance contributions, private insurance premiums and out-of-pocket payments. The relative shares of these sources are indicated in the row headed "Share" in Table 1. These shares have been derived using a somewhat broader definition of "health care" than that used in van Doorslaer et al. (1993a) and includes care of the elderly, home help, and so on. This adds a further Dfl 9 billion onto the Dfl 34.5 billion allocated in van Doorslaer et al. (1993a) and raises the shares financed via tax revenues (7% to 14%) and out-of-pocket payments (7% to 11%).

Even with the broader definition, taxation still accounts for only a small part of overall revenues. By far the biggest component of the health care financing system is social insurance. There were, in fact, two social insurance schemes operating in the Netherlands in 1987. The first, known as the AWBZ scheme, provided cover to everyone for catastrophic and other exceptional medical expenses. Contributions were compulsory for everyone below pensionable age, being a fixed proportion of earnings up to a ceiling and paid by the employer in the case of employees. The second social insurance scheme, involving sickness funds, provides cover to enrolees for expenses associated with short-term medical care. Enrolment was compulsory for, and available only to, wage-earners with earnings below Dfl 49 150, contributions being proportional to earnings up to a ceiling and split

Table 1
Decomposition of redistributive impact of Dutch health care financing system, 1987

Decile/Index	Gross income	Direct taxes	Indirect taxes	Sickness funds	AWBZ	Private insurance	Direct payments	Total
1	3.9%	1.3%	5.6%	5.8%	1.1%	3.4%	6.2%	4.1%
2	5.2%	1.8%	6.5%	8.9%	3.9%	2.3%	5.4%	5.6%
3	6.2%	3.2%	8.2%	9.8%	5.0%	4.6%	5.4%	6.8%
4	7.2%	4.2%	8.0%	10.9%	7.6%	6.5%	5.8%	8.2%
5	8.3%	5.8%	9.4%	10.9%	8.8%	8.5%	7.9%	9.2%
6	9.4%	7.3%	10.0%	10.9%	10.8%	10.4%	10.9%	10.5%
7	10.6%	9.5%	11.0%	10.9%	12.0%	12.4%	12.3%	11.5%
8	12.4%	11.9%	12.0%	10.6%	13.8%	14.8%	13.2%	12.5%
9	14.3%	15.4%	13.8%	11.8%	16.8%	15.8%	14.5%	14.3%
10	22.3%	39.5%	15.4%	9.5%	20.2%	21.3%	18.4%	17.4%
Share		7%	4%	33%	24%	14%	11%	93%
g		0.0100	0.0055	0.0500	0.0278	0.0246	0.0158	0.1337
K_T		0.23898	−0.10759	−0.22105	0.04670	0.05257	−0.03803	−0.05431
RE		0.00241	−0.00060	−0.01288	0.00119	0.00089	−0.00099	−0.00971
V		0.00242	−0.00060	−0.01164	0.00133	0.00133	−0.00081	−0.00838
H		0.00000	0.00000	0.00029	0.00008	0.00019	0.00011	0.00029
R		0.00000	0.00000	0.00094	0.00007	0.00045	0.00027	0.00103

equally between the employee and the employer. [11] Those insured with sickness funds comprise roughly 60% of the population.

Those not insured with sickness funds in 1987 typically obtained cover for short-term medical expenses from a private insurer, the premiums for which were not income-related but were instead sometimes risk-related (for example, according to age). Persons with private insurance had the option of being covered only for certain types of care and/or to bear some fixed amount of treatment costs via deductibles. Out-of-pocket payments by the privately insured with less than full cover account for a sizeable proportion of total out-of-pocket payments, with the rest being accounted for by copayments associated with sickness fund or AWBZ cover.

4. Data, variable definitions and computational methods

Our empirical analysis is based on data taken from the 1987 *Household Expenditure Survey* undertaken by the Dutch Central Bureau of Statistics (CBS).

[11] In the Netherlands there are, in addition, statutory health insurance schemes for civil servants of provinces and municipalities (the so-called IZA/IZR schemes). We have included these under the "sickness fund" umbrella here, partly on grounds of expedience (our survey data classifies the contributions as sickness fund contributions) and in part because such a practice makes sense, given that membership of the scheme is compulsory and that contributions are income-related.

This is the same survey used in Wagstaff and van Doorslaer (1992), van Doorslaer et al. (1993a) and Janssen et al. (1994). Our unit of analysis is the household. After deleting unusable cases, our sample comprised 2226 households. Our sample was weighted using the weights supplied by CBS. Income, x, is gross income, defined along the lines of the Luxembourg Income Study (LIS) (cf., for example, Smeeding et al., 1990), but grossed up to include employer contributions to the AWBZ and sickness fund schemes. These contributions are, in effect, fringe benefits and our practice of including them in gross income, although not in line with LIS conventions, is in line with those of the OECD (cf., for example, OECD, 1990). Household income has been equivalised using AJL's equivalence scale with both parameters set equal to 0.5 – a household's equivalence factor is thus equal to the square root of the sum of the number of adults and half the number of children.

Payments have been computed from each of the four financing sources – these are the analogue of $T(x)$ in AJL's notation. Direct and indirect taxes have been allocated pro rata, there being no earmarking of specific taxes for health care finance in the Netherlands. Direct taxes have been proxied by personal income taxes (accounting in reality for 63% of direct taxes), obtained directly from the survey. Indirect taxes have been assumed to be borne by the consumer and have been estimated from consumption patterns. Our indirect tax variable excludes indirect taxes other than VAT and excise duties, but accounts for 74% of all indirect taxes. AWBZ contributions have been assumed to be borne by the employee in the case of employees and have been obtained from the survey. Both employee and employer sickness fund contributions have been assumed to be borne by the employee and have been computed using the employee's contribution recorded in the survey. Private insurance premiums are recorded in the survey, as are out-of-pocket payments. The latter are for a 12-month period and include all outlays above a minium of Dfl 25. Included sources account for 93% of total health care revenues, the shortfall from 100% being attributable to the aforementioned omitted direct and indirect taxes. All payments have been equivalised using AJL's equivalence scale.

Computation of the components of RE is not straightforward. The most cumbersome term to compute is H, since it involves computing as many Gini coefficients as there are groups of pre-payment equals. We have therefore computed this as a residual. RE can be computed simply as the difference between G_X and G_{X-T} – cf. Eq. (1). We have used the "convenient covariance" method adapted for a weighted sample (cf. Lerman and Yitzhaki, 1989). To compute V and R one has to decide on the ranges into which pre-payment incomes are to be grouped – i.e., which households are to be treated as pre-payment equals. We have picked a range of Dfl 894 *per annum* – similar to the £3.82 per week figure used by AJL for 1986/87. R can then be computed as the difference between G_{X-T} and C_{X-T}. K_T is computed as the difference between the equal-treatment tax concentration index, calculated on grouped observations using the pre-payment groups based on the Dfl 894 range, and G_X.

5. Principal empirical results

Table 1 shows the distribution of the principal financing sources across equivalent income deciles, along with the corresponding values of g, K_T, RE, V, H and R. Figures for the total health care financing burden are also reported. The positive and negative values of K_T for direct and indirect taxes respectively indicate that direct taxes are progressive whilst indirect taxes are regressive. Sickness fund contributions are also regressive, not least because the majority of persons who are contracted out of the scheme (and are instead privately insured) are members of households with relatively high equivalent incomes. AWBZ contributions, by contrast, are marginally progressive – the reasons for this will become clear in Section 6. Private insurance premiums are also progressive, for the same reason that sickness fund contributions are regressive. The regressiveness of out-of-pocket payments reflects in part the fact that not all out-of-pocket payments are made by the privately insured but also the fact that there are some households with relatively low equivalent incomes which contain one or more persons who are privately insured. The Dutch health care financing system overall is somewhat regressive.

The broad conclusions reached in the previous paragraph are much the same as those reached by van Doorslaer et al. (1993a). In contrast to that paper, the present paper also sheds light on the impact of the various health care financing sources on the distribution of income. As Eq. (4) makes clear, it is not just K_T (i.e., departure from proportionality) that determines the vertical component of income redistribution but also g. For a given value of K_T, the absolute value of V (i.e., the extent of income redistribution that would have occurred in the absence of any differential treatment) is higher, the higher is g. Likewise, a given value of V could be achieved by a variety of different combinations of K_T and g. For example, the same value of V is recorded for both the AWBZ scheme and the private insurance scheme. In the case of the AWBZ scheme this is not so much due to a high degree of progressivity but rather due to the relative importance of the AWBZ scheme in the financing mix. By contrast, in the case of private insurance, the value of V is attributable more to a relatively high degree of progressivity than to a high relative share in the financing burden. The message here is clear: for a given degree of differential treatment, one needs to know g as well as K_T in order to determine the impact of a financing source on the distribution of income.

Turning to the question of differential treatment, it is clear that this too has an important influence on the income redistribution associated with health care finance in the Netherlands. Considering once again the AWBZ and private insurance schemes, it is evident that although both record the same value of V, there is in practice more redistributive effect associated with the AWBZ scheme than with the private insurance scheme. H and R in the case of the AWBZ scheme are relatively small and reduce redistributive effect (compared to what it

Table 2
Percentage decomposition of redistributive impact of Dutch health care financing system, 1987

Index	Direct taxes	Indirect taxes	Sickness funds	AWBZ	Private insurance	Direct payments	Total
RE	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
V	100.2%	99.7%	90.4%	112.4%	191.8%	61.7%	86.3%
H	0.1%	−0.2%	−2.3%	6.5%	27.5%	−11.3%	−3.0%
R	0.1%	−0.1%	−7.3%	5.9%	64.3%	−27.0%	−10.6%

would have been in the absence of differential treatment) only by a relatively small amount (0.00014). In the case of private insurance, by contrast, the values of H and R are fairly high, the implication being that differential treatment reduces redistributive effect by rather more (0.00024). H and R are even higher in the case of sickness funds, their sum being equal to 0.00123. Since this a regressive financing source, differential treatment here *increases* redistributive effect, RE being larger in absolute size than V.

Another way of presenting the results for H and R is to express them as percentages of RE (see Table 2). The value of V for direct taxes of 100.2% indicates that direct taxes would have been 0.2% more redistributive if there had been no differential treatment, the values of H and R indicating that half of this shortfall is due to pure horizontal inequity and half to reranking. Indirect taxes, by contrast, would have been marginally *less* redistributive in the absence of differential treatment – here the regressiveness of the source causes RE to be negative and hence H and R are negative when expressed as percentages of RE. [12] Sickness funds would have been 9.6% less redistributive in the absence of differential treatment, the majority (7.3 percentage points) being due to reranking. A much higher degree of differential treatment occurs in private insurance – this source would have been 92% *more* redistributive in the absence of inter-household differences at a given level of equivalent income. Out-of-pocket payments also reflect a fairly high degree of differential treatment, and again the effect of inter-household differences is to *increase* the degree of redistributive effect. Classical horizontal inequity accounts for some of this redistributive effect. Some of this is due to households with similar incomes having different insurance status – i.e., some will be insured with sickness funds, whilst others will be privately

[12] The low percentages involved seem to reflect in part the low shares of direct and indirect taxes in the overall financing burden – an increased emphasis on, say, direct taxes would raise g, leave K_T unchanged and reduce the post-tax Gini coefficient.

insured – and therefore having different deductible arrangements. Some, though, is undoubtedly due to households with similar insurance status making different choices with respect either to the combination of premium and deductible or to the package of care itself. Overall, the pro-rich income redistribution associated with the Dutch health care financing system would have been around 14% less in the absence of differential treatment, with the bulk of this (11 percentage points) being attributable to reranking.

This raises the question of the normative significance of H and R. In the case of the AWBZ scheme, as we shall see in more detail in the next section, the non-zero values of H and R are to a large extent attributable to the institutional features of the scheme that result in households on similar equivalent incomes making different (equivalent) contributions. Calling this "differential treatment" seems sensible, though whether one wants to refer to this differential treatment as inequitable is less clear, since one needs to know precisely what features of the scheme are responsible and whether they might be construed as generating equitable differential treatment. We return to this issue in the next section. Suffice to say for the moment that the label "differential treatment" seems applicable. This label is also applicable in the case of direct taxes and other compulsory schemes, in this case the sickness funds being the obvious example. The applicability of the label is less clear where there is a degree of choice involved. Non-zero values of H and R in the case of indirect taxes, for example, arise not because of differential treatment across households, but rather because household spending patterns differ. To some extent the same is true of out-of-pocket payments, but here there is much less "choice" involved – direct payments are made by individuals who are in poor health and it is not just choices that determine which individuals, at a given income level, are in poor health at any one time, but also chance. Given this, the non-zero values of H and R in the case of out-of-pocket payments do in a sense result from differential treatment across households, the source of differential treatment being the degree of ill-health of the household members. Some might also want to term such differential treatment "inequitable".

Another issue is whether H has a different normative significance from R. Here, it seems important to be able to ascertain how much of any reranking is due to the existence of differential treatment and how much is due to marginal tax rates in excess of 100%. One may well want to bring the former under the horizontal equity umbrella, since even though it is the principle of vertical equity that such reranking offends, it is nonetheless a *consequence* of a horizontally inequitable tax system. If, as in Fig. 1, all reranking is caused by differential treatment, knowing the relative values of H and R (rather than just their sum) may not be particularly informative from a policy perspective. This is reinforced by the fact that the relative values of H and R are sensitive to the choice of interval for defining equals – AJL find, and results that we have obtained for the Dutch health care financing system confirm this, that H falls and R rises as the interval is reduced.

6. Some microsimulation detective work

In this section we present the results of some detective work aimed at uncovering the sources of progressivity and differential treatment associated with the AWBZ scheme. Knowing these seems important from a policy perspective – for example, some sources of differential treatment may well be considered to be equitable by policy-makers.

As indicated above, the contribution rules for the AWBZ scheme are straightforward. Rules apply to *individuals* rather than to households. Some individuals – notably pensioners – were exempt in 1987. Wage-earners pay a fixed percentage (4.55%) of their assessable income up to a ceiling of Dfl 64550 (the maximum contribution therefore being Dfl 2937). Both the exemptions and the ceiling can be expected to have effects on V, H and R. The effect of the ceiling on V is, of course, to introduce a regressive element into the AWBZ scheme. But the ceiling could also have effects on H and R, since the rules relate to individuals and we are using the household as the unit of analysis. For example, a household containing one earner with an income of Dfl 100000 would pay Dfl 2937 in contributions, whilst another household with the same income divided equally across two earners would pay Dfl 4550. Reranking could also result. Suppose the one-earner household's income were Dfl 101000 and the two-earner household's income were Dfl 102000. The income of the first after AWBZ contributions would be Dfl 98063, whilst that of the richer household would be only Dfl 97410. The exemptions will raise the value of V if those who are exempt are concentrated amongst the lower income deciles – as, in fact, they are. The exemptions can also obviously have effects on H and R.

To ascertain the contributions of the exemptions and the ceiling to V, H and R, we have simulated the effects of three policies: (i) the abolition of the contributions ceiling, (ii) the abolition of exemptions, and (iii) the abolition of both. In each case we have adjusted the contribution rate so as to generate the same (unequivalized) AWBZ revenues in each policy scenario. [13] The results are shown in Table 3.

The effect of abolishing the ceiling is to make the AWBZ scheme a good deal more progressive (K_T doubles) and hence to make the scheme marginally more pro-poor in its redistributive impact. The abolition of the ceiling also reduces the gap between actual and potential redistributive effect from 12% to 5%, with H and R falling by the same amount (0.00001). Abolishing the exemptions (but keeping the ceiling intact) makes the AWBZ scheme become regressive and hence to result in pro-rich redistributive effect; the reason for this is the retention of the ceiling in this scenario. The effect on H of abolishing the exemptions is of the

[13] The values of g in the three scenarios differ, since changing the rules also changes gross income, since this is defined as gross of the employer contribution.

Table 3
The effects of exemptions and contribution ceiling on the redistributive impact of the AWBZ scheme, 1987

Index	Actual AWBZ	No ceiling	No exemptions	No ceiling or exemptions
g	0.0278	0.0276	0.0327	0.0322
K_T	0.04670	0.09300	−0.09178	−0.04710
RE	0.00119	0.00251	−0.00322	−0.00167
V	0.00133	0.00264	−0.00310	−0.00157
H	0.00008	0.00007	0.00007	0.00006
R	0.00007	0.00006	0.00005	0.00004
RE	100.0%	100.0%	100.0%	100.0%
V	112.4%	105.0%	96.4%	94.1%
H	8.5%	2.7%	−2.1%	−3.7%
R	5.9%	2.3%	−1.5%	−2.2%

same order of magnitude as in the case where the ceiling is eliminated, but the effect on R in this case is somewhat larger. Eliminating the ceiling *and* the exemptions (scenario (iii)) still leaves a pro-poor redistributive effect and gives the smallest values of H and R of the three scenarios – H and R fall to 75% and 57% of their pre-simulation values respectively. The fact that neither is reduced to zero reflects presumably the lack of consonance between the equivalence scale used and the rules of the AWBZ system.

The fact that the exemptions appear to have a slightly greater effect on horizontal equity and reranking raises the obvious policy question: are these effects inequitable? An analysis such as this obviously cannot answer such a question. It does, however, help the policy-maker determine the direction in which he or she might wish to alter the rules concerning health care financing arrangements. [14]

7. Conclusions

If ultimately a concern over the distribution of health care payments by income stems, at least in part, from a concern over the impact of health care payments on the income distribution, it seems important to extend the distributional analysis of health care payments beyond the analysis of progressivity to embrace the full range of determinants of redistributive effect. These include not just progressivity (or departure-from-proportionality), but also the share of income going to finance

[14] It is interesting to note that the exemptions were in fact abolished in 1990, accompanied by appropriate adjustments to pensions.

health care, the degree of pure horizontal inequity in the system (equals being treated unequally) and the extent of any reranking in the move from the pre-payment to post-payment income distribution.

Our results suggest that the Dutch health care financing system overall has pro-rich redistributive effect. Most of this is due to the system's regressiveness, which in turn is attributable to the duality of the system's insurance payments, with income-related payments mainly for the lower half of the income distribution and non-income-related premiums for the higher income groups. Some of the system's pro-rich redistributive effect is due, however, to horizontal inequity and reranking – redistributive effect would have been some 14% lower than it was in 1987 if all households at each level of (equivalent) income had made exactly the same (equivalent) health care payments. Of course, such inter-household differential treatment may not always be considered to be (horizontally) inequitable – some of the ''differential treatment'', for example, arises through households having different spending patterns and hence paying different amounts of indirect tax. Ultimately it is up to policy-makers to decide whether horizontal inter-household differences in payments are inequitable or not – the AJL decomposition simply indicates the importance of such differences in promoting or offsetting the redistributive effect generated by vertical inter-household differences. A microsimulation detective exercise of the type reported in this paper ought to help policy-makers pinpoint the sources of both vertical and horizontal inter-household differences.

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