Universität Potsdam

Hans-Georg Petersen

Taxes, Transfers, Economic Efficiency and Social Justice

Essays on Public Economics 1979 – 2009

Chapter 1: Redistribution – Theory and Measurement

University of Potsdam

Hans-Georg Petersen

Taxes, Transfers, Economic Efficiency and Social Justice

Essays on Public Economics 1979 – 2009

Chapter 1: Redistribution – Theory and Measurement

University of Potsdam

University of Potsdam 2011

Am Neuen Palais 10
D-14469 Potsdam

Published online at the Institutional Repository of the University of Potsdam:
URL http://pub.ub.uni-potsdam.de/volltexte/2011/5037/
URN urn:nbn:de:kobv:517-opus-50379
http://nbn-resolving.org/urn:nbn:de:kobv:517-opus-50379

Contents

Chapter 1:

Redistribution – Theory and Measurement

1.1.

Effects of Growing Incomes on Classified Income Distributions, the Derived Lorenz Curves, and Gini Indices

(Econometrica, New Haven/Conn., Vol. 47 (1979), pp 183-195

1.2.

"Just" Tax Scales at Alternative Sacrifice Principles and Utility Functions

Co-authors: Friedrich Hinterberger and Klaus Müller

(FinanzArchiv, Tübingen, N. F. Vol. 45 (1987), pp 45 – 69)

1.3

Redistribution and the Efficiency/Equity Trade-off

(Studi Economici, Milano, No. 82, 2004, pp 5 – 42)

1.4.

Pros and Cons of Negative Income Tax

(Herbert Giersch (Ed): Reforming the Welfare State, Springer Berlin et al. 1997, pp 53 – 82)

Chapter 2:

Shadow Economy

2.1.

Shadow Economy, Laffer Curve and Illicit Cash in Simple Macroeconomic Models

(10th Anniversary Edition of the Greek Journal of Political Economy, Athens 1990, pp 118 – 157, in Greek Language)

2.2.

Size of the Public Sector, Economic Growth and the Informal Economy - Development Trends in the Federal Republic of Germany

(The Review of Income and Wealth, New Haven/Conn., Series 28 (1982), pp 191 – 215)

2.3.

Taxes, Tax Systems and Economic Growth

(Herbert Giersch (Ed): Towards an Explanation of Economic Growth, Tübingen 1981, pp 313 – 347)

Chapter 3:

Impact of Taxation and Tax Reform

3.1.

Impact of the Tax System. Federal Republic of Germany

(Walter Block and Michael Walker (Eds): Taxation: An International Perspective, The Fraser Institute, Vancouver, B. C. 1984, pp 283 – 329)

3.2.

Marginal Tax Burden - A Case Study of Austria and the Federal Republic of Germany

Co-author Johann K. Brunner

(Empirica (Austrian Economic Papers), Stuttgart, Vol. 12 (1985), pp 209 – 226)

3.3.

Further Results on Income Tax Progression

(Zeitschrift für Wirtschafts- und Sozialwissenschaften, Berlin, 101. Jg. 1981, pp 45 – 59)

3.4.

The German Tax and Transfer System: A Problem Oriented Overview

(Hans-Georg Petersen and Patrick Gallagher (Eds): Tax and Transfer Reform in Australia and Germany. Australia Center Potsdam, Berlin 2000, pp 13 – 40)

3.5.

Globalisation, Capital Flight and Capital Income Taxation

(Tax Notes International, Vol. 33, No. 10, March 2004, pp 887 – 897)

Chapter 4:

Economics of Transformation

4.1.

Towards a Reformulation of the Role of the Tax and Social State in the Polish Transformation Process

Co-author Klaus Müller

(Marek Belka and Hans-Georg Petersen (Eds): Economic Transformation in Poland. Reforms of Institutional Settings and Macroeconomic Performance. Frankfurt, New York 1995, pp 131 – 141)

4.2.

Taxes and Transfers: Financing German Unification

Co-author Michael Hüther

(Ghanie Ghaussy and Wolf Schäfer (Eds): Economics of German Unification, London, New York 1993, pp 73 – 91)

4.3.

The Polish Success in Monetary Stabilization

Co-author Christoph Sowada

(Beihefte zu Kredit und Kapital, Heft 13, Konzepte und Erfahrungen der Geldpolitik, Berlin 1995, pp 383 – 411)

4.4.

On the Integration of Industrial and Social Policy in the Transition Process

Co-author Christoph Sowada

(Hans-Georg Petersen (Ed): Industrial and Social Policy in Transition Countries – Two Case Studies: Poland and Bulgaria. Shaker Verlag, Aachen 2000, pp 33 – 59)

4.5.

Privatisation and Ownership: The Impact on Firms in Transition – Survey Evidence from Bulgaria

Co-authors Atanas Christev and Felix FitzRoy

(Hans-Georg Petersen (Ed): Industrial and Social Policy in Transition Countries – Two Case Studies: Poland and Bulgaria. Shaker Verlag, Aachen 2000, pp 177 – 212)

Chapter 5:

Group- and Microsimulation

5.1.

Simulation Models in Tax and Transfer Policy: Introduction

Co-author Johann K. Brunner

(Johann K. Brunner and Hans-Georg Petersen (Eds): Simulation Models in Tax and Transfer Policy, Frankfurt, New York 1990, pp 11 – 18)

5.2.

Microsimulation of Alternative Tax and Transfer Systems for the Federal Republic of Germany

Co-authors Michael Hüther, Matthias Müller and Bernd Schäfer

(Johann K. Brunner and Hans-Georg Petersen (Eds): Simulation Models in Tax and Transfer Policy, Frankfurt, New York 1990, S. 539-572)

5.3.

Revenue and Distributional Effects of the Current Tax Reform Proposals in Germany – An Evaluation by Microsimulation

Co-author Christhart Bork

(Hans-Georg Petersen and Patrick Gallagher (Eds): Tax and Transfer Reform in Australia and Germany. Australia Center Potsdam, Berlin 2000, pp 219 – 235)

Chapter 6:

Social Policy, Higher Education and Environmental Economics

6.1.

World Crisis in Social Security: West Germany

Co-author Karl Heinz Jüttemeier

(Jean-Jacques Rosa (Ed): World Crisis in Social Security, Paris, San Francisco 1982, pp 181 – 205)

6.2.

Gloomy Prospects for Social Retirement Insurance - An International Phenomenon

Co-author Karl Heinz Jüttemeier

(Intereconomics, Hamburg, Vol. 18 (1983), pp 11 – 17)

6.3.

International Reforms of Health Care Systems: Quasi Markets, Privatization, and Managed Care. Comment on Richard M. Scheffler

(Herbert Giersch (Ed): Reforming the Welfare State, Berlin et al. 1997, pp 261 - 266)

6.4.

Systemic Change Instead of Curing Symptoms: Coordinating Social and Private Health Insurance in Germany and Beyond

(Case Doradcy Sp. z o.o., Forum Ochrony Zdrowia. Warsaw 2004, pp 1 – 26, in Polish Language)

6.5.

Education Return and Financing: Donated Affluence as Consequence of Tuition Free Study Programs in Germany

(Finanzwissenschaftliche Diskussionsbeiträge Nr. 55, Potsdam 2007)

6.6.

Economic Aspects of Agricultural Areas Management and Land/Water Ecotones Conservation

(Ecohydrology & Hydrobiology, Warsaw, Vol. 1 (2001), pp 46 – 58)

Preface

This volume contains the articles and papers which predominately have been published in international journals or edited volumes in the period from 1979 to 2009. The single articles reflect the main research areas of the editor and his co-authors who were engaged at the Kiel Institute of World Economics, the Johannes-Kepler-University Linz/Austria, the Justus-Liebig-University Giessen, the University of Potsdam, and the German Institute for Economic Research (DIW Berlin). The editor would like to thank all the copy right holders for their content; if any have been inadvertently overlooked the editor will be pleased to make the necessary arrangement at the first opportunity.

The editor would also like to thank Doris Gericke and Christina Bennewitz for all their effort they have invested in the creation of this volume. As a matter of course the editor is deeply indebted to all his co-authors and collaborators and last but not least to all the foundations, which have supported the research projects by generous grants.

Potsdam, September 2010

Hans-Georg Petersen

Chapter 1:

Redistribution – Theory and Measurement

1.1.
Effects of Growing Incomes on Classified Income Distributions, the Derived Lorenz Curves, and Gini Indices
(Econometrica, New Haven/Conn., Vol. 47 (1979), pp 183-195

1.2.
"Just" Tax Scales at Alternative Sacrifice Principles and Utility Functions
Co-authors: Friedrich Hinterberger and Klaus Müller
(FinanzArchiv, Tübingen, N. F. Vol. 45 (1987), pp 45 – 69)

1.3
Redistribution and the Efficiency/Equity Trade-off
(Studi Economici, Milano, No. 82, 2004, pp 5 – 42)

1.4.
Pros and Cons of Negative Income Tax
(Herbert Giersch (Ed): Reforming the Welfare State, Springer Berlin et al. 1997, pp 53 – 82)

Econometrica, Vol. 47, No. 1 (January 1979)

EFFECTS OF GROWING INCOMES ON CLASSIFIED INCOME DISTRIBUTIONS, THE DERIVED LORENZ CURVES, AND GINI INDICES

BY HANS-GEORG PETERSEN[1]

The purpose of this paper is to indicate the problems connected with the intertemporal comparability of Lorenz curves and Gini indices estimated by standard numerical approaches in the case of the classified empirical income distribution and a growth of individual income at a fixed rate. "Collector effects" of the higher class intervals lead to shifts of the Lorenz curve to the right or to the left; accordingly the Gini index may rise or fall. This "class phenomenon" occurs although actually nothing has changed in distribution.

1. INTRODUCTION

THE SUMMARIZATION OF AN EMPIRICAL income distribution is an important problem in the theory of income distribution, as official statistics are presented in grouped form. Until recently, representing an income distribution by a single functional form has not been successful (e.g., [**4**, **5**, and **14**]), although some studies (e.g., [**22** and **24**]) have obtained parametric curves which fit income data better than the lognormal (Gibrat) and Pareto distributions. Also, polynomial and spline interpolations have been used to approximate Lorenz curves [**3**, **7**, **24**]; however, the large number of classes used to report data may cause difficulties (e.g., [**3**]).

The problems involved with choosing one curve to fit immediate data become quite important in studies predicting the effect of income growth on the distribution of income. It is well known (e.g., [**5**, **12**, and **18**]) that multiplying all incomes by a constant leaves the Lorenz curve and Gini index unchanged. However, the size of the intervals used by governments presenting the data remain constant for long periods of time so that the proportion of people in the intervals may change significantly over time. This may cause the standard numerical approaches to estimating inequality to become less accurate, e.g., estimate an increase in inequality when it really has remained constant. This effect will be illustrated on a simple theoretical income distribution and then on actual German tax data.

2. EFFECTS OF INCOME GROWTH ON THE LORENZ CURVE AND THE GINI INDEX DERIVED FROM A HYPOTHETICAL CLASSIFIED INCOME DISTRIBUTION

A. Effects of Income Growth at a Fixed Rate on the Distribution

The range of y (individual income) of the hypothetical income distribution is divided into m (four) disjunctive size intervals of the form

$$z_{i-1} \leq y < z_i \qquad (i = 1, 2, \ldots, m) \tag{1}$$

[1] I wish to thank Marianne Blöcker, Manfred Höckendorff, and two unknown referees for many helpful comments on earlier drafts of this paper. Naturally responsibility for errors remain mine.

where z_{i-1} and z_i indicate the lower and upper class boundary, respectively. The total number of tax payers s have been classified accordingly. The extent of the size intervals increases with increasing income. It is presumed that the distribution within the intervals is known. For the sake of simplicity linear density functions for each interval have been used (see Figure 1). The general form of these functions is

(2) $$s = ay + b.$$

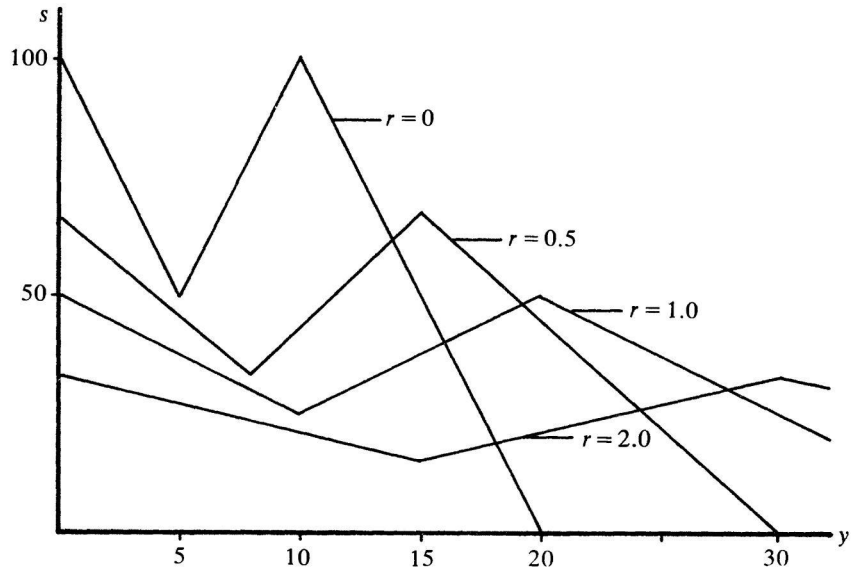


FIGURE 1.—Density function.

The numerical functions are:

(2a) $s = -10y + 100$ when $0 \leq y < 5$,

(2b) $s = 10y$ when $5 \leq y < 10$,

(2c) $s = -10y + 200$ when $10 \leq y < 20$ and when $20 \leq y < \infty$.

By simple integration we derive the cumulative distribution function from the density function [**4**, **15**]:

(3) $$S = \int_{z_{i-1}}^{z_i} (ay + b)\, dy = \left[\frac{a}{2}y^2 + by\right]_{z_{i-1}}^{z_1}.$$

Figure 2 shows the corresponding distribution function. The integral over the distribution function gives the total income Y of all tax payers s in the size interval $z_{i-1} \leq y < z_i$. To define this value, we derive the inverse corresponding to the distribution function (3),

(4) $$y = \sqrt{\frac{2}{a}S + \left(\frac{b}{a}\right)^2} + \frac{b}{a}.$$

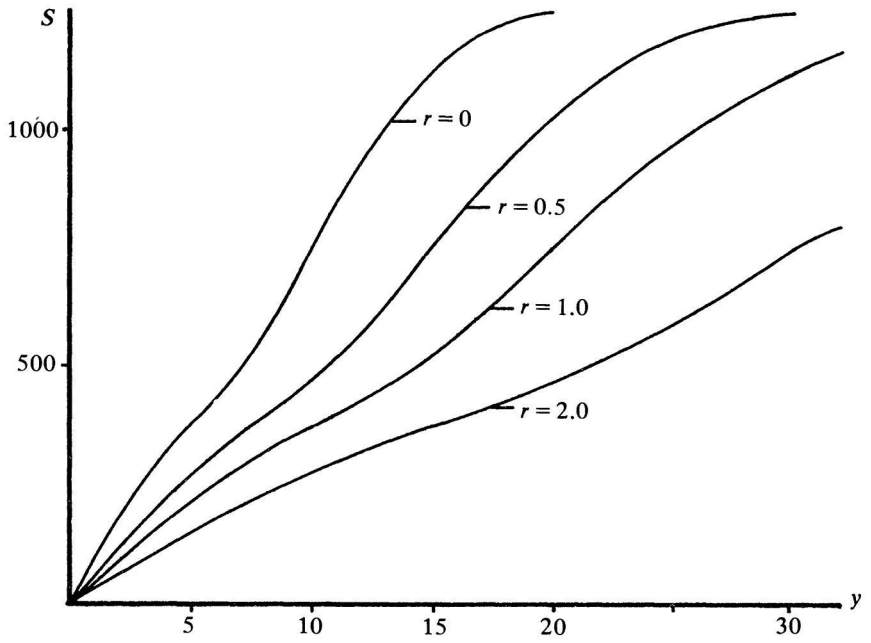


FIGURE 2.—Cumulative function.

Integrating, we get

$$(5) \qquad Y = \int_{S(z_{i-1})}^{S(z_i)} \left(\sqrt{\frac{2}{a} S + \left(\frac{b}{a}\right)^2} + \frac{b}{a} \right) dS.$$

Table I shows the values for the basic distribution ($r = 0$) and three extrapolated distributions ($r = 0.5$, $r = 1.0$ and $r = 2.0$). The first and second size intervals are of equal length, while the third and fourth are of increasing length. S_i is the absolute number of tax payers in a given interval and S_k their cumulative number; Y_i is the total income in the size interval and Y_k the cumulative income; S'_i, S'_k, Y'_i, and Y'_k are the corresponding relative values. In the basic distribution the open-ended uppermost income class is empty.

We now assume a growth of individual incomes at a fixed rate (r per cent). Then the inverse distribution function (4) changes to

$$(6) \qquad y = (1+r) \cdot \left(\sqrt{\frac{2}{a} S + \left(\frac{b}{a}\right)^2} + \frac{b}{a} \right).$$

Having transformed this we get for the distribution function,

$$(7) \qquad S = \frac{a}{2(1+r)^2} y^2 + \frac{b}{(1+r)} y,$$

and for the density function,

$$(8) \qquad s = \frac{a}{(1+r)^2} y + \frac{b}{(1+r)}.$$

Figures 1 and 2 show also the density and distribution functions corresponding to

different percentage rates of income growth. The average income as well as the standard deviation naturally change according to the magnitude of linear income growth.

Table I shows the corresponding values for three extrapolations. After an initial income growth of 50 per cent ($r = 0.5$), the absolute number of tax payers S_i and the relative frequencies S_i' in the first and second income class is falling and in the third and fourth income class increasing. This effect could be called the "collector effect"[2] of the higher class intervals. The same effect is shown by the absolute total income Y_i of the various size groups, but only in the case of the uppermost group does the relative income Y_i' rise sharply. In the next extrapolations ($r = 1.0$ and $r = 2.0$) the absolute and relative values S_i, S_i', Y_i, and Y_i' increase in the uppermost open-ended class only.

TABLE I

BASIC DISTRIBUTION AND THREE EXTRAPOLATIONS

	$z_{i-1} \leq y < z_i$		S_i		S_i'		S_k		S_k'		Y_i		Y_i'		Y_k		Y_k'	
							$r = 0$											
I	0– 5	I	375	I	0.30	I	375	I	0.30	I	833	I	0.08	I	833	I	0.08	I
I	5–10	I	375	I	0.30	I	750	I	0.60	I	2,917	I	0.28	I	3,750	I	0.36	I
I	10–20	I	500	I	0.40	I	1,250	I	1.00	I	6,667	I	0.64	I	10,417	I	1.00	I
I	20–∞	I	—	I	—	I	1,250	I	1.00	I	—	I	—	I	10,417	I	1.00	I
							$r = 0.5$											
I	0– 5	I	278	I	0.22	I	278	I	0.22	I	648	I	0.04	I	648	I	0.04	I
I	5–10	I	194	I	0.16	I	472	I	0.38	I	1,458	I	0.09	I	2,106	I	0.13	I
I	10–20	I	556	I	0.44	I	1,028	I	0.82	I	7,256	I	0.47	I	9,362	I	0.60	I
I	20–∞	I	222	I	0.18	I	1,250	I	1.00	I	6,263	I	0.40	I	15,625	I	1.00	I
							$r = 1.0$											
I	0– 5	I	219	I	0.18	I	219	I	0.18	I	521	I	0.03	I	521	I	0.03	I
I	5–10	I	156	I	0.12	I	375	I	0.30	I	1,146	I	0.05	I	1,667	I	0.08	I
I	10–20	I	375	I	0.30	I	750	I	0.60	I	5,833	I	0.28	I	7,500	I	0.36	I
I	20–∞	I	500	I	0.40	I	1,250	I	1.00	I	13,333	I	0.64	I	20,833	I	1.00	I
							$r = 2.0$											
I	0– 5	I	153	I	0.12	I	153	I	0.12	I	370	I	0.01	I	370	I	0.01	I
I	5–10	I	125	I	0.10	I	278	I	0.22	I	926	I	0.03	I	1,296	I	0.04	I
I	10–20	I	167	I	0.14	I	445	I	0.36	I	2,379	I	0.08	I	3,675	I	0.12	I
I	20–∞	I	805	I	0.64	I	1,250	I	1.00	I	27,575	I	0.88	I	31,250	I	1.00	I

B. *Effects on the Lorenz Curve and the Gini Index*

The "collector effect" has some consequences for the Lorenz curve and the Gini index. We derive the points of the Lorenz curve $L(z_i)$ from the cumulative frequency S_k and cumulative income Y_k for the upper boundary z_i of each size

[2] Defined as the increase in the number of tax payers in an income interval.

group (see Table I):

$$(9) \qquad L(z_i) = \left\{ \frac{\sum_{k=1}^{m} Y_k}{Y}; \frac{\sum_{k=1}^{m} S_k}{S} \right\}.$$

In accordance with usual practice (e.g., [**10**]) we apply a linear approximation between these points of the Lorenz curve as well. For the purpose of a supplementary numerical characterization we take the Gini index, which is defined as the area between the Lorenz curve and its inverse and is estimated according to the following simple numerical approach:

$$(10) \qquad G = \sum_{i=1}^{m} [(S'_{i-1} + S'_i) \cdot Y'_i] - 1.^3$$

Figure 3 shows the linear-approximated Lorenz curve of the basic distribution ($r = 0$) and of the two extrapolations ($r = 0.5$ and $r = 2.0$). If we compare the Lorenz curve of the basic distribution and the Lorenz curve of the first extrapolation ($r = 0.5$) we can see that almost over the whole area the Lorenz curve shifts to the right. The Gini index G changes correspondingly from 0.3 ($r = 0$) to 0.353 ($r = 0.5$). On the other hand, if we compare the Lorenz curve of the basic distribution and the third extrapolation ($r = 2.0$), a shift to the left can be observed; then the Gini index G falls from 0.3 to 0.164 ($r = 2.0$). How can this "class phenomenon"[4] occur?

In addition, from the distribution function (3) and its inverse (5) a "quasi-continuous" Lorenz curve has been estimated (see Figure 3).[5] This curve could be called the "true" Lorenz curve, because it is independent of the classification of the income distribution. Any classification of an income distribution makes the estimation of a continuous "true" Lorenz curve impossible. The single points of the (basic or extrapolated) Lorenz curve $L(z_i)$ as well as single segments of the curve estimated from the classified distribution can be situated to the left or to the right of the "true" Lorenz curve.[6]

[3] These simple numerical approaches to the Lorenz curve and the Gini index lead to an underestimation of inequality (e.g., [**5**]); however these approaches are sufficient to demonstrate possible effects.

[4] Defined as shift of the Lorenz curve derived from a classified income distribution as the result of an income growth at a fixed rate.

[5] If we assume divisibility of S we can define any number of points of the Lorenz curve, because we have within the size intervals continuous distribution functions (in practice they are not given). The value of the Gini index of the "true" Lorenz curve is 0.342.

[6] As long as a suitable representation of a classified income distribution in a single continuous function is unsuccessful, only the estimation of single points of the Lorenz curve is possible (otherwise the Lorenz curve is a distribution function of the standardized inverse sum function [**15, 20**]). Changes in such approximated Lorenz curves could be caused exclusively by the "class phenomenon." This result is independent of the interpolation method used (e.g., Hermite interpolation [**7**] or parametric approaches [**10, 11**]). An alternative approach to the representation of a classified distribution in a density function "is to find an equation of the Lorenz curve which would fit actual data reasonably well" [**11**]. This approach must fail if actual data are already influenced by the "class phenomenon," especially if single points of the Lorenz curve are situated to the right of the "true" Lorenz curve.

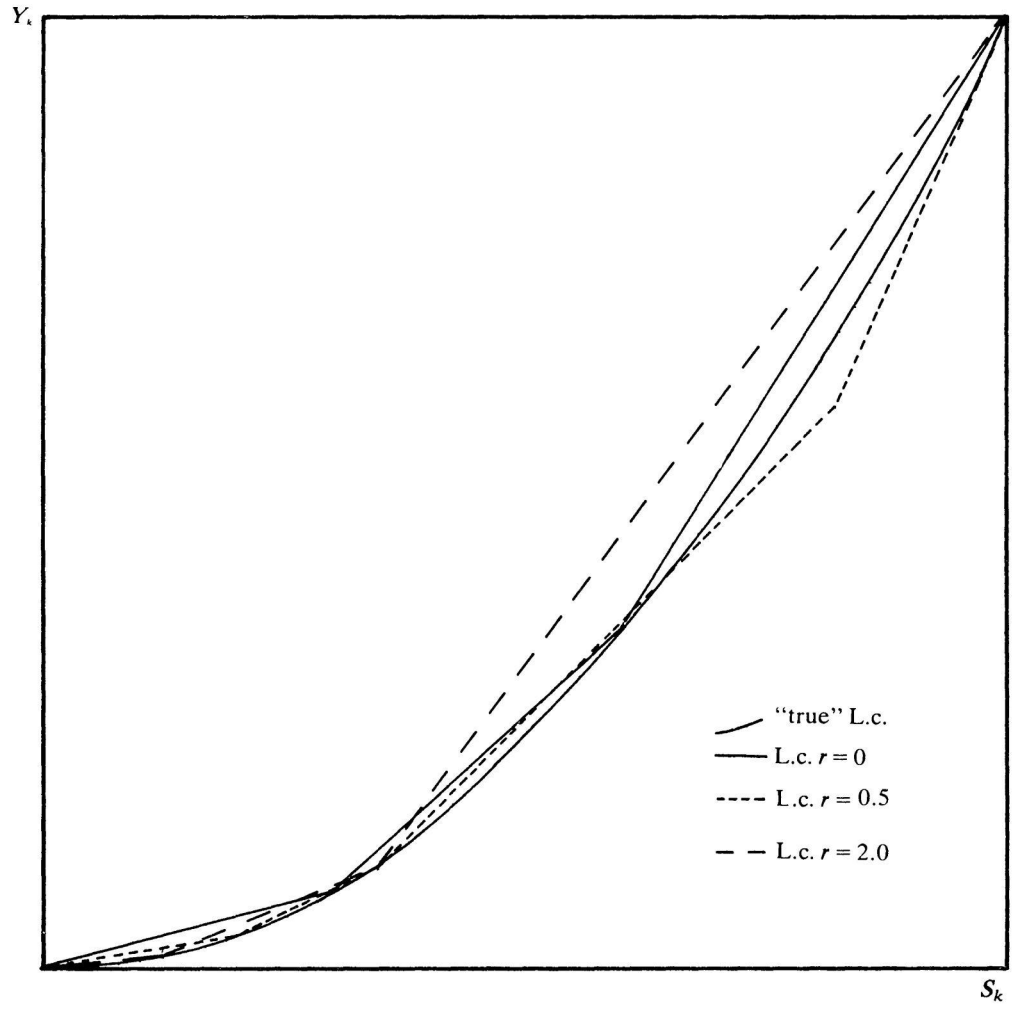


FIGURE 3.—Lorenz curves of the hypothetical distribution.

What are the factors which determine the direction and extent of the shift of the basic Lorenz curve when income grows at a fixed rate? The main factor has already been mentioned: (1) the classification of the income distribution, or, more precisely, (1a) the number of size groups m and (1b) the change (increase) in the length of interval $(z_i - z_{i-1})$ over the income scale. Another important factor (2) is the structure of the income distribution itself: (2a) uni- or multimodal, (2b) skewed to the left or skewed to the right. The last but not least factor (3) is the magnitude of income growth.[7]

[7] Naturally, the estimation method used will also affect the extent of the shift of the Lorenz curve. A more complicated method of interpolation (e.g., [**7**, **10**, **11**]) can reduce the extent of the shift but the shift itself must, in principle, remain.

The extent of the shift of the Lorenz curve is more severe, the smaller is the number of income classes, the stronger is the increase in the length of interval over the income scale, and if the distribution is multimodal. The direction is primarily dependent on the magnitude of income growth and the slope (skewed to the right or left) of the distribution. Naturally different combinations of these factors would lead to different results.

In our example we used only four income classes. Moreover the length of interval of the third and fourth is strongly increasing, and the distribution is multimodal. Therefore we have relatively large shifts of the Lorenz curve. The basic distribution ($r = 0$) is skewed to the left, because most of the tax payers are situated in the lower (first and second) income classes and the uppermost income class is empty (see Table I). After the first extrapolation ($r = 0.5$) the center of gravity of the distribution moves to the right, but the distribution itself remains skewed to the left. We observed above the "collector effect"; if, as a result of such "collector effect," the proportion of tax payers S_i' in one (or more) income interval is increasing and the proportion of the total income of the same class Y_i' is increasing too, but to a lesser extent, shifts of the Lorenz curve to the right are possible. The shift is very strong, if, as in the example (see Table I, $r = 0.5$), the proportion of tax payers S_i' in the third class interval increases, while the proportion of total income Y_i' falls.[8]

After further extrapolations ($r = 1.0$ and $r = 2.0$) the number of tax payers in the uppermost income class increases strongly; a "collector effect" occurs only in this class. The distribution becomes skewed to the right. As a result the points on the Lorenz curve $L(z_i)$ of the lower (especially the second lowest) classes shift sharply toward the origin (0; 0). Thus linear interpolation would bring about a strong shift of the Lorenz curve in the upper range toward the line of equal distribution although actually nothing has changed in the matter of distribution. If we assume theoretically an extremely high income growth at a fixed rate, almost all tax payers would be included in the uppermost income class. Then the Lorenz curve would still indicate an almost equal distribution. If we determine the Gini index by these Lorenz curve points we get corresponding results.

To summarize the argument, the effects on a classified income distribution of income growth at a fixed rate may lead to a shift of the Lorenz curve to the right or to the left; accordingly the Gini index may rise or fall. While in theory a shift to the left could conceivably proceed right up to the egalitarian line, a shift to the right is, in contrast, restricted.[9] The same effect should hold true for more complicated empirical income distributions. We shall now proceed to investigate the potential effects on a distribution given by German income tax statistics. This requires a preliminary closer but brief look at the method of interpolation and extrapolation of the empirical distribution.

[8] This occurs especially in the first income class with an increased extent of the class width. But as later investigations have proved it is also possible in lower income classes with equidistant class intervals.

[9] The value of the Gini index can never reach the maximum of one. According to experience the rise of the Gini index is mostly less than 20 per cent compared with the basic index.

3. EFFECTS OF INCOME GROWTH AT A FIXED RATE ON THE LORENZ CURVE AND THE GINI INDEX DERIVED FROM AN EMPIRICAL INCOME DISTRIBUTION

A. *The Method of Linear Interpolation of the Empirical Distribution*

As I mentioned in the introduction, our aim is to reconstruct the empirical income distribution by means of interpolation. Thus the individual classes of the empirical frequency distribution are to be represented by an interpolation function. Interpolation by spline functions, for example, suggests itself in this case and was employed especially by Bedau [**3**] and Spahn [**25**] for the representation and extrapolation of empirical income distributions. There are two disadvantages, however. The method involves a lot of mathematical work and does not supply economically useful data in the upper income classes; in these classes we usually fall back on an exponential function. Therefore a different method is developed here which is simpler and produces useful results in the entire income area. Its accuracy is almost equal to the spline functions.

Let's take as an example the distribution of tax payers of the "Lohnsteuerklasse I." This is based on the tax statistics of 1965 [**26**]. According to (1) the range y is divided into i disjunctive intervals. Consequently the vector of the class boundaries is

$$\vec{z} = (z_0, z_1, z_2, \ldots, z_m) \tag{11}$$

with $z_0 = 0$ and $z_m = \infty$.

The number of tax payers within the income classes are

$$S_i = S(z_{i-1} \leqslant y < z_i). \tag{12}$$

This simple frequency distribution is transformed into the cumulative frequency distribution by adding the class frequencies in the upper class limits (upward cumulation):

$$S(z_i) = \sum_k S_k \qquad (k = 0, 1, 2, \ldots, m). \tag{13}$$

The corresponding vector is

$$\vec{S} = (S_0, S_1, S_2, \ldots, S_m) \tag{14}$$

with $S_0 = 0$ and $S_m = S$.

The linear interpolation of the cumulative numbers of tax payers in the lower and upper class limits results in the corresponding absolute sum polygon. We thus assume that the increase in function values is proportional to the increase in argument values.[10] The area above the upward cumulated sum polygon is the total sum of data [**20**], in this case the income of all tax payers. Consequently we determine by the two-point-formula[11] m linear equations of general form for each income class:

$$y_{ij} = a + bS_{ij} \qquad (j = 1, 2, 3, \ldots, n), \tag{15}$$

[10] The distribution within the width intervals is unknown (contrary to the example above).

[11] $P_{i-1}(S_{k-1}; z_{i-1})$ and $P_i(S_k; z_i)$.

where y_{ij} represents the individual income of the jth tax payer in the ith income class. Now, if we take the integral over the tax payers of the single income class, we get the income of the corresponding income class Y_i,

$$(16) \qquad Y_i = \int_{S_{k-1}}^{S_k} y(S_{ij})\, dS_{ij},$$

and consequently, after having cumulated upward, the income vector

$$(17) \qquad \vec{Y} = (Y_1, Y_2, Y_3, \ldots, Y_m).$$

This simple linear interpolation of the empirical sum polygon (the lower class boundary of the lowermost income class z_0 and the upper class boundary of the uppermost open-ended income class z_m were established heuristically)[12] gives us useful results in the intermediate income classes. The deviations from the empirical data in the upper income classes, however, are not acceptable. The reason is that the number of tax payers is not uniformly distributed within these classes in particular. To reach a better approximation to the actual distribution of tax payers within the classes, one intermediate value per class in the center of the class has been interpolated as

$$(18) \qquad S_k^c = S\left(\frac{z_i - z_{i-1}}{2}\right).$$

Interpolation is done by continued fractions and the inverted-difference-scheme.[13] Subsequently we submit the intermediate value S_k^c again to a linear interpolation and get two linear equations per income class according to (15). Then we integrate again according to (16) over the two equations and get the income of the corresponding income class Y_i.

To prove the efficiency of this method the empirical income per income class Y_i as well as the average class income y_i is contrasted in Table II with the data produced by the method we described above. In the lower groups the income is slightly underestimated, in the upper classes, however, slightly overestimated. The biggest difference in the single income class is between −4.4 per cent and +5.3 per cent. The total income of all classes deviates by −1 per cent from the statistical data. This accuracy seems absolutely sufficient to justify the use of the "synthetic" distribution for further investigations.[14]

B. *The Extrapolation of the "Synthetic" Distribution*

Now let us assume that the incomes of all tax payers y_{ij} rise at a fixed rate r in the period t. Consequently all parts of the sum polygon shift to the right according to

[12] The values of the lower class boundary of the lowermost income class z_0 and the upper class boundary of the uppermost income class z_m were estimated at $z_0 = 200$ DM and $z_m = 200{,}000$ DM, because these values lead to the best approximation of the empirical total income Y_i in these class intervals.

[13] For reference, see [**8**]. The FORTRAN SUBROUTINE ACFI is printed in [**9**].

[14] This method has been especially effective in the simulation of changes in fiscal law [**16, 17, 18**].

TABLE II

THE EMPIRICAL DISTRIBUTION

$z_{i-1} \leq y < z_i$	S_i	Y_i^a	y_i	$Y_i^{a,b}$	y_i^b	S_i^c	Y_i^c	y_i^c
0–1,200	613,212	440,624	719	429,795	701	538,338	402,977	749
1,200–2,400	753,490	1,306,487	1,734	1,357,261	1,801	507,477	913,570	1,800
2,400–3,600	433,657	1,299,242	2,996	1,263,330	2,913	350,231	1,043,234	2,979
3,600–4,800	488,041	2,049,139	4,199	1,958,138	4,012	300,106	1,261,259	4,203
4.800–6,000	580,585	3,146,297	5,419	3,044,851	5,244	293,374	1,619,270	5,519
6,000–7,200	662,117	4,375,093	6,608	4,282,002	6,467	307,552	2,026,466	6,589
7,200–8,400	681,119	5,305,714	7,790	5,306,278	7,791	330,407	2,572,226	7,785
8,400–9,600	589,467	5,309,747	9,008	5,289,300	8,973	354,319	3,182,168	8,981
9,600–10,800	443,858	4,511,368	10,164	4,472,816	10,077	374,021	3,807,939	10,181
10,800–12,000	290,873	3,310,013	11,380	3,265,482	11,226	385,438	4,388,995	11,387
12,000–16,000	309,309	4,145,282	13,402	4,149,511	13,415	1,097,246	15,050,396	13,717
16,000–20,000	62,988	1,106,718	17,570	1,116,221	17,721	583,549	10,141,606	17,379
20,000–25,000	18,198	399,834	21,971	407,304	22,382	314,438	6,797,112	21,617
25,000–36,000	5,603	160,026	28,561	168,065	29,996	155,491	4,344,095	27,938
36,000–50,000	1,036	42,559	41,080	44,457	42,912	33,153	1,322,687	39,896
50,000–75,000	315	18,473	58,644	19,450	61,745	7,287	411,704	56,502
75,000–100,000	60	5,072	84,533	5,330	88,828	1,132	94,827	83,797
100,000–∞	45	7,022	156,044	6,941	154,245	416	68,491	164,643

[a] In 1,000 DM.
[b] "Synthetic" distribution.
[c] Extrapolated distribution ($t = 5$).

this percentage r. In other words, the vector of the class boundaries is multiplied by $(1+r)$:[15]

$$\vec{z}^t = \vec{z}(1+r) = (z_0(1+r), z_1(1+r), \ldots, z_m(1+r)). \tag{19}$$

We now coordinate the vector of the transformed (extrapolated) class boundaries $\vec{z}^t$ and the vector of the cumulated numbers of tax payers $\vec{S}(14)$.

Then (13) changes to

$$S(z_i^t) = \sum_{k=1}^{m} S_k. \tag{20}$$

The linear equation y_{ij} for each income interval with extrapolated class boundaries $z_{i-1}^t \leqslant y < z_i^t$ is now determined by[16]

$$y_{ij}^t = (1+r) \cdot (a + bS_{ij}) \tag{21}$$

and the total income per income class is

$$Y^t(z_{i-1}^t \leqslant y < z_i^t) = \int_{S_{k-1}}^{S_k} y^t(S_{ij})\, dS_{ij}. \tag{22}$$

The total income and naturally the average income per income class have risen by exactly r per cent.

The result of this procedure is an income distribution in *extrapolated* class boundaries. Since the number of tax payers in the single income classes stays constant and the incomes in all income classes have risen linearly at the same time, it should be quite clear that the Lorenz curve and the Gini index remain unaltered.

For further investigations the distribution of the increased total income $Y^t = Y(1+r)$ within the *original* class boundaries is of interest. To estimate the new number of tax payers in the original class intervals $z_{i-1} \leqslant y < z_i$ we have to derive the inverse of the function (21):

$$S_{ij} = \frac{y_{ij}^t}{b(1+r)} - \frac{a}{b}. \tag{23}$$

If we take for y_{ij}^t the original upper class boundaries z_i, we get the new cumulative numbers of tax payers within the original income intervals,

$$S_k^t = \frac{z_i}{b(1+r)} - \frac{a}{b}, \tag{24}$$

and so the corresponding vector

$$\vec{S}^t = (S_0^t, S_1^t, S_2^t, \ldots, S_m^t). \tag{25}$$

[15] For the sake of simplicity the intermediate values according to (18) are neglected.

[16] $P_{i-1}^t(S_{k-1}; z_{i-1}^t)$ and $P_i^t(S_k; z_i^t)$.

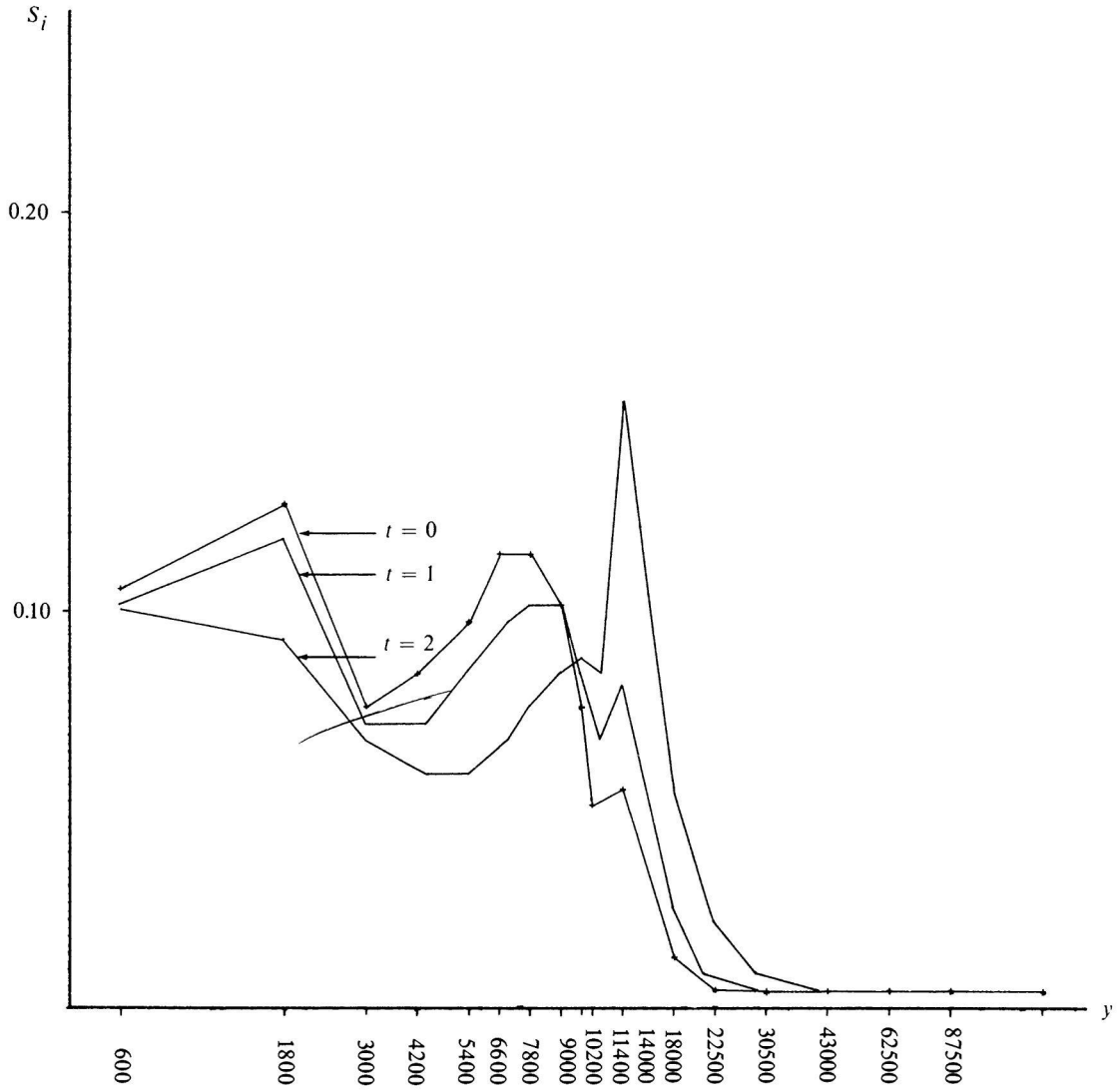


FIGURE 4.—Relative frequency polygon.

The extrapolated incomes within the original class intervals follow from the integral of function (21), but in the limits given by vector (25):

$$(26) \qquad Y^t(z_{i-1} \leq y < z_i) = \int_{S^t_{k-1}}^{S^t_k} y^t(S_{ij})\, dS_{ij}.$$

Figure 4 shows the relative frequency polygon (basic period and two extrapolations), which is extrapolated periodwise by 10 per cent, and Figure 5 the corresponding relative sum polygon, both within the *original* class boundaries. In Figure 4 we see that the lower income classes are increasingly depleted by an accelerating income growth in favor of the intermediate and upper income classes.[17]

[17] In Table II additionally the values after the fifth extrapolation are represented.

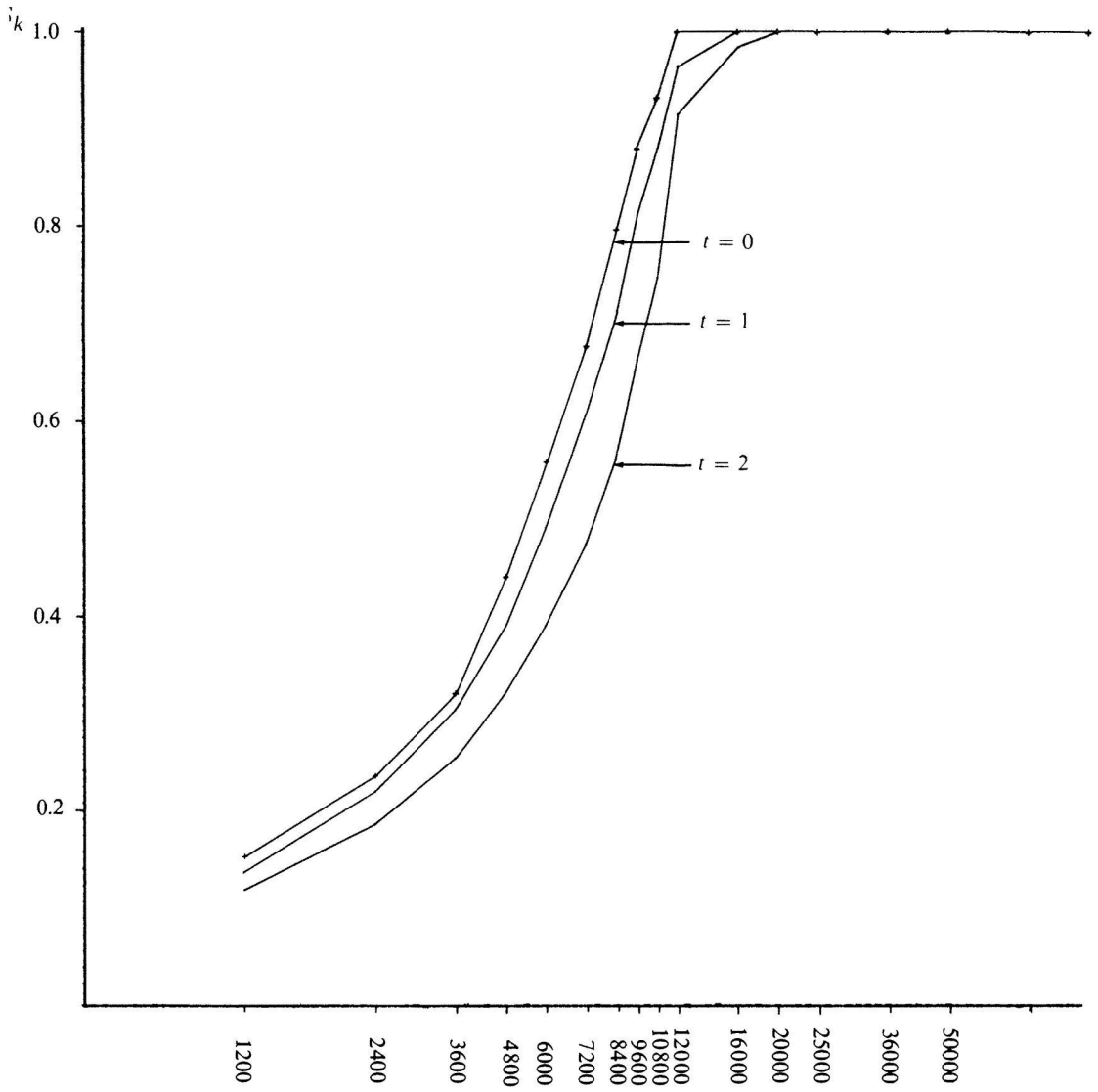


FIGURE 5.—Relative sum polygon.

C. *Effects on the Lorenz Curve and the Gini Index*

These developments correspond to the "collector effects" in our hypothetical distribution observed above. The single points of the Lorenz curve $L(z_i)$ are estimated according to (9) and we apply a linear interpolation between these points of the Lorenz curve as well. Now the Gini index is defined as

$$G = 1 - 2 \cdot \int_0^1 \text{LOCUR}. \tag{27}$$

We determine the integral over the Lorenz curve by the trapezoid rule. If we extrapolate this distribution in *extrapolated* class boundaries, the Lorenz curve

and Gini index, as we have already seen, remain unaltered. This, however, is *not true* for the extrapolation of the basic distribution in *original* (constant) class boundaries. If we assume an income growth of only 10 per cent per period, shifts in the proportion of tax payers and in the proportion of total income between the class intervals occur. We find here "collector effects" already in the intermediate income classes.[18] These effects result in a slight shift of the Lorenz curve, period by period, to the right in the intermediate and upper area, thus indicating an increasing inequality. The Gini index changes correspondingly (see Table III). It rises from 0.359 in the basic period ($t = 0$) to 0.391 in the fifth period ($t = 5$). The Lorenz curve and the Gini index of an empirical income distribution too might be falsified by the "class phenomenon."

TABLE III
GINI INDICES

t	$(1+r)$	G
0	1.0	0.3591
1	1.1	0.3607
2	1.21	0.3689
3	1.331	0.3770
4	1.4641	0.3845
5	1.61051	0.3908

4. CONCLUDING REMARKS

The purpose of this paper is primarily to indicate the problems connected with the intertemporal comparability of Lorenz curves and Gini indices estimated by standard numerical approaches in the case of classified empirical income distributions and income growth at a fixed rate. If we consider Lorenz curves of income distributions of two successive periods on the basis of actual observed data,[19] we have to reckon with changes in the Lorenz curve, caused partly by the "class phenomenon." This was shown in our examples and this renders the analysis of actual redistribution processes more difficult and—especially if inflation increases—may even make it impossible.

As far as simulations with classified distributions are concerned, there is a simple way out. By increasing the class boundaries of the basic date with uniform income growth we can avoid the "collector effect." The Lorenz curve and Gini index then remain constant [**18**]. A similar extrapolation of class boundaries in the official statistics as well would in practice probably fail, because a workable "uniform income growth" would prove most difficult to define. An income scale, which develops mathematically as a geometric series, would be preferable. If we were to introduce a new uppermost income class, especially following periods of

[18] The first "collector effect" can be recognized in the class interval $9{,}600 \leq y < 10{,}800$.

[19] Which include, of course, different individual income growth in the case of different income levels, and additional growing or declining numbers of income recipients.

sharp income growth, the "class phenomenon" would, at least for some time, be removed.[20]

As long as consequences of this kind are not drawn for official statistics, potential "collector effects" in the intertemporal analysis of empirical income distributions have to be reckoned with and have to be included in the analysis. If this is not done, we risk infering redistribution effects which have not really happened.

Kiel Institute of World Economics

Manuscript received April, 1977; final revision received February, 1978.

REFERENCES

[1] ATKINSON, A. B.: "On the Measurement of Inequality," *Journal of Economic Theory*, 2 (1970), 244–263.

[2] BAMBERG, G.: "Bayes-Verfahren zur Schätzung von Einkommensverteilungen," *Zeitschrift für Wirtschafts- und Sozialwissenschaften*, (1976), 1–13.

[3] BEDAU, K. D.: "Darstellung und Fortschreibung von Einkommensschichtungen unter Verwendung von Spline-Funktionen," *Vierteljahreshefte zur Wirtschaftsforschung*, (1969), 406–425.

[4] GASTWIRTH, J. L.: "A General Definition of the Lorenz Curve," *Econometrica*, 39 (1971), 1037–1039.

[5] ———: "The Estimation of the Lorenz Curve and Gini Index," *Review of Economics and Statistics*, 54 (1972), 306–316.

[6] GASTWIRTH, J. L., AND J. T. SMITH: "A New Goodness of Fit Test," Proceedings of the Business and Economics Section of the *American Statistical Association*, 34 (1972), 320–322.

[7] GASTWIRTH, J. L., AND M. GLAUBERMAN: "The Interpolation of the Lorenz Curve and the Gini Index from Grouped Data," *Econometrica*, 44 (1976), 479–483.

[8] HILDEBRAND, F. B.: "Introduction to Numerical Analysis," New York/Toronto/London: McGraw-Hill, 1956.

[9] IBM APPLICATION PROGRAM: System 360, Scientific Subroutine Package, Version 3, Programmers Manual.

[10] KAKWANI, N. C., AND N. PODDER: "On the Estimation of Lorenz Curve from Grouped Observations," *International Economic Review*, 14 (1973), 278–292.

[11] ———: "Efficient Estimation of the Lorenz Curve from Grouped Observations," *Econometrica*, 44 (1976), 137–148.

[12] KESTENBAUM, B.: "Evaluating SSA's Current Procedures for Estimating Untaxed Wages," Proceedings of the Social Statistics of the *American Statistical Association*, Part II, 19 (1976), 461–465.

[13] KOCH, W.: "Einkommensschichtung und Steuertarif," *Jahrbücher für Nationalökonomie und Statistik*, 189 (1975), 42–64.

[14] KRUPP, H. J.: "Empirische Ansätze zur Erklärung der personellen Einkommensverteilung," in "Neue Aspekte der Verteilungstheorie" (Schriftenreihe des Wirtschaftswissenschaftlichen Seminars Ottobeuren, Bd. 2), ed. by G. Bombach, B. S. Frey, and B. Gahlen. Tübingen, 1974, pp. 99–134.

[15] LEVINE, D. B., AND N. M. SINGER: "The Mathematical Relation between the Income Density Function and the Measurement of Income Inequality," *Econometrica*, 38 (1970), 324–330.

[16] PETERSEN, H.-G.: "Ein Vorschlag zur Reform des Einkommensteuertarifs 1978," *Finanzarchiv*, N.F., 35 (1976/77), 128–146.

[17] ———: "On the Measurement of Progression," Diskussions beiträge aus dem Institut für Finanzwissenschaft der Universität Kiel, No. 3, Kiel, 1977.

[20] Desirable in addition to the classified income distribution in official statistics would be the introduction of a decile distribution which would show no "collector effects" as a result of an income growth at a fixed rate.

[18] ———: "Personelle Einkommensbesteurerung und Inflation. Eine theoretisch-empirische Analyse der Lohn- und veranlagten Einkommensteuer in der Bundesrepublik Deutschland," in *Finanzwissenschaftliche Schriften*, Bd. 5, ed. by W. Albers a.o. Frankfurt/Bern/Las Vegas: Peter Lang, 1977.

[19] PIESCH, W.: "Lorenzkurve und inverse Verteilungsfunktion," *Jahrbücher für Nationalökonomie und Statistik*, 185 (1971), 209–234.

[20] ———: "Statistische Konzentrationsmaße," in Tübinger Wirtschaftswissenschaftliche Abhandlungen, Bd. 18. Tübingen: J. C. B. Mohr (Paul Siebeck), 1975.

[21] ROTHSCHILD, M., AND J. E. STIGLITZ: "Some Further Results on the Measurement of Inequality," *Journal of Economic Theory*, 6 (1973), 188–204.

[22] SALEM, A. Z. B., AND T. D. MOUNT: "A Convenient Description Model of Income Distribution: The Gamma Density," *Econometrica*, 42 (1974), 1115–1127.

[23] SCHAICH, E.: Lorenzfunktionen und Gini-Koeffizient in kritischer Betrachtung," *Jahrbücher für Nationalökonomie und Statistik*, 185 (1971), 193–208.

[24] SINGH, S. K., AND A. S. MADDALA: "A Function for the Size Distribution of Income," *Econometrica*, 44 (1976), 963–970.

[25] SPAHN, P. B.: "Die Besteuerung der persönlichen Einkommen in der Bundesrepublik Deutschland—System und Modell," unpublished dissertation, Berlin, 1972.

[26] STATISTISCHES BUNDESAMT: Fachserie L, Finanzen und Steuern, Reihe 6, II. Lohnsteuer 1965. Stuttgart/Mainz: W. Kohlhammer, 1971.

→

Chapter 1:

Redistribution – Theory and Measurement

1.1.

Effects of Growing Incomes on Classified Income Distributions, the Derived Lorenz Curves, and Gini Indices

(Econometrica, New Haven/Conn., Vol. 47 (1979), pp 183-195

1.2.

"Just" Tax Scales at Alternative Sacrifice Principles and Utility Functions

Co-authors: Friedrich Hinterberger and Klaus Müller

(FinanzArchiv, Tübingen, N. F. Vol. 45 (1987), pp 45 – 69)

1.3

Redistribution and the Efficiency/Equity Trade-off

(Studi Economici, Milano, No. 82, 2004, pp 5 – 42)

1.4.

Pros and Cons of Negative Income Tax

(Herbert Giersch (Ed): Reforming the Welfare State, Springer Berlin et al. 1997, pp 53 – 82)

"Just" Tax Scales at Alternative Sacrifice Principles and Utility Functions

Friedrich Hinterberger, Klaus Müller, and Hans-Georg Petersen

I. Problem

In his famous essay "On Progressive Taxation" COHEN STUART has disproved the at that time dominating hypothesis[1] that due to falling marginal utility a just and fair income taxation has necessarily to be progressive.[2] "As soon as we leave the well-trodden path of taxation proportional to income, we find ourselves in a wide open space where we can follow any number of pathes, ranging of those which deviate very little from the road of proportionality to those which lead to confiscation of all higher portions of income and equalization of all incomes".[3] FRISCH has clearly demonstrated the far reaching assumptions of the utility oriented deduction of just tax scales and tax redistribution. In connection with his empirical studies on the marginal utility of income he has analysed different concepts of a just distribution of tax burdens, in which the principle of an equal relative sacrifice as mentioned by COHEN STUART is only one special case.[4]

---

1 See A.J. COHEN STUART: On Progressive Taxation (translated by J.C. Te Velde, excerpt from the Dutch original from 1889), in: R.A. Musgrave and A.T. Peacock (Ed.): Classics in the Theory of Public Finance, London - New York 1958, pp. 48-68. COHEN STUART refers in his article to A. WAGNER: Finanzwissenschaft, 2. Part, Leipzig 1880, p. 355.

2 HALLER deserves the merit to commemorate this discussion for the academic profession; see H. HALLER: Bemerkungen zur progressiven Besteuerung und zur steuerlichen Leistungsfähigkeit, in: Finanzarchiv, N. F., Vol. 20, 1960, pp. 35-57, and H. HALLER: Die Steuern, 3. Ed, Tübingen 1981, pp. 82-86.

3 A.J. COHEN STUART: On Progressive Taxation, ibid., p. 67.

4 R. FRISCH: New Methods of Measuring Marginal Utility, in: E. Lederer and J. Schumpeter (Ed.): Beiträge zur ökonomischen Theorie, Vol. 3, Tübingen 1932, pp. 114-135.

For a deduction based on utility theory principally the following assumptions are necessary:

(1) It has to be defined what a *"just" distribution of tax sacrifice* (loss in utility) means (e. g. equal absolute, relative or marginal sacrifice).

(2) A cardinal[5] *utility function* has to be defined, which is valid for all taxpayers and describes the utility *U*, which is derived from the current income *x*.

If both definitions are given, the derivation of a "just" tax scale can be reduced to a purely mathematical problem. However, FRISCH has only derived the general conditions and COHEN STUART merely determined the tax scales for some utility functions and specific income brackets. Modern computer based simulation methods allow to calculate the different resulting tax scales if all sacrifice principles which can be found in the literature are applied and combined with the alternative utility functions over the whole income range.[6] Then the respective tax yield functions are derived and analysed in using the today methods for the determination of the type of the tax scale (progression, proportionality, regression).[7] Then the spectrum ranges from a differentiating lump sum tax to a totally equalizing progression, which is much broader as was mentioned in the introductory cited proposition of COHEN STUART.

II. Alternative Sacrifice Theories and Utility Functions

Sacrifice based justifications, which evaluate the utility withdrawal as a “sacrifice” of the taxpayer for the advantage of the state, have been formulated in different specifications. The specific sacrifice theory delivers justice hypotheses; combined with concrete utility functions “just“ tax scales can be derived from such an approach.

1. Possible Characteristics of Sacrifice Theories

A whole set of justice hypotheses are to be found in the literature; beside the principles already mentioned above, additionally the postulations for an *equal absolute nominal burden* and an *equal relative normal burden* have to be added. The former corresponds to a lump sum tax, which in the practice of today’s tax policy does not play any remarkable role but is of relevance in the optimal taxation literature. From the latter postulate a proportional tax scale can be derived, which has been the base for the distribution of tax burdens in the classical theories. Hence, MILL has stated that proportionality can be derived from SMITH tax principles,[8] in spite of the fact that later authors have been of the opinion that in SMlTH writings first attempts to justify progressive tax scales can be found. Be that as it may, in this

---

5 If the method of FRISCH is applied, the function must be twice differentiable.

6 The authors would like to thank L. PETERSEN, who has written the necessary plotter program on an Olivetti M 24.

7 See M. BLÖCKER und H.-G. PETERSEN: Eine vergleichende Analyse der deutschen Einkommensteuertarife 1958, 1965 und 1975 unter Einbeziehung des Progressionsgrades, in: Public Finance, Vol. 30, 1975, pp. 347-365.

8 See J.St. MILL: Principles of Political Economy, 6. Ed., London 1965, here: pp. 395.

analysis the lump sum tax and proportionality are taken as *possible results* of such a utility based approach but not as independent concepts of a just tax burden distribution.

Table 1 taken from FRISCH[9] shows the well known justice principles based on the sacrifice theory;[10] also the names of the respective authors are mentioned in the sources cited there. For the justice hypothesis of an equal change of the marginal utility an author is missing so that this hypothesis might have been developed by FRISCH himself.[11] As already mentioned above, FRISCH does not postulate a given utility function but analyses under which conditions for given utility functions a progressive tax scale will result. As an example the derivation for the justice postulate "equal relative sacrifice" is presented where as measure of progression the average tax rate elasticity $E_{\bar{t},x}$ has been used (with $\bar{t}$ as average tax rate and x as income):

$$E_{\bar{t},x} = \frac{d\bar{t}}{dx} \cdot \frac{x}{\bar{t}} \quad \begin{cases} > 0 : \textit{progression} \\ = 0 : \textit{proportionality} \\ < 0 : \textit{regression} \end{cases} \tag{2.1}$$

[9] See. R. FRISCH: New Methods of Measuring Marginal Utility, opt. cit.., p. 135.

[10] See also M.A. PIGOU: A Study in Public Finance, 3. Edl., London 1956, here: p. 89.

[11] For the sake of completeness it should be mentioned that also postulates for an equal absolute change of average utility or equal relative change of average utility are possible justice hypotheses, respectively. In the following these hypotheses are neglected.

Table 1

Justice Functions

Author	Justice Hypothesis		Condition for Progression
	verbal	formal	
E. SAX [a]	Equal absolute sacrifice (EAS)	$U(x)-U(x-t)=g$	$-E_{U',x}>1$
A.J. COHEN STUART u.a.	Equal relative sacrifice (ERS)	$\frac{U(x)-U(x-t)}{U(x)}=g$	$E_{U,x}-E_{U',x}>1$
F.Y EDGEWORTH [b]	Equal marginal utility or minimal sacrifice (MS)	$U'(x-t)=g$	$U''(x)<0$
R. FRISCH	Equal absolute change in marginal utility (EACMU)	$U'(x-t)-U'(x)=g$	$-E_{U'cx}-E_{(E_{U',x}),x}>0$
K. SCHÖNHEYDER R. MEYER [c]	Equal relative change in marginal utility (ERCMU)	$\frac{U'(x-t)-U'(x)}{U'(x)}=g$	$-E_{(E_{U',x}),x}>0$

[a] See E. SAX: Grundlegung der theoretischen Staatswissenschaft, Wien 1887, and E. SAX: Wertungstheorie der Steuern, in: Zeitschrift für Volkswirtschaft und Sozialpolitik, N.F., Vol. 4 1924, pp. 224-227.
[b] See F.Y. EDGEWORTH: Papers Relating to Political Economy, Edition by B. Franklin, New York n. d.
[c] R. MEYER: Die Prinzipien der gerechten Besteuerung, Berlin 1884.

Source: R. FRISCH: New Methods of Measuring Marginal Utility, opt. cit., p. 135.

For "small" tax rates approximately the following equation holds true[12]:

$$U(x) - U(x-t) = U' \cdot \Delta x = U' \cdot t \,, \tag{2.2}$$

where t presents the tax yield. Using this simplification the postulate for the equal absolute sacrifice is defined as:

$$g = U' \cdot t = const \,. \tag{2.3}$$

or

$$t = g / U' \tag{2.4}$$

or

$$\bar{t} = \frac{g}{x \cdot U'} \,. \tag{2.5}$$

The total differential $d\bar{t}$ is:

$$d\bar{t} = -\frac{g}{x^2 \cdot U'} \cdot dx - \frac{g}{x \cdot U'^2} \cdot dU' \tag{2.6}$$

and after some transformations:

$$E_{\bar{t},x} = -1 - \frac{dU'}{dx} \cdot \frac{x}{U'} \tag{2.7}$$

or

$$E_{\bar{t},x} = -1 - E_{U',x} \,, \tag{2.8}$$

where $E_{U',x}$ is the elasticity of marginal utility related to income; as criteria for the type of tax scale in case of the absolute equal sacrifice results with:

$$-E_{U',x} \begin{cases} > 1: \textit{progression} \\ = 1: \textit{proportionality} \\ < 1: \textit{regression} \end{cases}$$

In the last column of table 1 the identically derived progression conditions are shown. These progression conditions clearly reveal that for each course of the tax scale the utility functions and its derivations are of relevance.

---

[12] The approximation by integration and power series development is substituted by the more simple and equally effective depiction by differentials.

For the derivation of the tax scale for the whole income range, in case of the ERS principle full information on the total utility function (and derivative) is necessary. For the other sacrifice principles the information about the marginal utility function is sufficient.[13]

2. The Applied Utility Functions

In the following for three specified utility functions often used in the literature the possible tax scales will be derived presumed that alternative justice hypotheses are applied.

The first of these functions is:

$$U = a \cdot \ln x + b, \tag{2.9}$$

which is often denoted as *"general BERNOULLI utility function"*. The most simple special case in which the marginal utility is reciprocally proportional to income is the "BERNOULLI utility function" with $a = 1$ and $b = 0$ (see figure 1).[14] Next the function

$$U = c \cdot \sqrt{x} + d, \tag{2.10}$$

is used which is called *"general COHEN-STUART utility function"*.[15] A special case is the function used by COHEN STUART with $c = 2$ and $d = 0$. Finally a quadratic function

$$U = e - f \cdot x - 0{,}5 \cdot h \cdot x^2 \tag{2.11}$$

is implemented and usually denoted as *"general GOSSEN utility function"*. The special case with $e = 0$ is named "GOSSEN utility function".[16] It has a linear average and marginal utility function which are zero for $x = f/h$. Contrary to the BERNOULLI- and COHEN STUART functions the GOSSEN function has a point of saturation. For the assurance of comparability and the avoidance of otherwise necessary differentiations, this function is only analysed left from the point of saturation.

In figure 1 the courses of these three types of functions as well as the average and marginal utility functions are illustrated.

---

[13] In case of the ERS principle information on the marginal utility function is sufficient because for the disintegration to t the constant of integration is omitted.

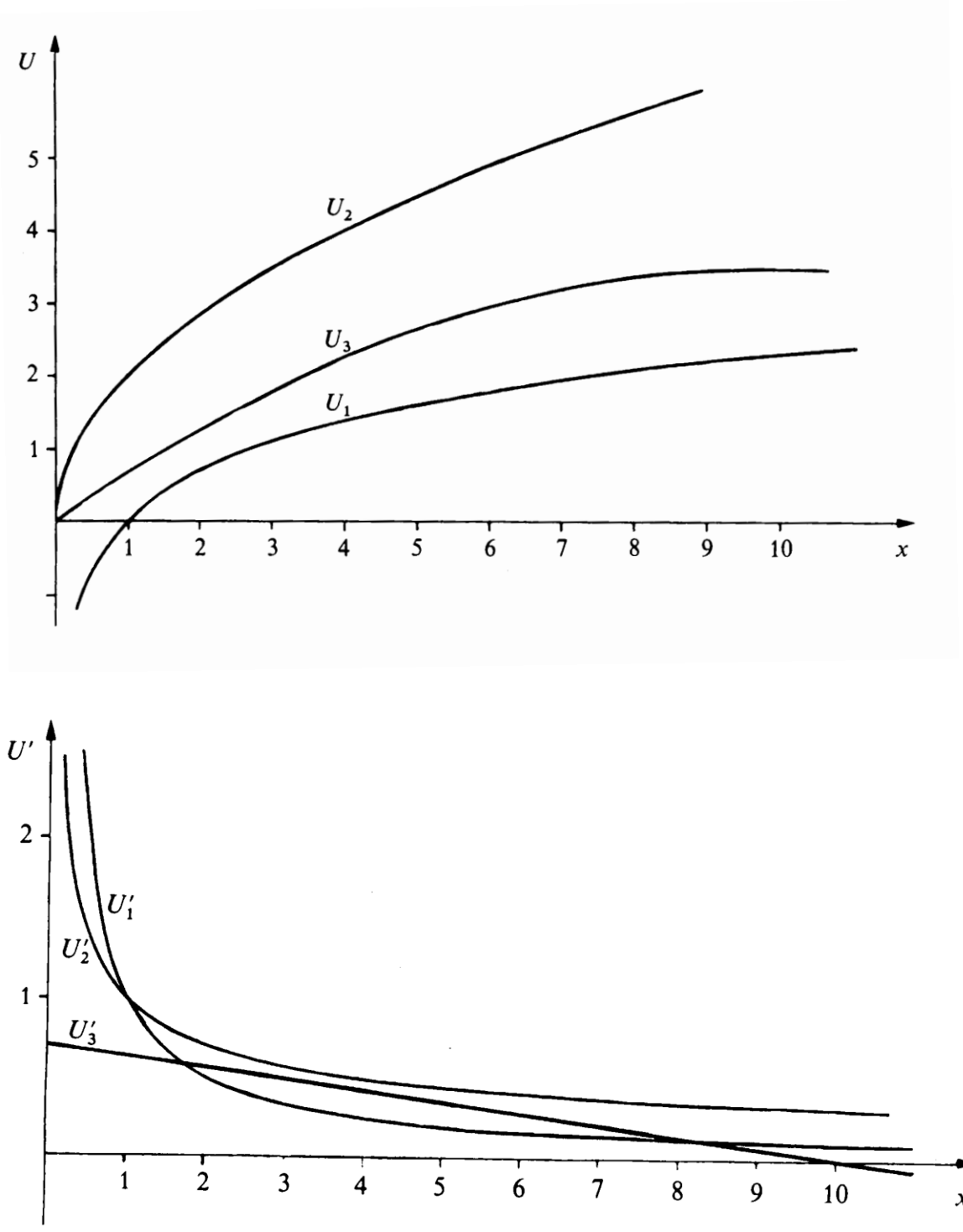
[14] See D. BERNOULLI: Specimen theoriae novae de mensura sortis, German translation ed. by A. Pringsheim, Leipzig 1896, here: pp. 30.

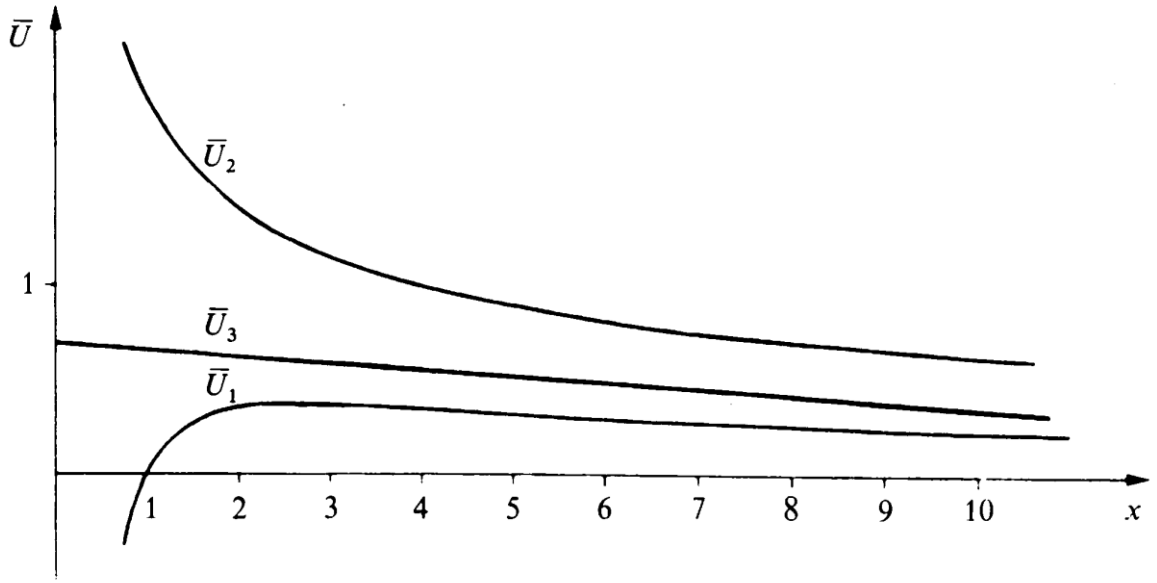
[15] The COHEN-STUART function corresponds to a COBB-DOUGLAS function with a degree of homogeneity of 0,5.

[16] See P.A. SAMUELSON: Foundations of Economic Analysis, Cambridge 1947, here: p. 93.

Figure 1

BERNOULLI ($U_1 = \ln x$), COHEN STUART ($U_2 = 2 \cdot \sqrt{x}$) *and* GOSSEN ($U_3 = 0{,}7 \cdot x - 0{,}5 \cdot 0{,}07 \cdot x^2$) Utility Functions and the Corresponding *Marginal* (U'_1, U'_2 *and* U'_3) and *Average Utility Functions* ($\overline{U}_1, \overline{U}_2$ *and* $\overline{U}_3$)





III. Tax Scale Types for Alternative Sacrifice Principles and Utility Functions

As mentioned above no concrete tax scale type can be simply derived from a specific justice hypothesis, although prima vista the concept of an equal relative utility withdrawal seems to correspond to a progressive schedule. Not even a tax yield being higher for the "rich" then the "poor" can be based on each of the five sacrifice concepts. In the following exemplary tax scales are shown and analysed. Then a systematic overview on the results for alternative justice hypotheses and utility functions are presented. In a first step the constant term in the utility functions is set to zero *(b, d* and *e).* Afterwards the so-called "initial value problem" will be discussed.[17]

1. "Typical" Tax Scales over the Whole Income Range for Functions without Constant Term

We start with the equal absolute sacrifice concept (EAS). The justice function G results with

$$G(U,x,t) = U(x) - U(x-t) = g = const\,. \tag{3.1}$$

Here the problem arises that meaningful solutions are only possible as long as $U(x) > g$. For the income where $U(x) = g$ (*which is called* x_U) the income is equal to the tax yield $(x = t)$.

[17] See A.J. COHEN STUART: On Progressive Taxation, opt. cit.., pp. 57.

If the utility function (2.9) is inserted into this justice function, the following expression results

$$a \cdot \ln x - a \cdot \ln(x-t) = g \tag{3.2}$$

or

$$\ln\left(\frac{x}{x-t}\right) = \frac{g}{a} \tag{3.3}$$

and

$$t = x \cdot (1 - e^{(-g/a)}) \tag{3.4}$$

with the marginal tax rate

$$t' = 1 - e^{(-g/a)} = \bar{t}\,, \tag{3.4a}$$

which also coincides with the average tax rate. The average rate progression $\bar{t}'$ as well as the second derivation of the average tax function $\bar{t}''$ are zero:

$$\bar{t}' = \bar{t}'' = 0\,. \tag{3.4b}$$

The derived tax scale corresponds to a *proportional schedule*. Figure 2 shows the course of the tax scale for the BERNOULLI function and the EAS principle. Left from the point *A,* where $x = x_u$, the proportional schedule cannot be justified with the EAS principle, what is represented in figure 2 by the hatched area.

In case of the ERS principle the justice function results with

$$\frac{\ln x - \ln(x-t)}{\ln x} = g \tag{3.5}$$

(where reasonably g must be $(0 < g < 1)$ [18] or

$$e^{(\ln x - g \cdot \ln x)} = x - t\,. \tag{3.6}$$

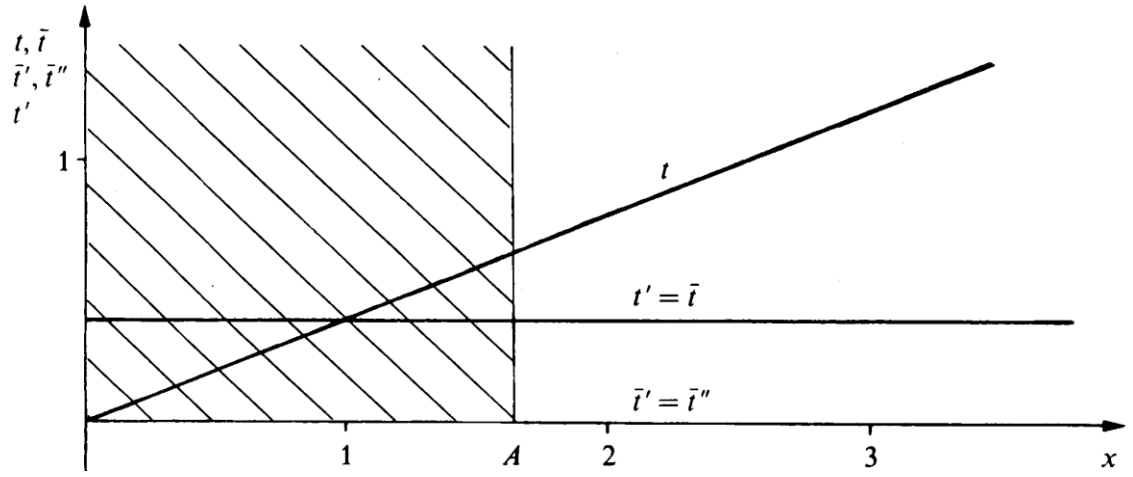
Resolved for *t* the tax yield function results with

$$t = x \cdot (1 - x^{-g})\,. \tag{3.7}$$

[18] The absolute utility loss has to be larger than zero but smaller than the total utility. The choice of the extent of g determines the volume of the tax revenue. For $g > 1$ a regression results, whereas a meaningful interpretation is no longer possible because the taxpayers are already in the negative utility area.

Figure 2

Tax Scale for a BERNOULLI Utility Function and the ERS Principle (Proportionality)



The marginal tax rate[19] results with

$$t' = 1 - (1-g)/x^g \tag{3.7a}$$

and the average tax rate with

$$\bar{t} = 1 - 1/x^g \,. \tag{3.7b}$$

The average rate progression

$$\bar{t}' = g \cdot x^{-(g+1)} \tag{3.7c}$$

is larger than zero and the second derivation of the average tax rate function

$$\bar{t}'' = -(g^2+g) \cdot x^{-(g+2)} \tag{3.7d}$$

is smaller than zero, therefore a *persistently delayed progression* results. The courses of the functions are represented in figure 3 for a BERNOULLI utility function.

[19] The marginal tax rate asymptotically approaches to one (100%): $\lim_{x \to \infty} dt/dx = 1$

COHEN STUART has also incorporated the area beyond $x = 1$ in his analysis and regarded $x = 1$ to a certain extent as minimum of subsistence[20], which has to be tax free and only beyond that amount the tax burden has to start. If $x = 1$ is taken as basic income of a negative income tax and includes the area $0 < x \leq 1$ into the analysis, it becomes apparent that the ERS principle combined with a BERNOULLI utility function requires a negative income tax.[21]

For the MS principle the justice function is as follows:

$$U'(x-t) = g \tag{3.8}$$

This condition leads for each utility function to a marginal tax rate which is equal to 100 % and to a tax exemption which represents the net income on which all the incomes (above and below) are levelled (totally equal income distribution). In this case not all values of g are meaningful. This is demonstrated in the example of the GOSSEN function; from (3.8) and (2.11) results

$$t = g/h + x - f/h \tag{3.9}$$

with

$$t' = 1 \tag{3.9a}$$

and

$$\bar{t} = (g/h)\cdot x^{-1} + 1 - (f/h)\cdot x^{-1}, \tag{3.9b}$$

being only meaningful if *g* is smaller than *f*, the latter determining the intercept point with the ordinate.[22]

The average rate progression and its derivates are

$$\bar{t}' = (-g/h)\cdot x^{-2} + (f/h)\cdot x^{-2} > 0 \text{ and} \tag{3.9c}$$

$$\bar{t}'' = (2\cdot g/h)\cdot x^{-3} - (2\cdot f/h)\cdot x^{-3} < 0, \tag{3.9d}$$

so that a delayed (here: indirect) progression follows.

Figure 4 shows the single functional forms. The average rate is growing and approximates the constant marginal rate which is 100%. The progression is indirect. Until an income of

$$x = f/h - g/h \tag{3.10}$$

---

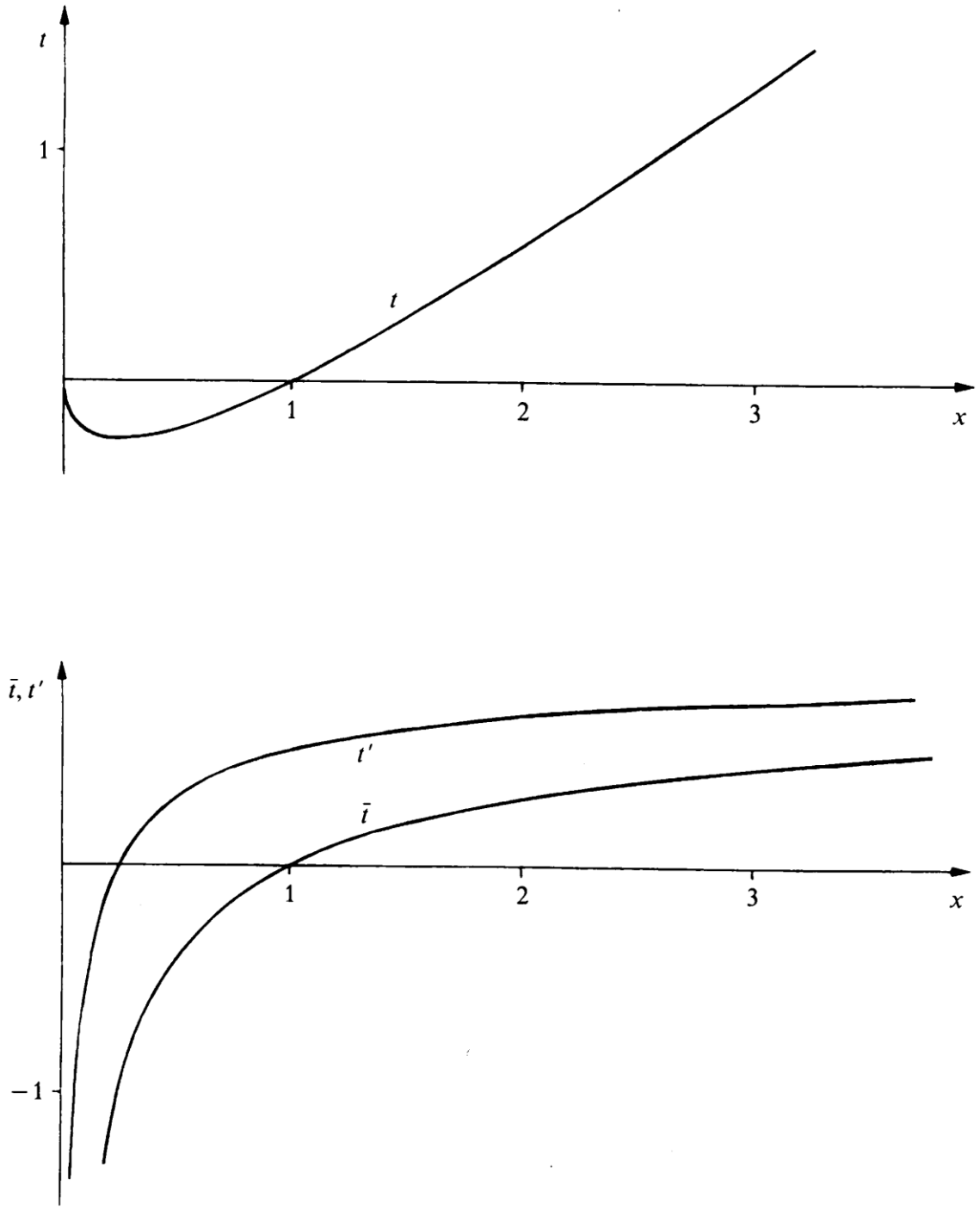
[20] The determination of $x = 1$ as minimum of subsistence by COHEN STUART is more or less arbitrary; economic arguments are not mentioned.

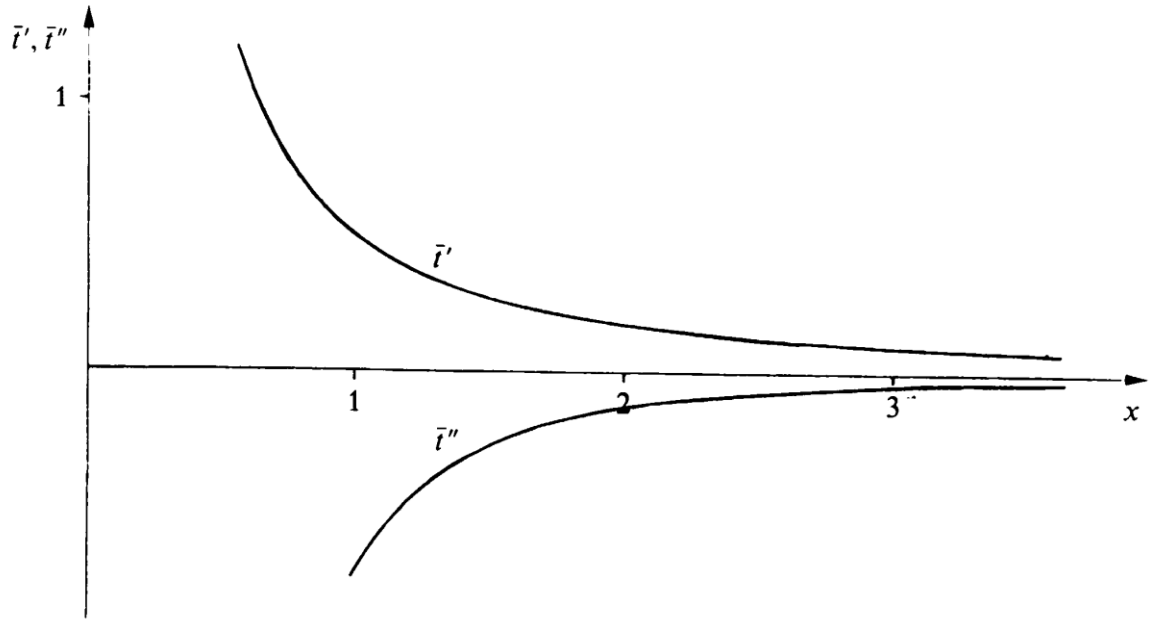
[21] The minimum in the total tax yield function results because in the negative area the BERNOULLI utility function asymptotically approaches the U-axis; the area left of the minimum does not allow for a meaningful interpretation.

[22] For $f = g$ proportionality results while the whole income is withdrawn by taxation.

Figure 3

Tax Scale for a BERNOULLI Utility Function and the ERS Principle

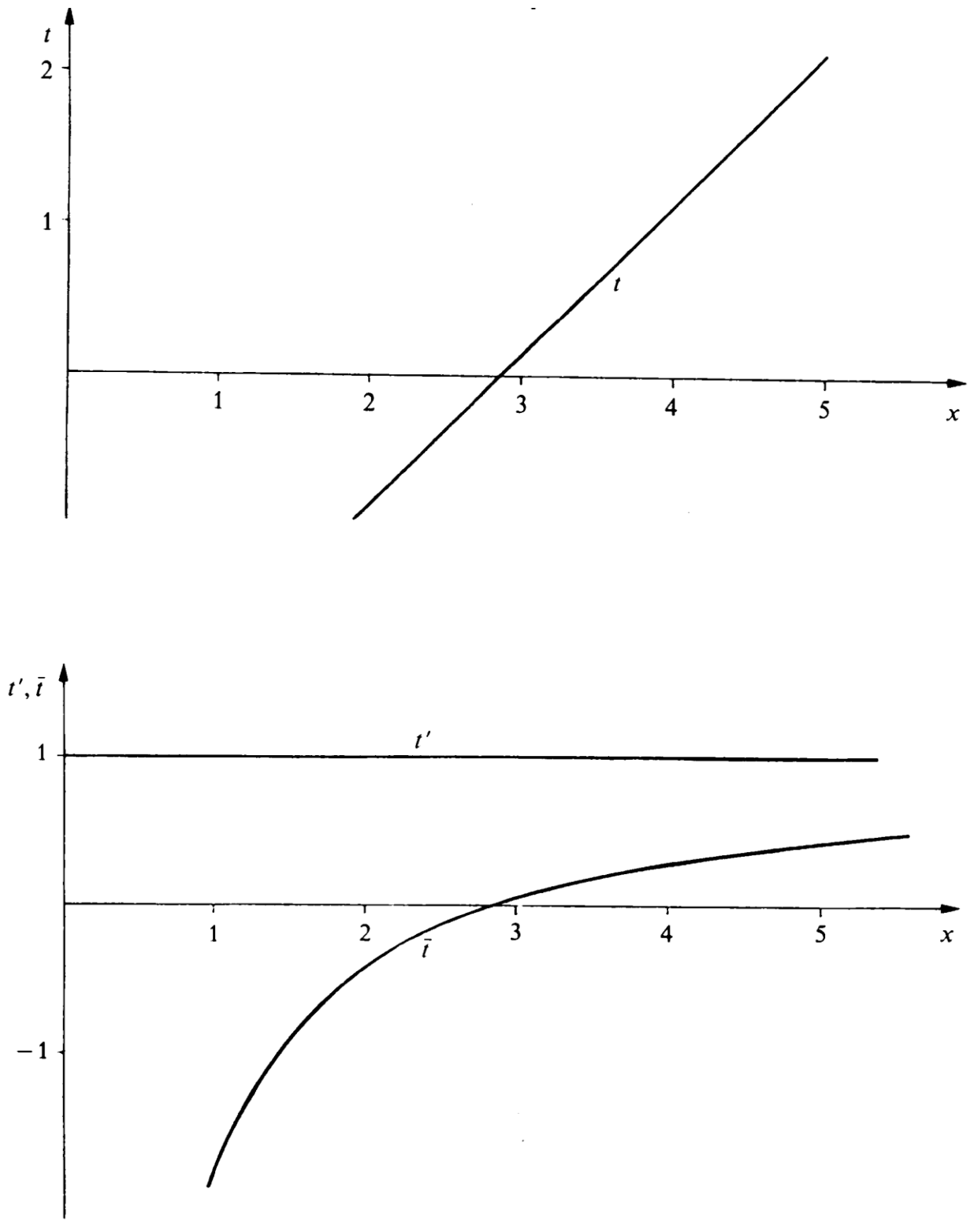


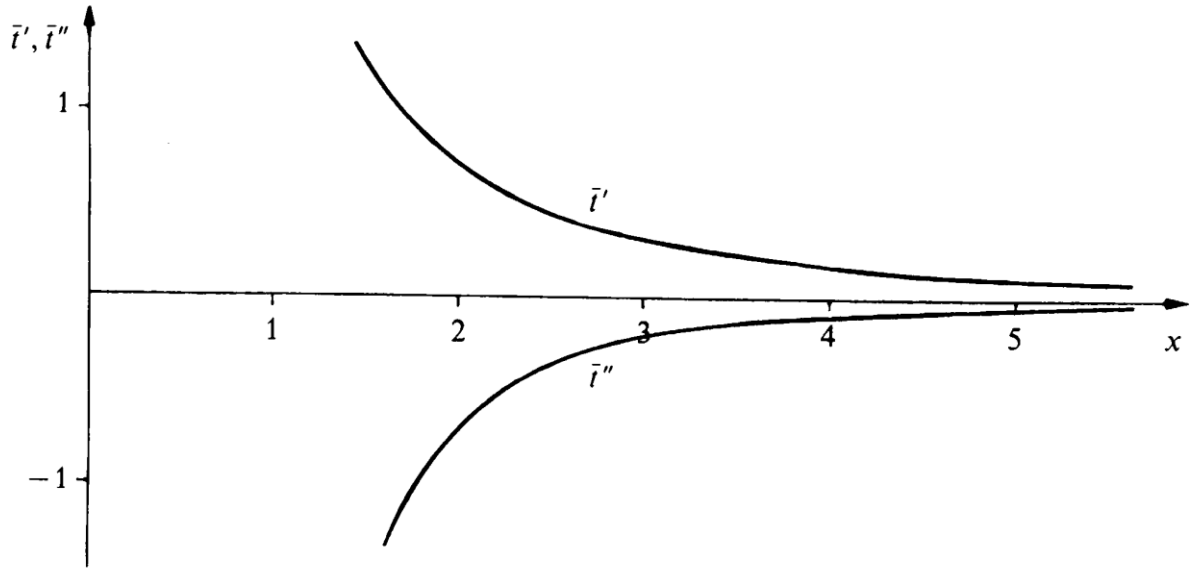


in these examples transfers are paid, which increase all lower income to the average income level; beyond this level all part of incomes are withdrawn by tax so that all citizen do get the same amount of net income, the income distribution is totally equalized.

Figure 4

Tax Scale at a GOSSEN Utility Function and the MS Principle





Another interesting tax scale, which will be described in more detail, follows from the EAS principle combined with a general COHEN STUART utility function of the type (2.10). The corresponding justice function (for $g > 0$) is:

$$c \cdot \sqrt{x} - c \cdot \sqrt{x - t} = g\,. \tag{3.11}$$

The dissolution to t is:

$$t = 2 \cdot g / c \cdot \sqrt{x} - (g / c)^2\,. \tag{3.12}$$

The marginal tax rate follows with

$$t' = (g / c) / \sqrt{x} \tag{3.12a}$$

and the average tax rate with

$$\bar{t} = (2 \cdot g / c) / \sqrt{x} - (g / c)^2 / x\,. \tag{3.12b}$$

The prefix of the average rate progression

$$\bar{t}' = (-g / c) \cdot x^{-1,5} + (g / c)^2 \cdot x^{-2} \tag{3.12c}$$

and the second derivation of the average tax rate function

$$\bar{t}'' = (3 \cdot g) / (2 \cdot c) \cdot x^{-2/5} - 2 \cdot (g / c)^2 \cdot x^{-3} \tag{3.12d}$$

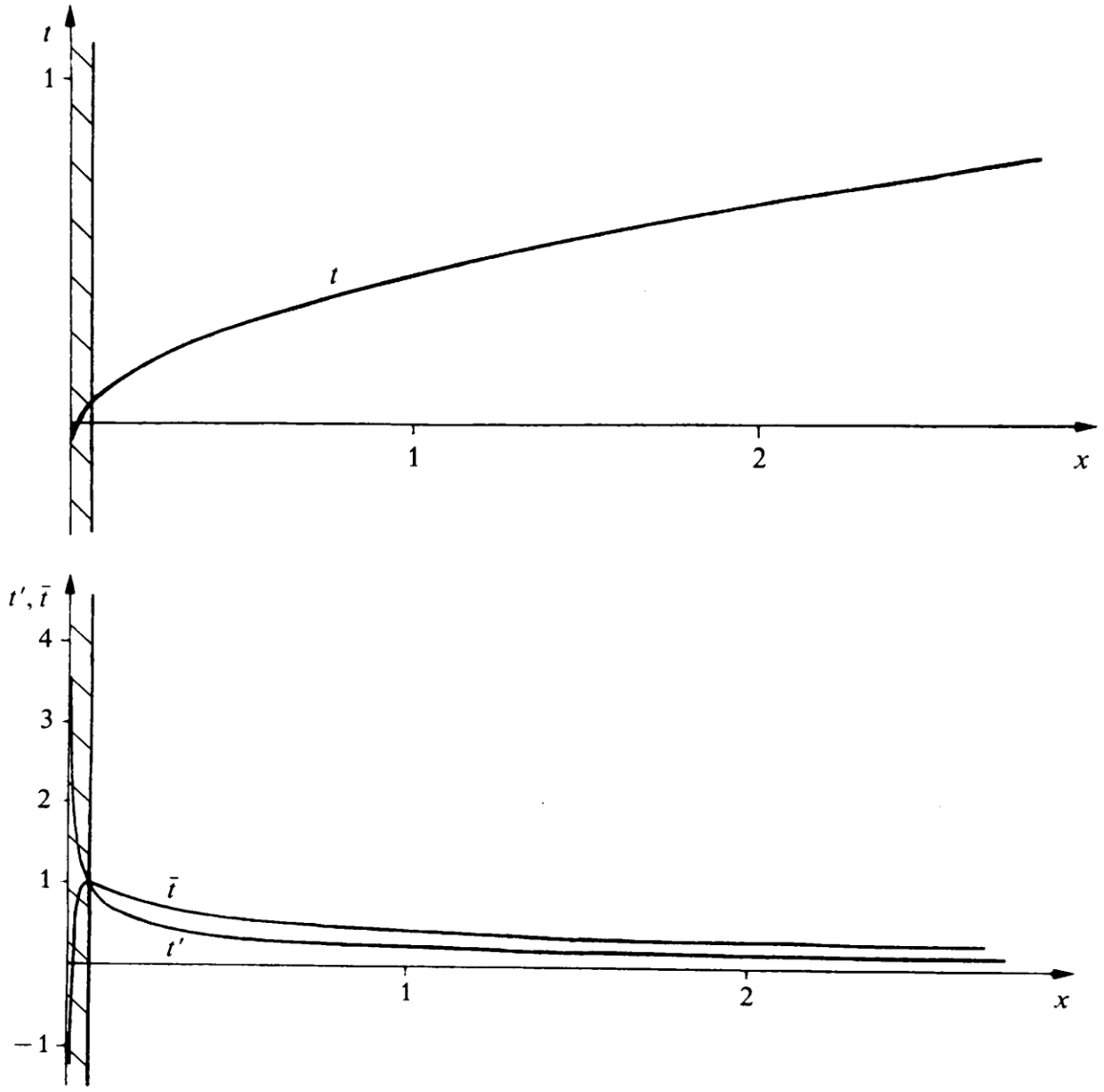
are not any longer definitely determinable. The resulting functions are represented in figure 5.

The tax yield function has again a negative bracket. The type of tax scale is not any longer clearly determined but is changing with increasing income. The average rate $\bar{t}$ at first increases (coming from the negative bracket) and in the positive bracket it reaches a maximum

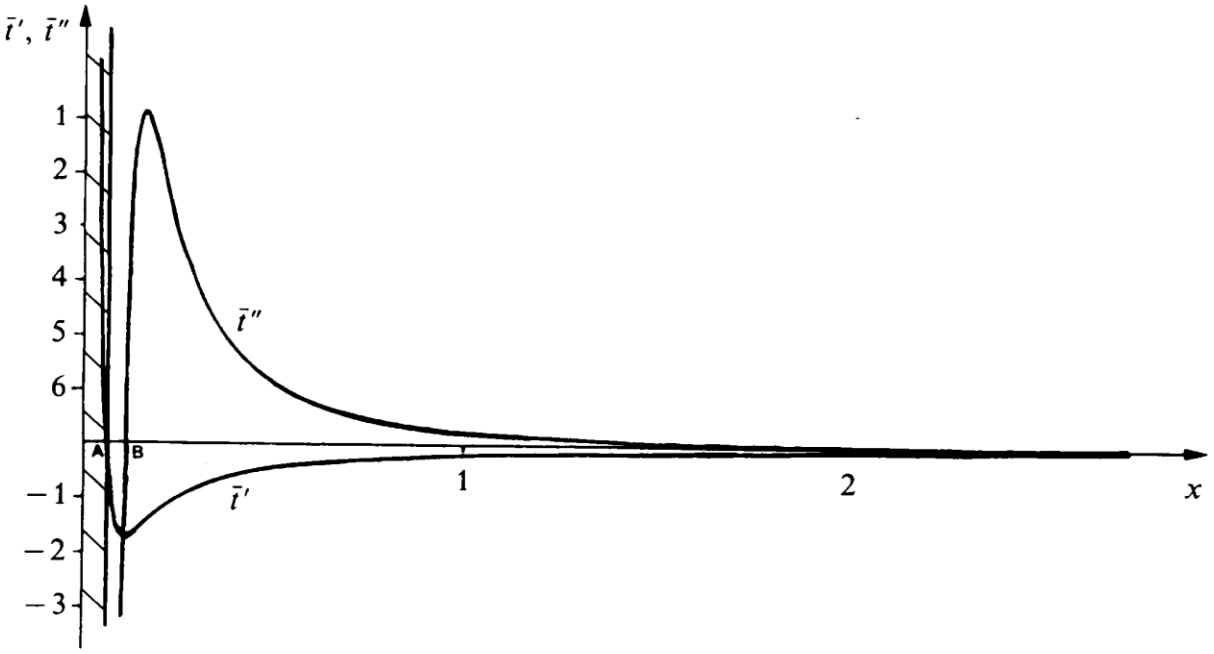
at $x = (g/c)^2$ (point A); the average rate progression $\bar{t}'$ points to a *progression* $(\bar{t}' > 0)$ which is of a *delayed* form $(\bar{t}'' < 0)$. Subsequently the average rate declines so that a *regression* follows $(\bar{t}' < 0)$ which is at first *accelerated* $(\bar{t}'' < 0)$ and then *delayed* $(\bar{t}'' > 0)$.[23]

Figure 5

Tax Scales for a COHEN-STUART Utility Function and the EAS Principle



[23] This is right from point B, in which the income is $x = ((4 \cdot g^2)/(3 \cdot c))^2$.



Although one and the same utility function results in a concrete tax scale, the scale type is changing with increasing income. Here is has to be mentioned again that the tax scale can only be interpreted above an income x_u for $U(x_u) = g$. If tax values left from $t = x$ are put into the formula of the EAS principle, it has to be mentioned that no solution does exist.

Therefore, the progression as well as the negative tax branch are not in a range, which can be justified with the EAS principle. The change from progression to regression is exactly at x_u (point *A*).

2. Overview on the Tax Scales

The tax yield function has been determined for all in table 1 mentioned justice hypotheses and the three types of utility functions, so far neglecting the "initial value problem" and the resulting types of tax scales were analysed. The results are presented in table 2. If a BERNOULLI utility function is taken into consideration and combined with the EACMU principle then a *delayed progression* results, while a lump sum element (fixed amount or minimum tax) is included. Likewise in case of the EAS principle a constraint has to be mentioned for $U'(x) > g$, which leads to a upper income limit of x_0. In case of the ERCMU principle a *proportional tax scale* follows, while for $U'(x) = g$ the tax scale is not defined.

If the COHEN STUART utility function is taken into consideration, with the exception of the EAS principle a definite tax scale for the different sacrifice principles results, which is in between *proportionality* and *delayed (direct) progression.*[24] In case of the GOSSEN utility

[24] Table 2 is valid for all relevant values of a, also for $a = 1$. Relevant values for *g* are in case of the EACMU principle $g > 0$ and in case of the ERCMU principle $0 < g < 1$.

functions the results are much more complex.[25] The EAS principle is he only one where within the relevant bracket a change in the average rate progression takes place, which is the case in between x_u and the point of saturation. The ERS principle yields a *delayed and accelerated progression* while the MS principle is connected with an *indirect progression*. For the EACMU principle a *lump sum tax (indirect regression)* results where the upper income limit x_0 coincides with the point of saturation. The ERCMU principle causes a *(direct and indirect) delayed regression*. Here a per capita tax (poll tax) exists where the tax yield is reduced with increasing income.

[25] Here the parameters have been fixed with $f = 0{,}7$ and $h = 0{,}07$. Then the marginal utility functions have in the relevant income brackets similar slopes and functional values than in case of the two other utility functions. For this function the parameter values are influencing the tax scale, e.g., the types of tax scales are differently combined but the change from progression to regression remains unaltered. Additionally the tax scale is dependent on g (see table 2).

Table 2

Justice Functions, Utility Functions, and Tax Scales

Justice Hypothesis \ Justice Function	$U = a \cdot \ln(x)$ (BERNUOULLI)	$U = c \cdot \sqrt{x}$ (COHEN STUART)	$U = 0{,}7 \cdot x - 0{,}5 \cdot 0{,}07 \cdot x^{2}$ [a] (GOSSEN) (in the relevant area)
$g = U(x) - U(x-t)$ (EAS)	proportional scale	(1) accelerated regression (2) delayed regression	(1) delayed regression (2) accelerated progression
$g = \frac{U(x) - U(x-t)}{U(x)}$ (ERS)	delayed progression (NT)	proportional scale	(1) delayed progression (2) accelerated progression
$g = U'(x-t)$ (MS)	delayed (indirect) progression (NT)	delayed (indirect) progression (NT)	delayed (indirect) progression (NT)
$g = U'(x-t) - U'(x)$ (EACMU)	delayed progression	delayed progression	delayed (indirect) regression (LST)
$g = \frac{U'(x-t) - U'(x)}{U'(x)}$ (ERCMU)	proportional scale	proportional scale	delayed regression (LST)

LST = Lump Sum Tax
NT = Negative Tax
[a] see footnote 24
Source: Own calculations.

If the different sacrifice principles are taken into consideration for the three analysed types of utility functions, it is obvious that only for the MS principle a uniform result can be observed. Independent from the utility function an indirect progression results and the marginal tax rate is 100 %.

3. The Initial Value Problem

As can be seen from table 1, the utility function (antiderivative) is only an argument in case of the justice principle ERS; for all other principles the information about the marginal utility function is sufficient. If the marginal utility function is given, the total utility function is also known without the value of the constant of integration. Even in case of a known slope for the marginal utility curve the ERS principle does not answer the question if a "just" tax scale should be progressive, proportional or regressive. Only the determination of the constant of integration by a meaningful initial value decides about the type of the "just" tax scale – a fact which especially has been stressed by COHEN STUART.

In the following the BERNOULLI utility function can be neglected because this function does not run through the point of origin (zero) and approximates the U-axis in the negative utility area. The constant of integration only alters the intercept point with the x-axis, an initial value problem does not exist.[26]

The initial value problem occurs in case of the COHEN STUART and the GOSSEN utility functions. The COHEN STUART utility function is generally given with

$$U = c \cdot \sqrt{x} + d\,, \tag{2.10}$$

where d is the constant of integration. The criteria for progression analogous to FRISCH (see table 1) is:

$$E_{U,x} - E_{U',x} = \frac{1}{d/\sqrt{x} + 2} + 1/2 \quad \begin{cases} > 1: \textit{progression} \\ = 1: \textit{proportionality} \\ < 1: \textit{regression} \end{cases} \tag{3.13}$$

---

[26] The general BERNOULLI utility function is as follows:

$$U = a \cdot \ln x + b\,.$$

Only in the marginal case – if b is infinite – this function runs through zero. If the tax scale is derived from the ERS principle, it results with

$$\bar{t} = 1 - e^{(-b \cdot g)/a} \cdot x^{-g}\,.$$

The average rate progression is

$$\bar{t}' = g \cdot e^{(-b \cdot g)/a} \cdot x^{-g-1}\,,$$

and the second derivation of the average tax rate function is

$$\bar{t}'' = -(g+1) \cdot g \cdot e^{(-b \cdot g)/a} \cdot x^{-g-2}\,.$$

Howsoever b is fixed, the average rate progression is larger than zero and progression is delayed. In case of the other justice hypotheses b does not show up in the total tax yield functions.

The following three initial values cause different types of tax scales, respectively:

$$U(x=0)=\ \ 0 \qquad \text{bzw.} \qquad U(x=1)=2\,, \tag{3.14a}$$

$$U(x=0)=-1 \qquad \text{bzw.} \qquad U(x=1)=1\,, \tag{3.14b}$$

$$U(x=0)=\ \ 1 \qquad \text{bzw.} \qquad U(x=1)=3\,. \tag{3.14c}$$

From these it follows that:

$$U=2\cdot\sqrt{x}\,, \tag{3.14a'}$$

$$U=2\cdot\sqrt{x}-1\,, \tag{3.14b'}$$

$$U=2\cdot\sqrt{x}+1\,. \tag{3.14c'}$$

As is well known in FRISCH the initial value (3.14a) leads to proportionality (see above). If the initial value is fixed according (3.14b) with $U(x=1)=1$, the following criteria results:

$$E_{U,x}-E_{U',x}=\frac{1}{2-1/\sqrt{x}}+1/2>1\,. \tag{3.15}$$

The tax scale is progressive; for the initial value (3.14c) the criteria is:

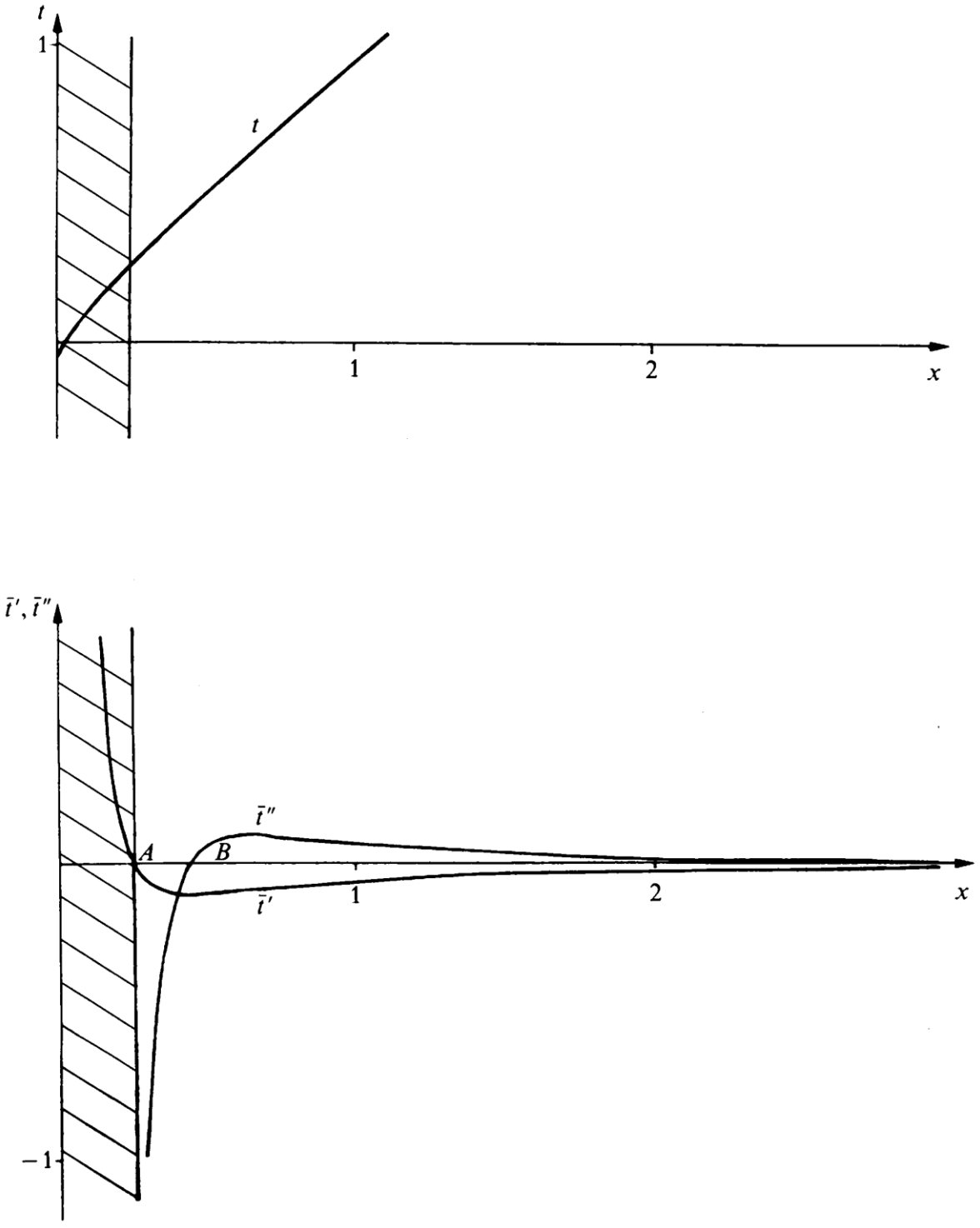
$$E_{U,x}-E_{U',x}=\frac{1}{2+1/\sqrt{x}}+1/2<1\,. \tag{3.16}$$

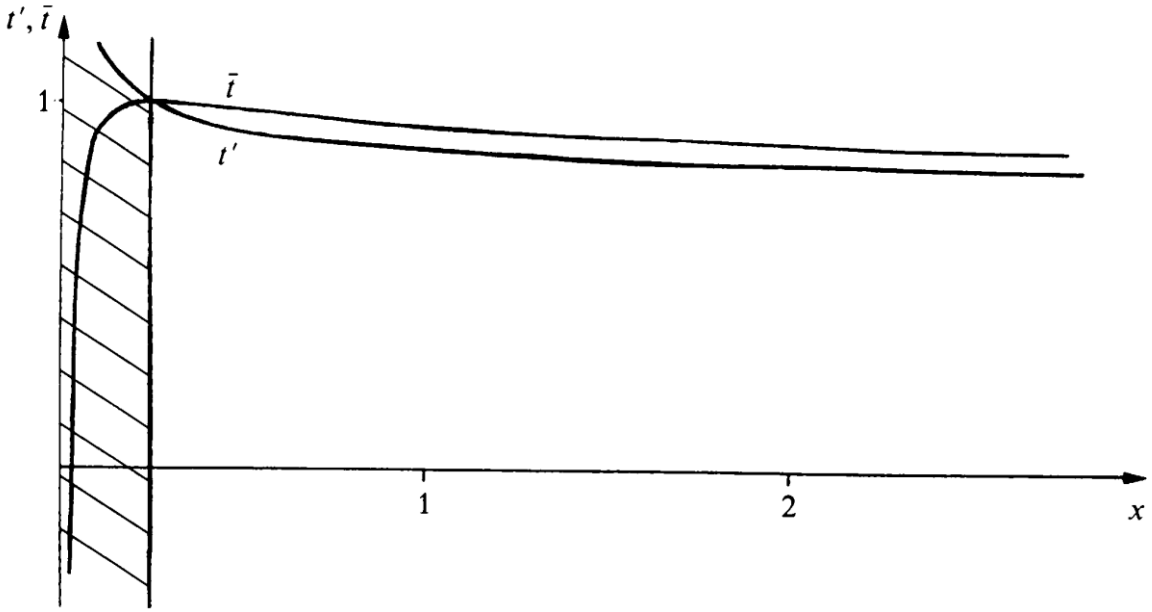
The resulting tax scale is regressive.

In the latter case the results in this paper differ from the FRISCH analyses (see figure 6) for $x<\left[2\cdot d\cdot g/1{,}5\cdot(1-g)\cdot c\right]^2$ (left from point *B* in figure 6); for this area at first a delayed progression, secondly from point *A* $x=\left[d\cdot g/c\cdot(1-g)\right]^2$ an accelerated, and thirdly from point *B* a delayed progression. The lower margin x_u is given by $U(x)=g+1$. This coincides with point *A*.

Figure 6

Tax Scales for a general COHEN STUART Utility Function
($U = 2 \cdot \sqrt{x} + 1$) and the ERS Principle





Therefore, also in this case progression and negative tax are justified by the ERS principle. For the initial value of (3.14b) the negative tax branch is omitted because the utility function is not defined left from $x_u = 0{,}25$.

If the general GOSSEN utility function is taken into consideration

$$U = e + f \cdot x - 0{,}5 \cdot h \cdot x^2 . \qquad (2.11)$$

Then tax scales are derived as shown in table 3.

IV. On the Relevance of the Results

(1) The derivation of "just" tax scales on the base of utility oriented arguments has an extreme speculative character. Beside the well known facts that there is no agreement on (1) the definition what justice is and (2) the course and slopes of a marginal utility curve being valid for all individuals, COHEN STUART and (later and in a more genral form) FRISCH have delivered the proof that – as long as a BERNOULLI utility fanction is not under consideration – even in case of an agreement on these two problems a conclusion on the type of tax scale is not possible as long as the initial value problem remains unsolved. Therfore we are still – to quote COHEN STUART, who has attributed this citation to MACCULLOCH (1852) – "... at sea without rudder or compass".[27]

(2) In this analysis the problem has been widened and all relevant utility functions have been taken into consideration. The used concept enables us to determine the exact type of tax schedule.

---

[27] A.J. COHEN STUART: On Progressive Taxation, opt. cit., p. 67.

Table 3

Tax Scales for the ERS-Principle and alternative Initial Values

Utility Function	$d, e = 0$	$d, e = +1$	$d, e = -1$
general COHEN STUART-utility function $U = 2\sqrt{x} + d$	proprtional scale	(1) accelerated regression (2) delayed regression	delayed progression
general GOSSEN-utility function $U = 0{,}7 \cdot x - 0{,}5 \cdot 0{,}07 \cdot x^2 + e$ (im relevanten Bereich)	(1) delayed progression (2) accelerated progression	(1) delayed regression (2) accelerated progression	delayed progression

Source: Own calculations.

(3) The results are of specific interest in the lower income brackets. The need for a negative income tax does not only exist in case of the MD principle but also exists for the ERS principle if it is combined with a BERNOULLI utility function. In the latter case a continuous delayed progression results which is in accordance with the so-called tax scale criteria.[28]

(4) Beyond that it is interesting to note that justice hypotheses based on marginal utility criteria incorporate elements of lump sum taxation, which is especially true for GOSSEN utility functions. Additionally with the conventional approaches it could not be demonstrated that the tax scales types are not constant for the whole income range but changing with increasing income.

(5) The combination of the ERS principle with the BERNOULLI utility function generates types of tax scales, which are quite similar to those in optimal taxation approaches without considering the "disincentives", which are included in that analyses.[29] Both approaches share the shortcomings mentioned above (1), but "optimal taxation" has – in spite of higher complexity – only limited additional value of explanation.

(6) Very restrictive is the assumption that all individuals do face the same utility function. If this assumption is skipped – e.g. are all individual utility functions (being from the type BERNOULLI, COHEN STUART and/or GOSSEN) additively (BENTHAM) or multiplicative (NASH) aggregated in form of a social welfare function –, the approach is not any longer mathematically resolvable and the results for the tax scales are totally undetermined.

---

[28] See, e.g., H.-G. PETERSEN: Ein Vorschlag zur Reform des Einkommensteuertarifs 1978, in: Finanzarchiv, N.F., Vol. 35, 1976, pp. 128-146.

[29] See, e.g., J.H. von OEHSEN: Optimale Besteuerung, Frankfurt – Bern 1982, p. 264.

Chapter 1:

Redistribution – Theory and Measurement

1.1.

Effects of Growing Incomes on Classified Income Distributions, the Derived Lorenz Curves, and Gini Indices

(Econometrica, New Haven/Conn., Vol. 47 (1979), pp 183-195

1.2.

"Just" Tax Scales at Alternative Sacrifice Principles and Utility Functions

Co-authors: Friedrich Hinterberger and Klaus Müller

(FinanzArchiv, Tübingen, N. F. Vol. 45 (1987), pp 45 – 69)

1.3

Redistribution and the Efficiency/Equity Trade-off

(Studi Economici, Milano, No. 82, 2004, pp 5 – 42)

1.4.

Pros and Cons of Negative Income Tax

(Herbert Giersch (Ed): Reforming the Welfare State, Springer Berlin et al. 1997, pp 53 – 82)

Redistribution and the Efficiency-Justice Trade-off

by

Hans-Georg Petersen
University of Potsdam and German Institute for Economic Research (DIW Berlin)

I. Introduction

Social justice has become a main objective of economic policy, which in many cases dominates efficiency considerations. In the history of economic thoughts the trade-off between efficiency and justice has often been discussed but remained an unsolved problem. In using a simple approach of standard welfare economics, the trade-off can be clarified and at least some theoretical arguments found that compulsory income redistribution is usually connected with disincentives and more or less serious efficiency losses. Obviously the acceptance of such efficiency losses depends on individual evaluations made on the quality or degree of justice that has been realised within the society. In a democratic setting the individual decisions determined by individual value judgements influence the public policies (particularly tax and transfer policy) through majority voting.[1]

Apart from the complex influences of the numerous actors in our representative democracies – for example politicians and political parties on differing levels of jurisdictions, governments, bureaucrats, interest groups, etc. – the objective of social justice itself is highly complex and overwhelmingly used as a political formula without precise definition. Therefore, under the banner of improving social justice, almost any interference with society and the economic system has been politically justified, leading to a permanent growth of the welfare state and compulsory social security systems whose enormous costs are currently the main reason for the economic malaise in many industrialised countries.

Hence, the most important task is to give a short and concise definition of justice, as done by *Aristotle* (384 – 322 B.C., here: 2001) many years before. In modern terms social justice can be divided into two components: the justice of ability (German: Leistungsgerechtigkeit) and the justice of needs (German: Bedarfsgerechtigkeit). While in a static neo-classical economy the justice of ability concept is in full accordance with Pareto-efficiency where the production factors labour and capital are paid regarding their marginal productivity's, for the justice of needs concept such simple technical rules do not exist. Because of the lack of information on the objective needs of the individuals and the impossible inter-personal utility comparisons, only two different extremes can be identified: on the one hand the physical minimum of subsistence and on the other hand equality regarding consumption volumes and structures.[2] Both targets seem to be equally unacceptable in democratic societies. To solve the connected problems at least theoretically *Bergson* (1938) has developed the concept of a social welfare function, in which social welfare is measured as a function of the utility levels of the single members within society. In this article the problems of the justice of needs and the redistribution

---

[1] For simplicity's sake we neglect the principal agent problem which dominates representative democracies. For details see *Petersen/Mueller* (1999).

[2] For more details see *Petersen* (1993, pp. 49).

(of income and/or consumption) are discussed (chapter II).[3] In chapter III the trade-off is presented in depth, which is then followed by some, concluding remarks (chapter IV).

II. Justice of Needs and Redistribution

A voluntary redistribution that would be a Pareto improvement will occur without any problems, at least in a two person model, if the utility functions of the two individuals positively inter-depend, meaning a one sided or mutual altruism. With the instrument of the social welfare function an involuntary redistribution can also be justified (through the independence of the individual utility functions), whereby the state functions as a redistributing agent. It may even be the case if the economy is found to be in a Pareto-optimal situation. Before the problems of redistribution are discussed (in II.2), the basics of the utility theory must be first dealt with (II.1). Then the effects of egoism, altruism, and envy on the large utility possibility curve will be analysed (in II.3). The examination of the types of various social welfare functions will make up the end of this sub-chapter.

II.I. The Basics of the Utility Theory

The ideally typical market system is based on performance equal rewarding the factors of production, meaning performance equal wages and fair trading through market prices. In our principally individual approach, we accept dissimilarities between persons as being just, namely as the consequence of the justice of ability or barter equality. Inequality is thereby a constitutive element of the incentive mechanism of market systems, next to a rich choice in goods, performance orientated rewards for labour and capital as well as the individual property rights. Inequality sets the incentives for a social ascent and it is therefore the driving force for social development in an open society. Naturally there are hidden risks, then individual failures might lead to social decline. Without such sanctions performance orientated market systems would not function sufficiently, efficiency advantages would not bloom. Ascent and decline, profit and loss, prosperity and bankruptcy or generally expressed as chance and risk are two sides of the same market economical coin.

Naturally this has the effect of humans in a market economy based on the justice of ability who are temporarily or permanently unable to perform (so are unable to work[4] and do not have the necessary assets at their disposal). Obviously they are not able to independently or autonomously support themselves in such a system. Market economies that are constructed on incentives and performance mechanisms must or should take the needs of the not so able citizens into account, thus avoiding serious social problems without falling back into a system of pure justice of needs which is typical for collectivistic societies.

However, market economies have to take into consideration the needs, if they do not want to endanger the basis of their own society. What particularly happens is a question of the social ethical consensus of society, whether it be for example the securing of a physical or social cultural minimum existence, a wide reaching basic security and/or a highly developed (private and/or social) insurance system. If wide reaching security systems are created, the market

[3] The consequences for the ability-to-pay approach in tax theory are discussed in *Petersen* (2003).

[4] The problem of willingness to work will not be taken into consideration, then inability to work could of course be followed back to refusal to work (laziness).

economy then deserves to be called "social". In a social market economy it is not only the efficiency target that is important, but also those regarding social equality, which is in the end a redistribution of income from those (especially) competitive to the needy.

The questions of egoism, altruism and envy only play a part if we look at more than one person or group of persons. Let us assume that we are using our two families, two goods model (with families A and R, and the goods x and y); then we can draw the following utility function (where A is for 'poor' and R is for 'rich'):[5]

$$U_A = U_A (x_A, y_A)$$

and

$$U_R = U_R (x_R, y_R).$$

This means the utility of both families is completely dependent upon their consumption; no relationship exists between the two utility functions. We would be confronted with egoistic behaviour in both cases. In this case a voluntary redistribution from R to A or visa verse is out of the question.

With the term altruism (common weal, bonum commune) we denote the 'general interests' with the interests of the individual or groups within society. The term is closely bound to the organisation of inter-human communication as well as the emergence of conflicts and the manner in which they are solved. One of the weakest forms of human cooperation is the 'tit-for-tat' strategy. Through another definition the 'common weal' can be characterised as a mutual basis for human existence, "dependent on all segments of society, whose social position, makes it possible to develop their personalities in a humane manner" (*Kerber* 1988, p. 244). This being the case the ethics of inter-human relationships must be far more than just simple cooperation without threatening behaviour - namely feelings of friendship, sympathy, apathy for the position of others, the love of thy neighbour, as well as thankfulness and guilt. Altruism in a formal sense could be seen as a positive dependency of utility function of humans.

Talking of altruism as being a positive interdependency between humans, one must not neglect the negative interdependencies, namely feelings of jealousy, enviousness, hate and revenge. In the end it is an empirical question, which kind of utility interdependencies exist within society. The more however altruism dominates a society, the less necessary it is for the state to intercede in the redistribution process and the stronger the implemented redistribution corresponds to the preferences of the persons burdened or favoured by this process.

Let us look at the case of altruism; to formally understand the utility function of an altruist, one has not only to look at the amount of emerging goods that he has at his disposal but also that others have at their disposal.[6] If R is the altruist then his utility function takes on the following shape:

---

[5] This concerns the amount if goods consumed according to revealed preferences and those actually consumed by individuals.

[6] See, e.g. *Gabisch* (1985); *Paqué* (1986) also introduces two other possibilities to help the formal understanding of altruism (teleologic and deontologic ethics), in which next to individual utility exists an 'ethical level of production' which is relevant for the total utility. For reasons of simplification we will not deal with this as in the end this approach will not lead to an additional substantial information.

$$U_R = U_R(x_R, y_R, x_A, y_A).$$

If a 'rich' individual can also gain utility out of the consumption of a 'poor' individual, then if necessary through a redistribution from 'rich' to 'poor' the utility of both economic subjects (or at least that of the 'poor' individual) could be increased. Such a Pareto improving redistribution[7] would also voluntarily come into being in this two-persons-model, meaning through philanthropy (charity).[8]

How can altruism be economically justified? To explain this we must fall back on the 'older' utility theories (old welfare economics, Carl *Menger*, William *St. Jevons*, Léon *Walras*). It is not just a goods hierarchy (necessary goods, 'comforts' and 'luxuries') that plays an important role, but it is also assumed that a cardinal utility function exists. This is taken to be realistically determinable,[9] so that interpersonal utility comparisons are possible. In contrast the new utility theories (new welfare economics, Francis Y. *Edgeworth* and Vilfredo *Pareto*) exclude determining cardinal utility functions. Utility can only be ordinal comprehensible, so that only a rank order of utility (or differing utility levels) can be stipulated. Utility differences can not be measured in quantity, so that a comparison of the utility of a good that is consumed by two different persons is not allowed: interpersonal utility comparisons are not possible. Because of this utility becomes a subjective term whose contents is unprecise.[10]

The opinion has been formed that a personal distribution analysis can not be done without an inter-personal utility comparison, where cardinality can not be supposed but partial comparability can.[11] It is offen argued that humans have a relatively unified reaction pattern. The intention of the inter-personal utility comparisons lies more or less in the idea that people share a general humanitarianism and the same basic sensations with regard to the satisfaction of their needs. "One merely has the choice in carrying out the interpersonal comparisons of either doing it sensibly that means reflectively, methodically and with revalation opening it up to criticism or by doing it implicitly, intuitively and thereby unconsciously hidden from criticism" (*Homann* 1988, p. 223).[12]

We want to follow this view and suppose that a cardinal utility function U exists in the classical utilitarianism. We will assume that it is not only through the consumption of single goods but also with regard to increasing income that the individual utility grows with a decreasing rate, in other words that the marginal utility MU falls when income is increasing (figure 1).The transition of the first *Gossen* law on income is very controversial, it does however assume a kind of income saturation.[13] This controversial fact again documents that all argu-

---

7 A redistribution that improves the position of one member of society without worsening that of another.

8 The case here is of one sided altruism; also conceivable is a mutual altruism where out of the utility function of the 'poor' individual, the 'rich' individuals quantity of goods emerge. A form of egoism, that goes beyond altruism, would then exist, for example when the 'poor' individuals quantity of goods was to be found mainly or completely on the 'rich' individuals utility function. One could use the examples of Albert Schweizer and Mother Theresa; both have however received the Nobel peace prize, and could therefore perhaps be interpreted as being egoists?

9 See, e.g. *Frisch* (1932).

10 See, e.g. *Sen* (1979, p. 463).

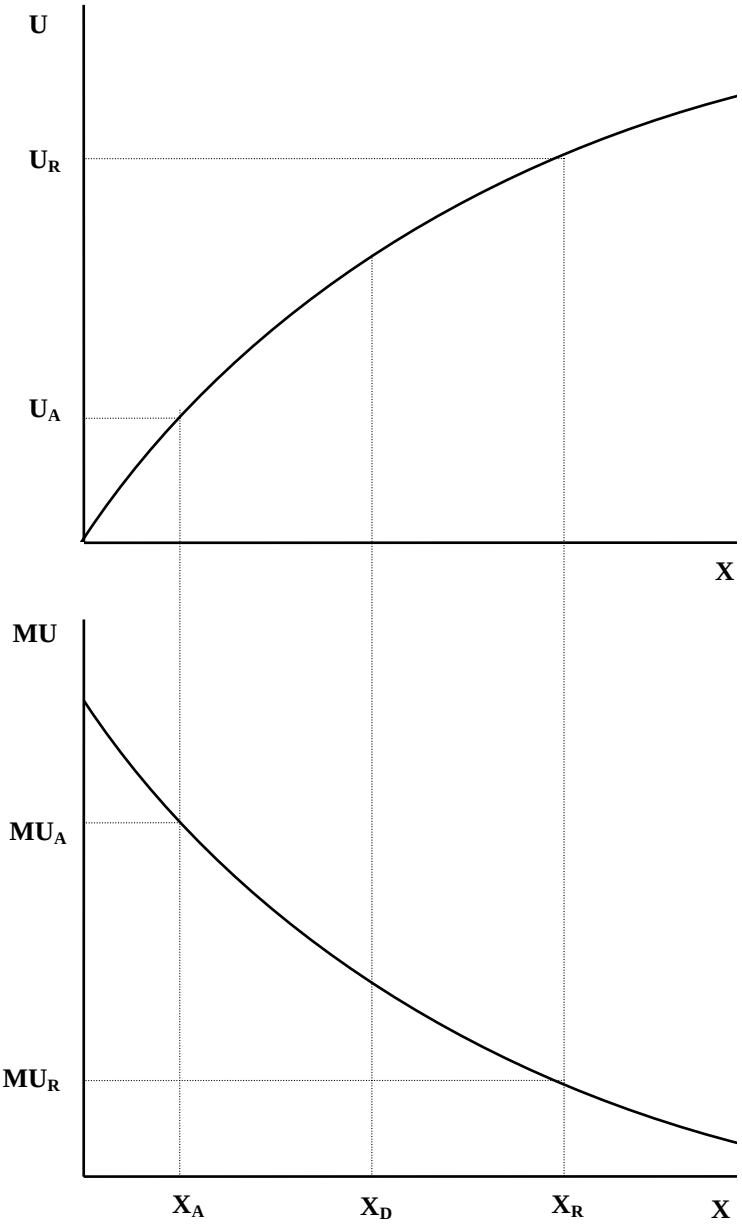
11 So for example *Sen* (1992).

12 For further problems of inter-personal utility problems see *Brunner* (1989, pp. 40).

13 The famous Uncle Scrooge is exactly the opposite. His enjoyment of bathing increases with every new coin in his deposit box.

ments concerning distribution are comparatively weak, namely they are based on value judgements that are not objective in a sense that all will see reason and understanding and therefore unanimously agree.

Figure 1: Utility Function U and Marginal Utility MU



In figure 1 it is assumed that a poor man and a rich man show an identical total utility function with regard to income. The rich man with an income of x_R, achieves the high total utility of U_R, the poor man with an income of x_A, achieves the total utility of U_A. In the lower part of figure 1 it can be clearly seen that the marginal utility of the rich man MU_R is very low and that that of the poor man MU_A is very high.[14] Let us assume an objective perception according to *Kant*, in which case R will recognise these differences in utility and will voluntarily pass over a section of his income to A, if A is in need. The total utility of R is therefore reduced but not proportionally with the gain that A receives and through this society's affluence

[14] For the poor man without any form of income the marginal utility is infinite (he should really starve). The first income that he receives secures his chances of survival and therefore has a very high marginal utility.

is increased. If R has positive utility interdependencies then even though he has transferred some of his income, his total utility will not decline, it may even increase. Through altruism society's prosperity will increase more strongly.

Going back to *Bentham*'s idea of classical utilitarianism and the cardinal utility theory which has come into dispute because the maximisation of society's total prosperity (happiness is brought about by the largest number) which forms the basis of Bentham's social welfare function (see below) leads to disastrous distributive political consequences. Figure 1 has already shown that society's total prosperity increases through the transfer of income from R to A up until the point where R is taxed down to X_D (the average income) and A is lifted to the point X_D through transfer payments. The result would be the equal distribution of income which we will call the egalitarian solution.

This minimal sacrifice principal as an equality criteria in tax theory has the result of taxing all segments of income that lie above the average income with a marginal rate of 100%.[15] These tax payments are used through transfers to stock up the income of those who lie below the average income. It was very quickly noticed that implementation of such a principal in a capitalistic society would have disastrous consequences.[16] The sacrifice principles of taxation completely neglect the fact that rich people as well as poor people change their working behaviour according to incentives from taxes and transfers. If segments of income were to be taxed with 100% then it would be realistic to say that the rich would change their working hours, reduce their capital investments or move into areas which are not taxed. Tax avoidance and tax evasion would explosively increase and the shadow economy would boom.[17] If the poor automatically receive the average income without having to work for it, then they will also work fewer hours, because the highest transfer they can achieve would be if they worked no hours at all (this means with the maximum leisure time).

The incentive effects of the implementation of the minimal sacrifice principle in the tax and social security system singularly have as result the reduction of labour input and capital investment in society. The total prosperity available to be redistributed will decline so much that those it was meant to support (namely the poor) would be worse off than if such scheme did not exist. This should however not lead to the cardinal utility theory being completely disregarded, moreover that leisure time should be included as an argument in the utility function.[18]

A voluntary redistribution is possible with the altruistic behaviour (through donations made by the rich to the poor). It can take two different forms. Pure altruistic behaviour occurs when the rich donate money to the poor, who may then choose their preferred use for it. By doing this the rich person accepts the poor persons consumer sovereignty. If the rich person transfers goods which he feels are important for the poor regardless of the poor persons preferences, then he acts in a paternal manner. *Paqué* (1987, p. 33) talks of a 'paternal altruism', there the consumer sovereignty of the poor person is not accepted.

---

15 See *Hinterberger/Petersen/Mueller* (1987).

16 Cautionary advice can be found in *Edgeworth* (1925, pp.103) and *Frisch* (1932, pp.129).

17 See *Petersen* (1981, 1982 and 1984).

18 This is the way the modern optimal tax theory proceeds.

Consequently altruism is the willingness to transfer segments of income to other individuals.[19] Especially in connection with the incentive effects the problem regarding how far altruistic behaviour should go has to be raised. For example does the rich man value the income of the poor man to the same extent as his own, in other words would he be prepared to transfer a unlimited amount of money to the poor person. Such behaviour goes beyond the Christian commandment of love thy neighbour[20] and can only be described as unselfishness. Altruism should only allow the redistribution of income to a certain extent. The wish of the rich person to transfer money to the advantage of the poor person, would start to diminish with the growing income of the poor person.

As in the case of altruism , envy emerges in the individual utility function through the consumed goods of the other members of society, however under a negative sign. Let us assume that the poor person is envious of the rich person (one-sided envy), then the consumption of the rich person reduces the utility that the poor person draws from his available amounts of goods. One may consider such a feeling in the *Kant*ian sense as being irrational. In the view of real human behaviour, envy is here a fact, nevertheless being aware that as in our utility description an interpersonal comparison is connected with large problems.

When aware of the restrictions the envy concept can be formulated similarly to the utility concept. Figure 2 assumes that envy E is dependent on income. When income is low (X_A) then the envy is high, with a high income (X_R) it is low, where by the reduction of envy with growing income sinks. Marginal envy ME is negative and moves towards the income axis, with growing income in an asymptotic manner. The assumption of the envy function course seems to be justified, there the prosperous with a growing income are continually able to satisfy more and more material wishes, meaning that they are increasingly saturated. Therefore the reasons for envy diminish because their origins lie in a shortage of goods.[21]

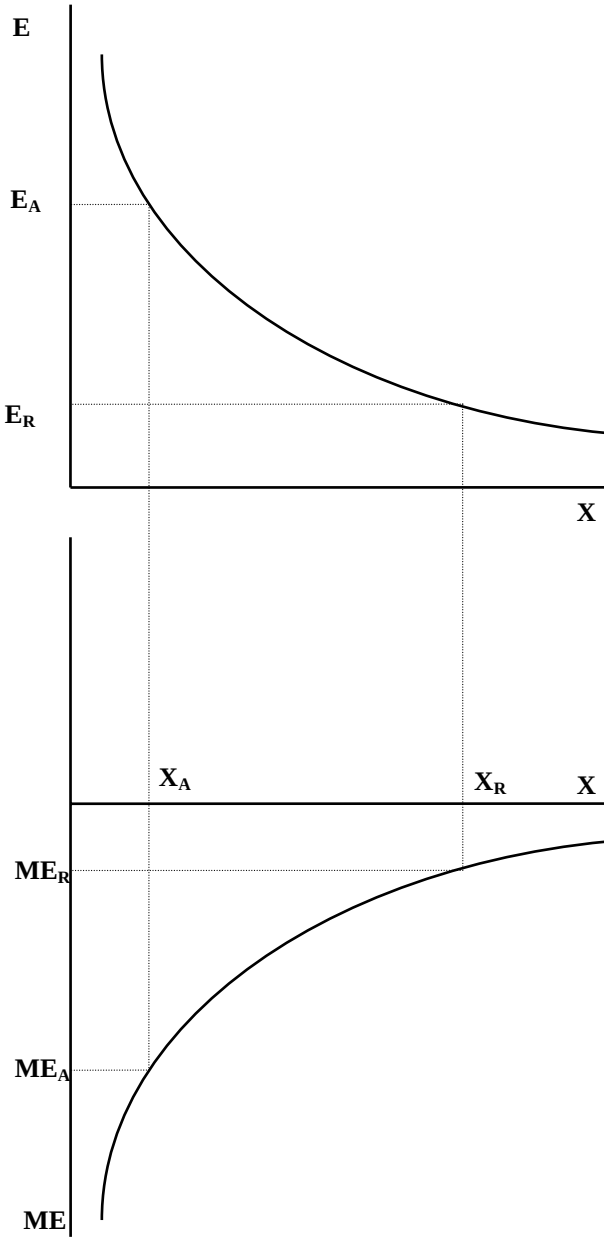
---

[19] The individual R firstly values the increase in his own income; when two situations are compared where R has the same income but A has a higher income, and R prefers this to a situation where A has had a lower income, then this cannot be named altruism because no transfer of income from R to A occurred. This cannot be described as altruistic behaviour.

[20] This being the case St Martin would have had to give not half his coat to the beggar but the whole coat.

[21] The possibility does naturally remain that envy can be connected with the uneven consumption of immaterial goods. Whereby the poor man may be a perfectly happy ascetic, which may in turn make the rich man envious. We are dealing with a many layered problem, the whole of which our simple model cannot possibly include.

Figure 2: The Envy Function E and the Marginal Envy ME



With one-sided, or particularly mutual envy is a society's total prosperity inevitably lower compared to the altruistic and egoistic behaviour of humans. Similarly to altruistic behaviour the question is asked if people feel envy across the board or whether they transfer from envious behaviour to altruistic and egoistic behaviour at a certain level of income (or at a certain level of income redistribution). Egoism, altruism, and envy all describe a person's behaviour with regard to another person, e.g. A is envious of R or R behaves altruistically towards A. This means that transfers from altruism to egoism and to envy flow into one another dependent on the individual income levels. The consequences for society's prosperity will be dealt with below.

A voluntary redistribution based on philanthropy works without doubt in a two-persons-(families)-model and surely in a transparent community, where donors and receivers of the private charities are mutually informed about the material situation of one another. Voluntary donations were an important issue of a pre-industrial social security. If a number of donors appear simultaneously, then the utility of these donors increases without them actually spen-

ding any money. Let us assume that there are two rich families, both conduct themselves in an altruistic manner towards poorer people. The donation of one family to the poor also increases the utility of the other rich family, which would then have no need to make a donation. Here we are confronted with a free-rider problem, there all parties profit from the donation of one family or in other words the exclusion principal fails, a voluntary redistribution through private transfers becomes questionable.

In a complex n-number of persons world, it is safe to say that there is incomplete information regarding the situation of every single individual. The individuals also develop diverging preferences regarding differing ideas about what level of income and wealth redistribution is sought. The state can then function as a redistributing agent, organising the distribution of income based on majority consensus. It can also by means of tax directives promote private charitable donations. However there exists between voluntary and state redistribution a close substitutional relationship (*Paqué* 1986). If for example a social pension scheme is institutionalised through compulsory membership of employees, then it can be assumed that the private efforts to save for security in old age will diminish. It is also to be remembered that state intervention can affect the peoples own responsibilities in a negative manner.

II.2. Social Welfare Functions and Redistribution

A social welfare function measures social prosperity as a function of the differing real utility levels of the single members of society. In other words the individual utility levels must be aggregated. The question that arises here is whether or not the single utility levels are to be weighted. Generally the welfare function (SW) can be expressed as

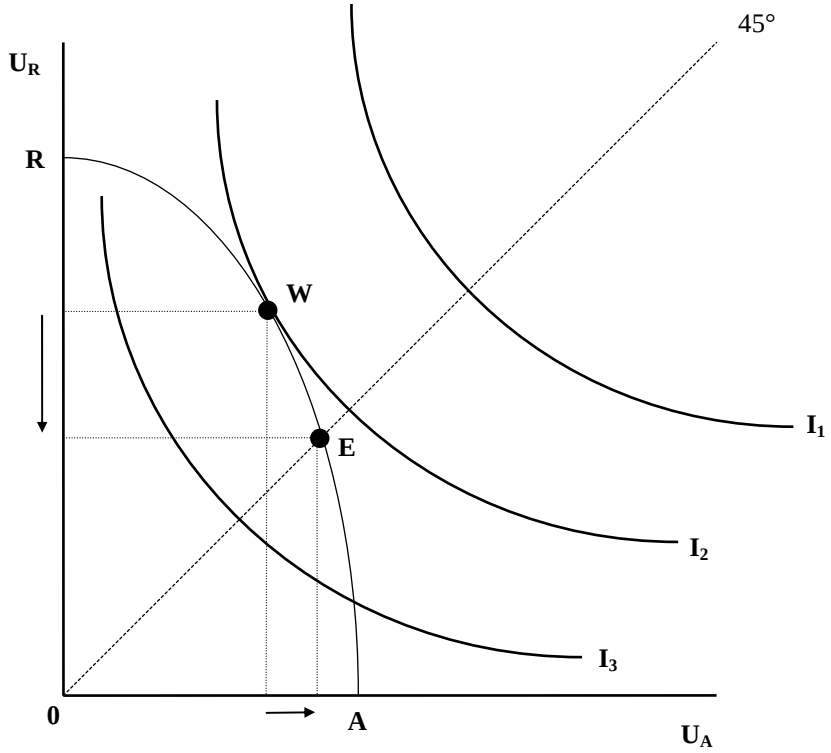
$$SW = SW(U_1, U_2, ..., U_i, ..)$$

where U_i is the utility level of the i-th person.

The Pareto efficiency's mathematical differentiation gives us within the utility diagram the possibility utility curve. This describes all efficient economic utility combinations from U_A to U_R that can be realised through the "original entitlements" (*Nozick* 1974), e.g. given resources (the inventory of the production factors labour, property and capital), preferences and given production technology. Figure 3 shows the utility possibility curve for our society, that contains the families A and R. The 45° line shows the situation of an equal utility distribution for both families (egalitarian solution). The stretch between zero on the coordinates and the point R represent the maximum utility level, that family A can achieve with the given starting provisions, the stretch 0A is that of family A. It is assumed that discrepancies exist from the beginning, differences in facilities and abilities. This means that 0R is larger than 0A because for example the family R puts in more work than family B, who happen to be very fond of their leisure time.

Every point on the utility possibility curve RA is in the economical sense efficient and describes a possible level of prosperity for society. The maximum levels of prosperity 0R and 0A are hypothetical. If one family would make the effort and try to reach this level of prosperity then the other family would perish. As the possibility to invest their resources in defence technologies exists, the situation would be such described by *Hobbes*, an anarchistic state of war, the consequence of which would be the decline and a lingering around zero (the natural situation).

Figure 3: Utility Possibility Curve and Social Indifference Curves



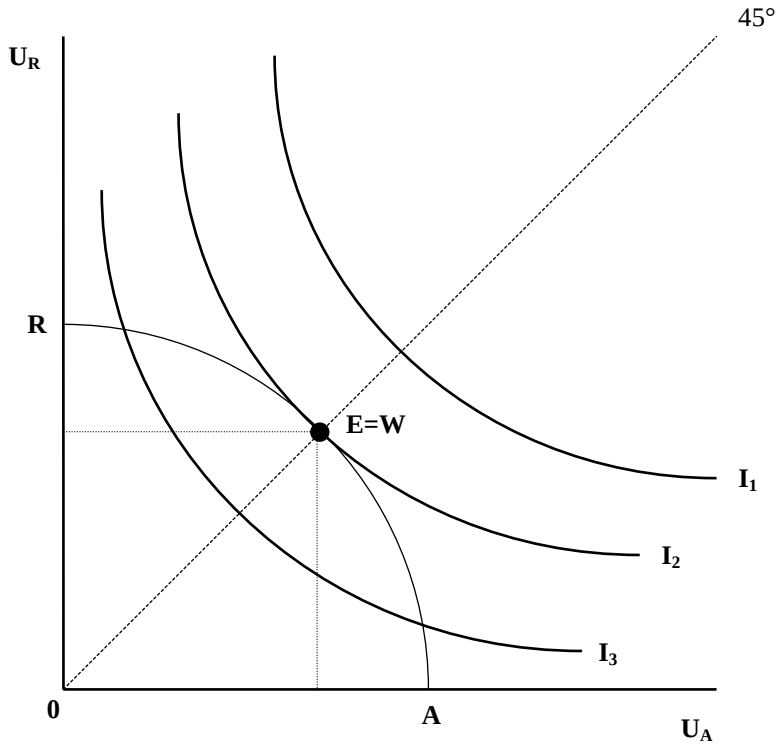
These so called corner solutions are therefore non-cooperative solutions. With a cooperative strategy a solution would be found which would lie on the utility possibilities curve between points R and A. The cooperation of families A and R means in the first instance that they have to relinquish the chance of maximising their possible utility levels. It has to be proven that such an abandonment is in the long-termed interests of both families. The economic theory on the optimal prosperity does not however give us an explanation about the utility distribution (this means which point on the utility possibility curve) between R and A should be chosen. This choice would set the condition of an interpersonal utility comparison, the reason for which being that needs can not be scientifically and objectively defined; this would inevitably be connected with value judgements. The optimal point for society can only be defined because the equality ideals developed by society can be taken into consideration. This is what welfare economics has done using the instruments of the social welfare function (*Bergson* 1938). A social welfare function is no different from an aggregation of the individual utility functions of family A and R (as members of society). The value judgement lies there in, how the utility of the single members of society is weighted in the social welfare function, in other words the laws of aggregation. The social indifference curves can be differentiated from the social welfare function, along those points where society is found to be on the same welfare level. According to the target of the optimisation of welfare the highest possible social indifference curve must be reached (this means the one furthest to the north east).

The 45°-line represents the social indifference curve of a social welfare function, which excludes the utility differences between members of society. If this social welfare function gains a unanimous consensus, then it can be compatible with the principal of free decision making. If it however comes into existence in a non democratic manner, then it does not correspond to the individualistic approach but can be described as a collective social welfare function. The 45° line should still be used as the comparative standard. The optimum optimorum, the highest possible level of welfare, which would be in the case of an egalitarian social indifference

curve point E on the utility possibilities curve (figure 3). If we on the other hand introduce a host of individualistic social indifference curves, as for example the curves I_1, I_2, and I_3 in figure 3, the optimum optimorum can be found where the social indifference curve I_2 and the utility possibility curve W are at a tangent to one another. The welfare optimum W lies on a higher indifference curve than the egalitarian solution E because of the individualistic and free cooperation. A voluntary redistribution towards E can therefore be discounted, on the one hand because of the Pareto criteria (everyone should be in a better position and no one in a poorer position) and on the other hand the utility loss for family R is greater than the utility gain for family A (see arrows in figure 3) and society's welfare sinks from point W to point E.

To demonstrate that this result is determined by the starting provisions (original entitlements), figure 4 shows the solution if the starting provisions are identical (with regard to ability and talent that means identical quality and quantity of all factors as labour, property and capital) as well as fully identical family production preferences (meaning decisions regarding working hours and leisure time) and consumer goods (the same preferences with regard to consumption also means the families behave in an identical manner when it comes to savings). In this case of complete equality the egalitarian solution E fully agrees with the free cooperation of W.

Figure 4: Optimum Optimorum at Equal Original Entitlements



Just like human capital (through training), or real capital (through the building up of savings) so the starting provisions can also be improved. Only when both families manage this to the same extent can the complete uniformity of the original situation (see *Hobbes*) remain in an evolutionary society. History really does give examples of societies where families were equal over longer periods of time. However it must be added that historical evidence clearly shows that the situation of equal distribution is not held up by the evolutionary process and

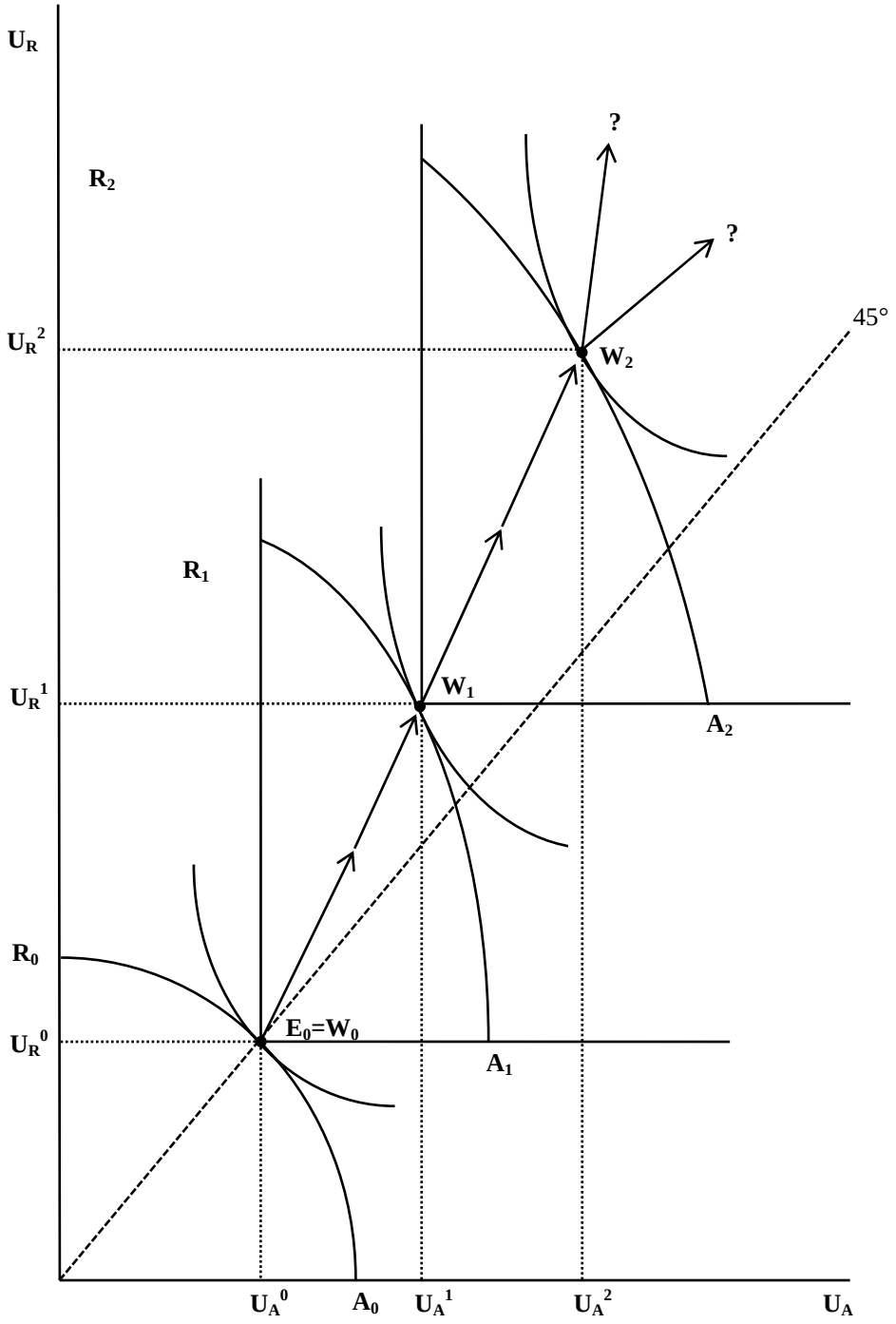
can normally only come into being in situations of extreme poverty or threats from the outside.[22]

Figure 5 shows an evolutionary process where both families are better placed in their original entitlements, however R more so than A, which means the maximum utility that can be achieved by family R has now been expanded. As the original entitlements have been improved the utility possibilities curve moves in a north easterly direction (because of high quantity and quality in human and real capital; the latter being technical progress). The distribution becomes increasingly unequal if we follow the development track in figure 5 from E_0 (= W_0) over W_1 and W_2.[23] This inequality can be followed back to the different implementations of labour and capital as well as diverging decisions concerning consumption and saving. Family R consume less and save more, they can therefore invest more in capital stock and through an increase in working hours raise the production which has the effect of increasing their consumption possibilities (barter possibilities). Therefore the inequality is the result of the justice of ability which is also plainly obvious for family A. As long as they are not envious they will tolerate this inequality. If the genetic based abilities of the two families do not differ too much, family A can then reduce this inequality by raising their labour supply and/or consuming less thereby enabling them to invest more.

[22] See *Markl* (1991, pp. 274).

[23] In the first period holds $R_0=A_0$ and in the following periods $R_1 > A_1$ and $R_2 > A_2$.

Figure 5: Utility Possibility Curve in an Evolutionary Society



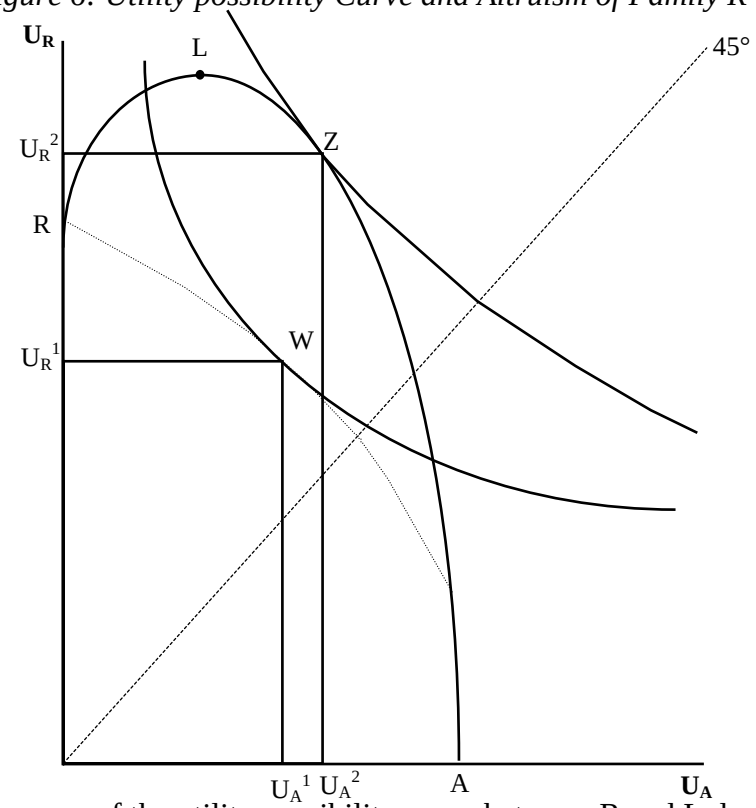
If it reacts in this way then the optimum will once again move towards the 45° line. When compared to the original situation the evolutionary process has improved the situation for both families $\left(U_R^0 < U_R^1 < U_R^2 \text{ and } U_A^0 < U_A^1 < U_A^2\right)$, the Pareto criteria has therefore been fulfilled. Inequalities, as mentioned, are of fundamental importance for the development of society. They encourage those lagging behind to catch the frontrunners by increasing the utility of both. Apart from this it becomes obvious in figure 5 why the two families neglect to implement the maximum possible utility level from the beginning. They have recognised that they are reliant on the other family's cooperation. It is firstly the allocation of labour between the families and the specialisation regarding the production of goods that allows both to move away from their starting point at zero in a north easterly direction. Both families act in the

sense of a long termed interest which determines the moral norms, especially those for the production and exchange of goods. Therefore no other reasons exist for the development of norms in the economic areas as in other areas involving human relations.

II.3. Utility Possibility Curves on Egoism, Altruism and Envy

We have already established above that altruism and envy can be described as being positive and negative respectively regarding utility interdependencies. There are almost certainly people whose welfare is influenced by the consumption of their neighbour (I feel ill, the Smiths are driving around in a new car and I can't afford that). Let us firstly look at the case above, the rich family behave in an altruistic manner and feel neighbourly love for the poor family. Figure 6 shows the utility possibility curve with altruism (the dotted is the egoistic utility possibility curve). Because of family R's utility, the utility possibility curve climbs up until the turning point L, where the utility of family A also starts to rise. This fact can be explained through the marginal utility theory. At the point R the rich family commands the whole of society's prosperity. They have reached a very high utility level. According to figure 1 the utility declines the more income rises, the marginal utility sinks. In other words the rich family find themselves to be in a situation that is marked by a low marginal utility. The poor family on the other hand without any prosperity is condemned to starvation and death. This situation cannot be accepted by family R. The marginal utility for family A is infinitely large, if they had enough prosperity just to be able to survive. The (voluntary) redistribution of welfare from family R to family A secures this survival. Since the marginal utility of family A is extremely large, due to family R's altruism society's prosperity grows above and beyond the value R because R's marginal utility is far lower.

Figure 6: Utility possibility Curve and Altruism of Family R

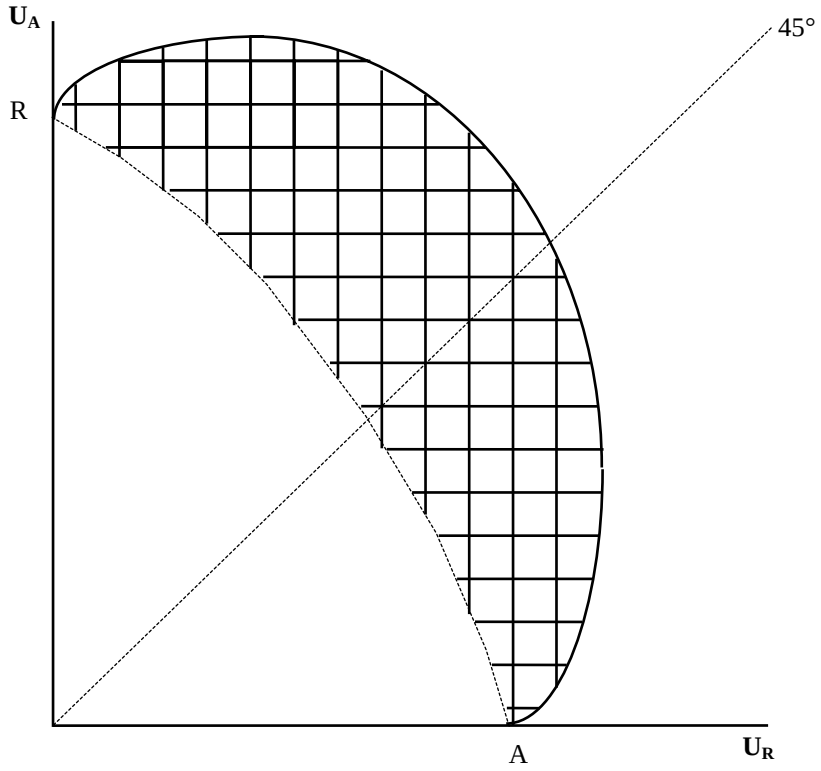


The area of the utility possibility curve between R and L does not conform to the Pareto-criteria, because at every point the situation of both families could be bettered. If the criteria were to be implemented then the target would be point L, which may be achievable through the

voluntary redistribution (philanthropy) of family R (*Pareto* improving redistribution). Let us assume a society with the indifference curve system (I_1, I_2, etc), then without altruism we reach the point W through the utility combination U_A^1 and U_R^1. With one sided altruistic behaviour by family R both families reach the higher utility level Z (U_A^2, U_R^2).

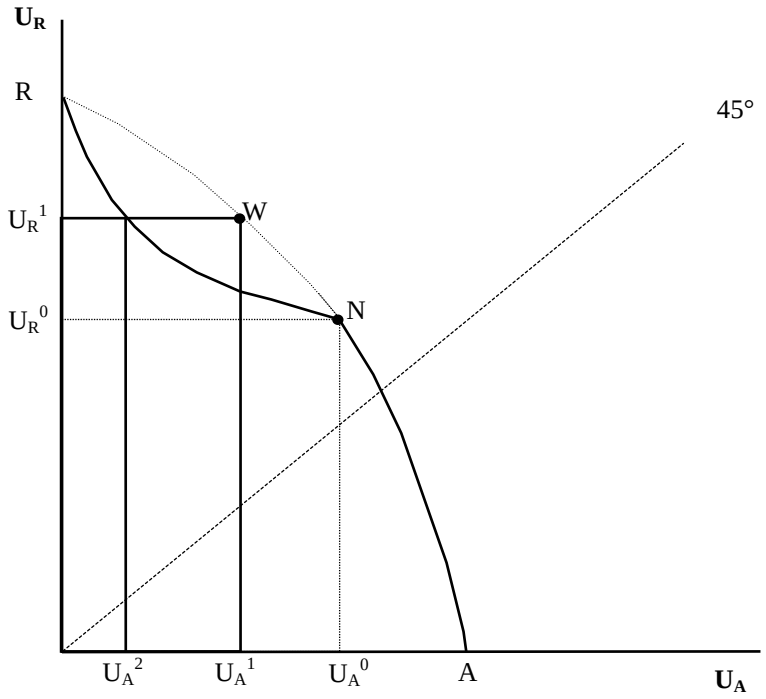
In figure 7 we assume the mutual altruism of the families A and R. With a low utility level of the other family both are voluntarily prepared for redistribution, which leads to mutual utility growth. The hatched area between the utility possibility curves with and without altruism could be termed as altruistic welfare growth (the latter being the shaded area).

Figure 7: Utility Possibility Curve and Mutual Altruism



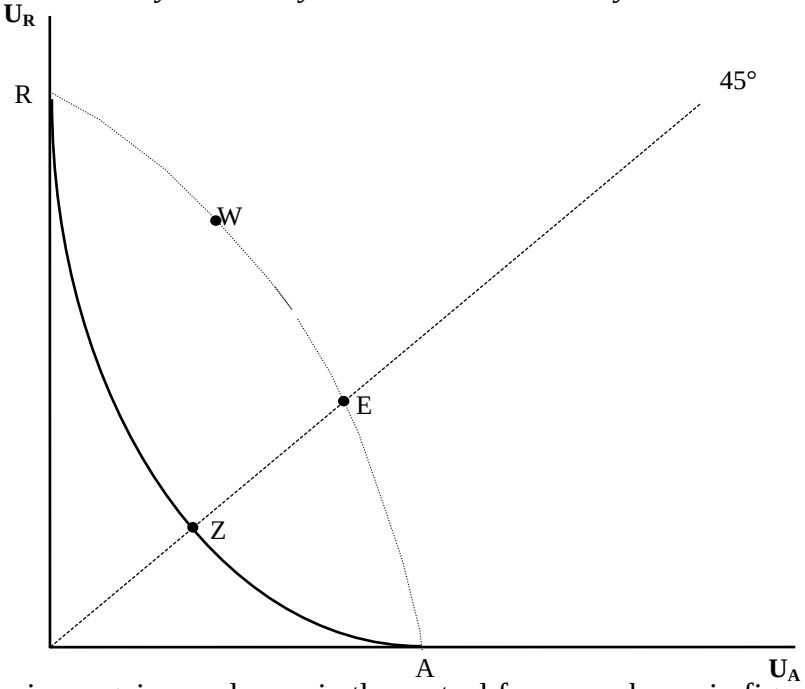
In contrast to figure 7 our figure 8 shows the utility possibility curve with one sided envy of family A with regard to family R (the dotted line displays the course without envy). The point W is the optimum optimorum without envy. But with regard to the utility level of family R, that lies above the level U_R^0, family A are envious so that their utility level is reduced from U_A^1 to U_A^2 when family R remains constant at U_R^1.

Figure 8: The Utility Possibility Curve and the Envy of Family A



Just as mutual altruism is possible so is mutual envy; in figure 9 constant mutual envy is assumed.[24] The optimum optimorum once again lies at point W and the egalitarian solution at E (on the dotted utility possibility curve). With enviousness the egalitarian solution lies more south westerly at point Z, so it is obvious that the solution is connected with a lower utility level for both families.

Figure 9: Utility Possibility Curve and Mutual Envy

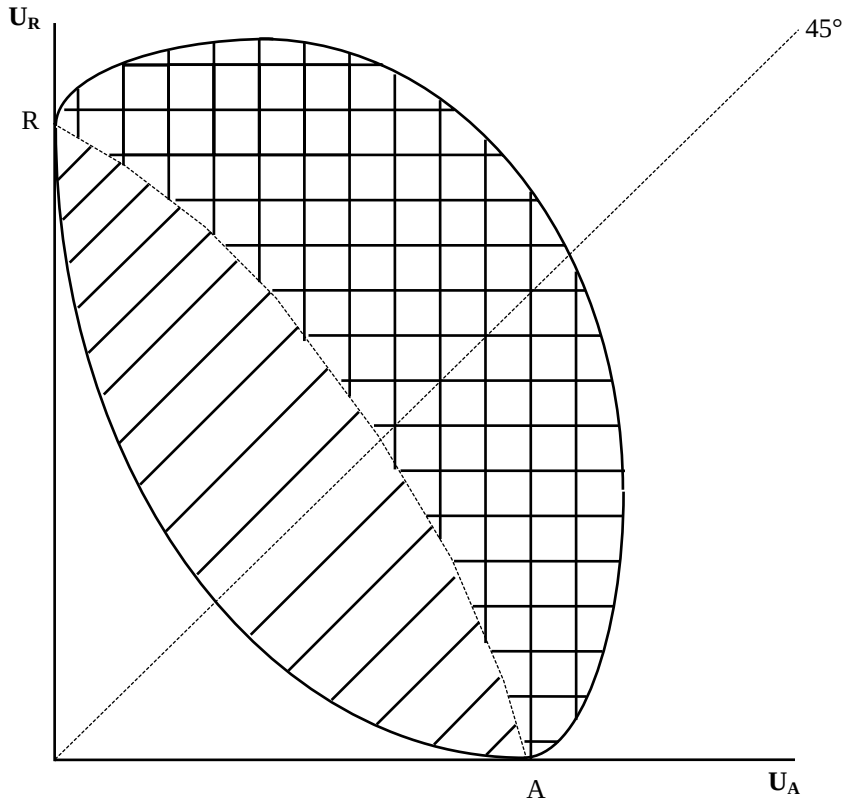


Altruism, egoism and envy in the mutual form are shown in figure 10. Whereas altruism with respect to egoistic behaviour leads to a raising of individual utility levels as well as a raising

[24] *Hackmann* (1972, pp. 194) shows similar courses of utility possibility curves, however with a different reasoning.

of society's welfare, envy causes in comparison to egoism a loss in welfare. The stronger the feelings of envy to one another the larger the loss in welfare (see the simply shaded area in figure 10). Apart from causing a loss in welfare, envy also causes a decline in society's general consensus, in other words the political divergence grows (polarisation), so that democratic majorities are harder to find for the supply of public goods or for the states motivation for intervening in distributive policies. Unanimity is unrealistic.

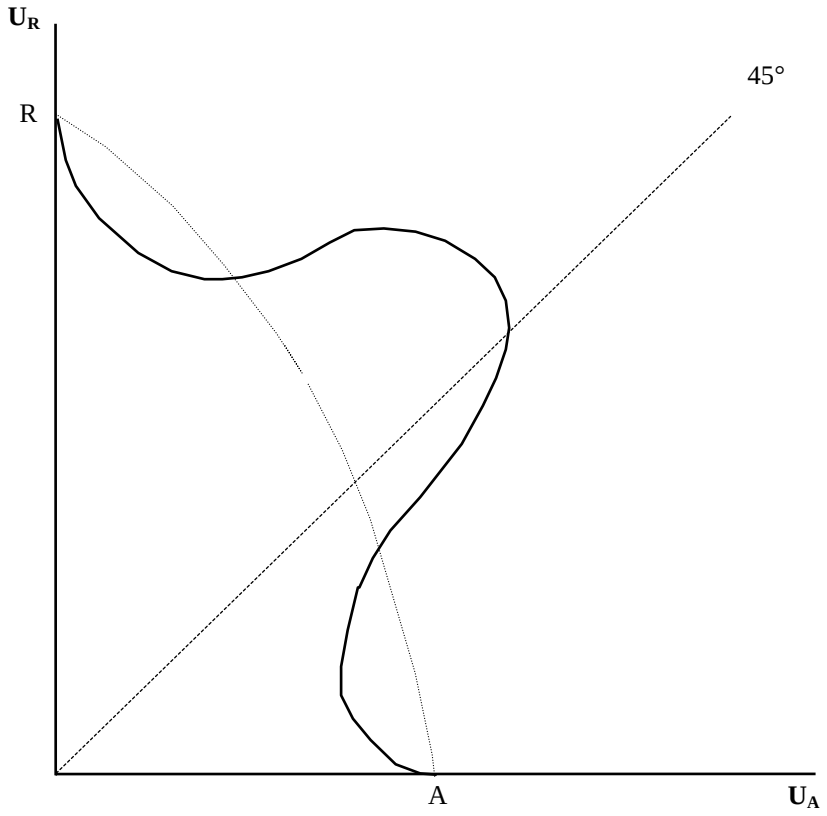
Figure 10: Utility Possibility Curves, Egoism, Altruism and Envy



In societies where social justice is sought (in the sense of both justice of ability and justice of needs) and in which the majority of the citizens (as either producers or consumers) have taken the values of an open economy including the ethical foundation to heart, envy as a continual phenomenon will rarely crop up. This is because inequality has in the first instance to do with personal performance. It is perhaps not unrealistic that at some lower levels of utility and income firstly envy and then egoism followed by altruism will come through the strongest. The utility possibility curve of such a society would most probably be rather complicated.

In figure 11 a more styled course of a utility possibility curve is portrayed. In observation of the possible course of the utility possibility curve it should be obvious that individual egoism leads to a satisfying level of welfare for the whole society. Above and beyond this it is ethically seen as acceptable human behaviour. Altruistic behaviour is surely to be rated higher, but realistically it will only appear in a restricted form. Not even Christianity requires of its believers selflessness.

Figure 11: Utility Possibility Curve on Partial Envy and Altruism



II.4. Types of Social Welfare Functions

Social welfare functions are described as individualistic when they are based on the individual utility functions of humans. These can be more or less arranged through their "social commitment" that through the type of aggregation or consideration can be expressed through the individual utility. The *Benthami*an or utilitarian welfare functions assume that all people strive for happiness and welfare (hedonism). Therefore all participants should act in a manner that is optimal for them. This is based on the consequential ethics in the sense that all effects of actions (including external effects) can be estimated. This is not just about a great happiness for the subjects but also about "the greatest happiness from the largest number". According to this the Benthamian welfare function SW_B adds up the single utility positions:

$$SW_B = U_1 + U_2 + ... + U_n = \max !$$

and

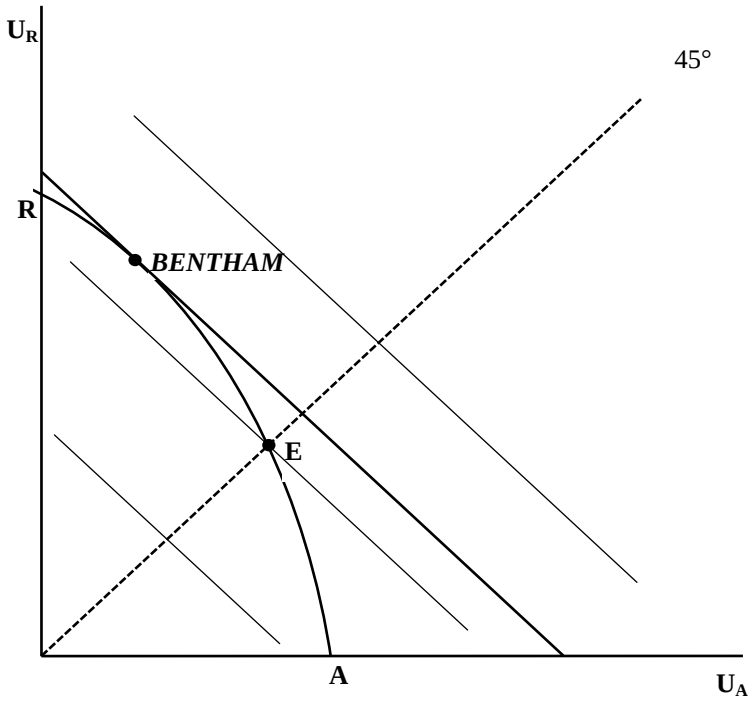
$$SW_B = \sum_i^n U_i = \max !$$

Utilitarianism is accused of bringing forward the position that leads to a higher total utility (apart from the consequences of distribution mentioned in the minimum sacrifice principal above). The distribution of the individual utility is not taken into account so that with the presentation of individual utility functions a distribution from rich to poor can also lead to a rise in the total welfare. "An impoverishment of certain social classes can be ethically justified according to the theory of conditional total utility maximisation" (*Enderle* 1985). On the

other hand the positive side of utilitarianism must be brought to the forefront, this being that not only the present, but also the future generations are taken into account in the decision making; this includes all living creatures.[25] Finally fact is that the *Benthami*an welfare function does not exclude the possibility of a maximum in which one or more persons receive no utility at all ($U_{1,\ 2} = 0$). These people will then be allowed to vegetate under the physical minimum existence and starve. The social commitment of this welfare function is so small that the basics of distributional policies in a social market economy would have to be rejected if there were many people in such a society that were unable to perform to the extent that they would be able to achieve the social cultural minimum existence under their own steam.

Let us use our above developed instruments to clarify the connections. As is easily shown the *Benthami*an social indifference curve is a linear function with the slope of –1;[26] the utilities of the two families therefore go equally balanced into the total prosperity. However with the *Benthami*an social indifference curve an egalitarian solution E deviating optimum optimorum only then results when the original entitlements were distributed unequally as assumed in figure 12. This being the case the *Bentham* point then lies once again on a higher indifference curve compared with the egalitarian point E. With complete equality in the original situation both points fall together.

Figure 12: Optimum Optimorum and the Benthamian Social Indifference Curve



[25] See, e.g. *Waibl* (1988).

[26] See, e.g. *Atkinson/Stiglitz* (1980).

The *Nash* welfare function (*Nash* 1950) is a game theoretical function which was derived as a solution to negotiations between two partners. In its simplest form it postulates that the individual utility functions of the single persons should be linked through multiplication (and not through addition as in *Bentham*'s theory) and to maximise the product of the utility levels:

$$SW_N = U_1 * U_2 *...* U_n = \max !$$

or

$$SW_N = \prod_i^n U_i = \max !$$

The *Nash* welfare function excludes unlike that of *Bentham* that the individual utility of a member of society is zero or negative, because otherwise the total prosperity would be either zero or negative. In this respect SW_N shows a higher extent of social commitment than SW_B. Beyond this the welfare function from *Nash* is not indifferent to the redistribution from poor to rich. For example family A has achieved a utility level of 4 and family R one of 8. In the case of the SW_B this would result in a social prosperity level of 12. If one utility unit is redistributed from A to R (3 and 9), it remains unchanged. Using a multiplicative link we would get a social prosperity level of 32. If one unit is moved from A to R (3 and 9), then the prosperity level sinks to 27. In the opposite case (5 and 7) it increases to 35. The highest possible level is achieved with equal distribution (6 and 6). This means that the *Nash* function shows to have an even higher level of social sympathy, moves in the general direction of equality. Formally the indifference curves of this function correspond to the figures 3 to 6 (I_1 etc.). The deviation from the egalitarian solution can be followed back to differing original entitlements or preferences.

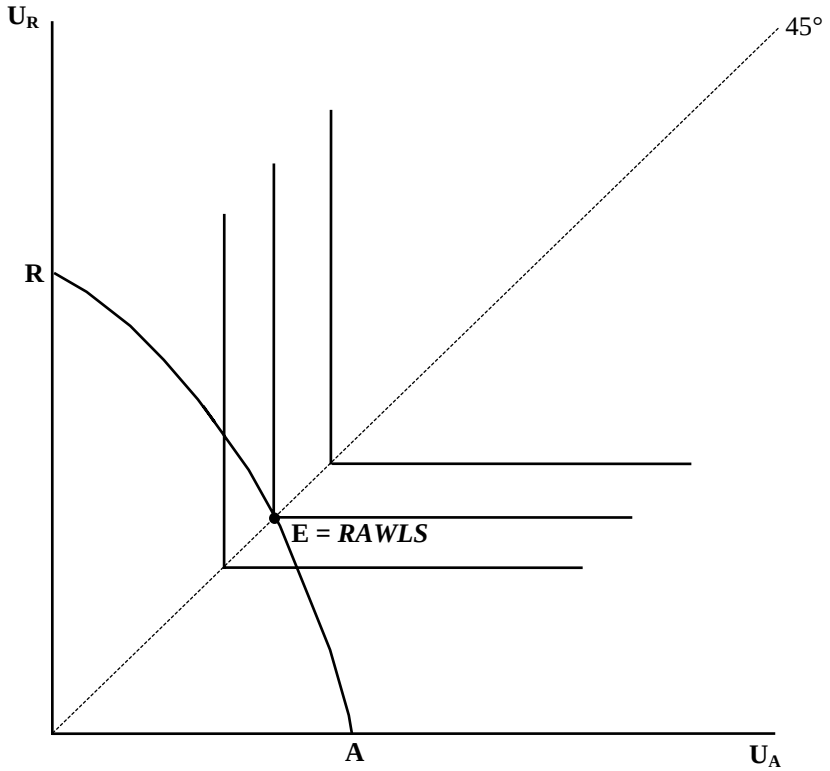
Rawls approach on equality is based on social fairness (*Rawls* 1975), this means that the advantages of one member of society should not be at the cost of another. In other words the members of society are not allowed to expect things to others that they would not do themselves. As a contract theorist *Rawls* believes that all individuals in their original situations are subject to a "veil of ignorance". If one had to make a choice on the rules of society then according to *Rawls* everybody would choose those, which one would still find acceptable if one "landed at the bottom of the heap" (*Waibl* 1988). Due to risk adverse behaviour a unanimous decision came into being about a rule that maximised the utility of the poorest person within society:

$$SW_R = \max \min (U_1, ..., U_n).$$

All people have an equal claim to freedom and human rights; social as well as economic inequalities are only acceptable if (a) the starting chance with regard to all positions and offices in society is equal and (b) if everybody gains advantages from the social and economic inequalities, this means the worst off individual is still better off than if an egalitarian distribu-

tion system was in operation.[27] So the social weighting of the poorest member of society is very high; the social indifference curve of this maximum principal lies on the 45° line and has an L-shaped course (figure 13).[28] To make this relevant one has to be aware that the *Rawls*ian maximum principal is based on an index of basic goods, which is neglected for the following argumentation.

Figure 13: Optimum Optimorum and Rawls Social Indifference Curve



Whether or not (as assumed in figure 13) the original entitlement is unequal (R > A) or equally distributed, *Rawls* optimum optimorum matches the egalitarian solution E, in the case of pure egoistic behaviour.[29] This is also valid for equal original entitlements and mutual altruism, whereas in the case of differing original entitlements and mutual altruism (as clearly shown in figure 14), *Rawls* solution does not appear to be egalitarian. In this case *Rawls* solution for family A is also connected with a higher utility level than the egalitarian solution E. *Rawls* maxi min principal leads then to an equality digressing result when the original entitlements (including preferences) are not identical and at least one family acts in an altruistic

---

[27] Regarding this there also exists an "elite" social welfare function, also known as *Nietzsche*'s welfare function, which states that the maximum is only then achieved when the utility of the person who receives the highest utility is maximised:

SW_N = maxi max (U_1, .., U_n).

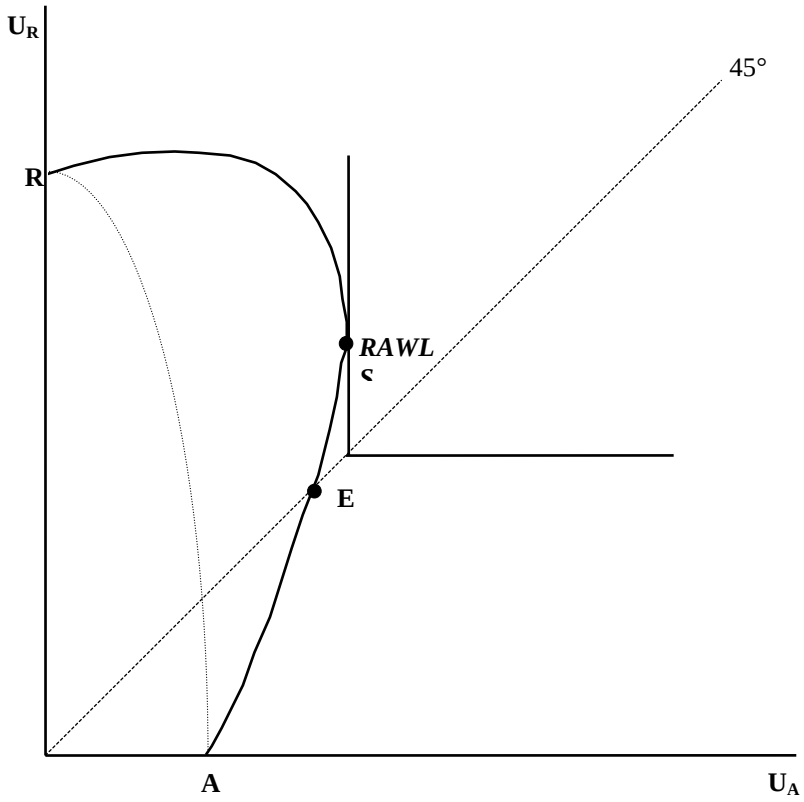
On a first glance this principal would break leading equality ideals and therefore would not gain a general consensus.

[28] *Atkinson/Stiglitz* (1980) offer the mathematical proof.

[29] In *Rawls* description of the state of the nature he believes that people (families) show no interest for one another, which would verify the assumption of a pure egoism.

manner. If however redistribution is pushed beyond a certain level the utility interdependence transforms into egoism and finally envy.[30]

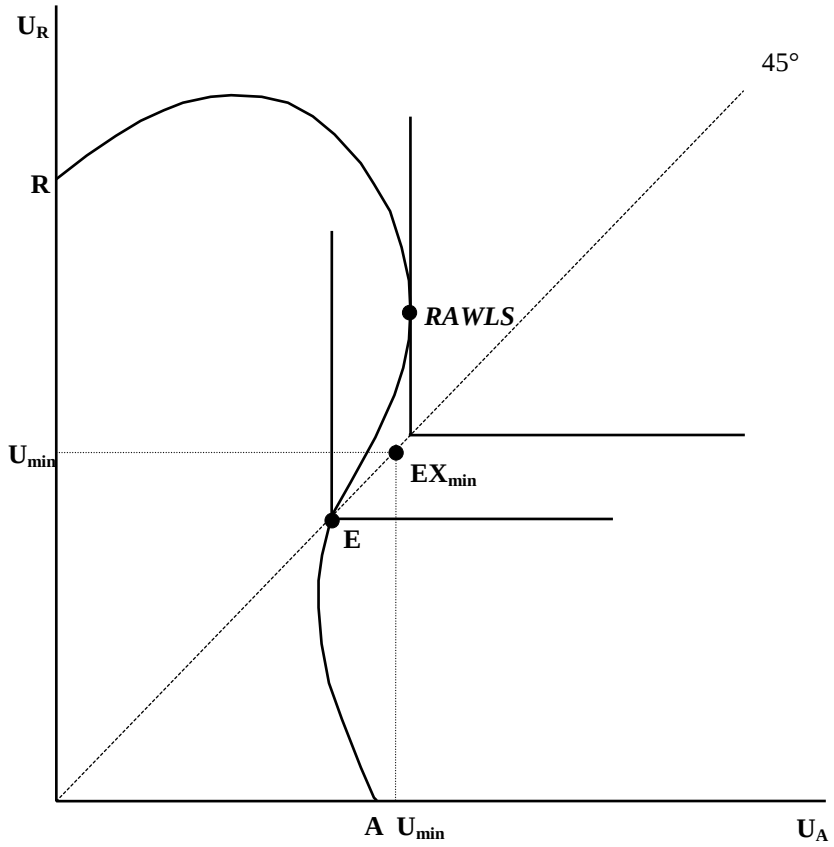
Figure 14: Optimum Optimorum, Rawls Social Indifference Curves and Mutual Altruism



Such as shown in figure 15, *Rawls* solution lies once again on the point of which it brings family A a higher utility than the egalitarian solution E, and simultaneously improves family R's condition and the prosperity of society.

[30] This is identical with our explanations above, that rampant redistribution destroys the incentives of those able and willing to perform.

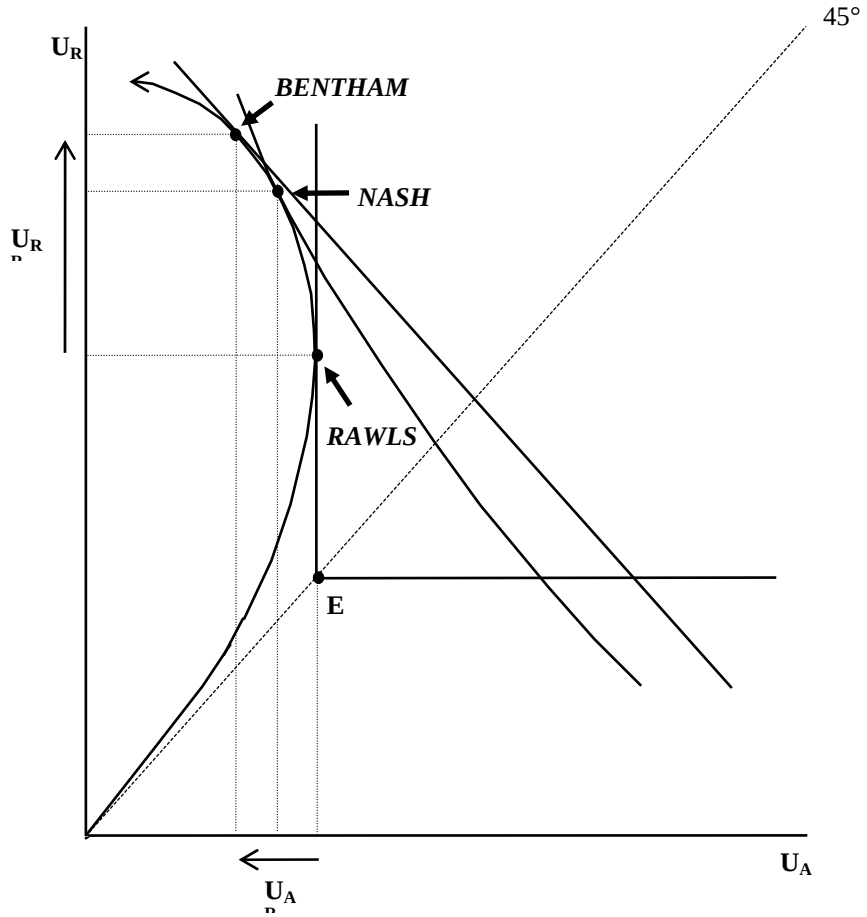
Figure 15: Optimum Optimorum, Rawls Social Indifference Curve, Altruism and Envy



Through the development path shown in figure 5 we can prove that *Rawls* maxi min principle only accepts inequality when this does not burden the poorest member of society. This is shown in figure 16. Up until *Rawls* point the distribution becomes increasingly unequal, however both (A and R) gain utility.[31] Beyond this *Nash*'s and *Bentham*'s welfare function are at a tangent on the development track thereby allowing the redistribution from the poor to the rich through which the utility of the poor family sinks. If we remember the *Pareto* criteria which states for an increase in society's prosperity that the increased utility of at least one individual member of society must occur without a worsening of the utility of others, the welfare function according to *Rawls* fulfills the *Pareto* criteria even from a dynamic perspective; it also avoids in the evolutionary process a worsening of the utility situation of family U_A. This does not occur with the welfare function by *Nash* and *Bentham*. It is also the case that the welfare function by *Rawls* shows a higher preference to social commitment and equality than that of *Nash* and especially *Bentham*.

[31] See *Rawls* (1990, pp. 96).

Figure 16: The Development Path and Different Social Indifference Curves.



Our assumption that a gradual transmission from altruism to egoism and envy occurs can, in the face of realistic human behaviour, certainly be justified. Due to lessons on the effects of taxes,[32] we are aware that a high tax burden on the well off leads to a cut in the supply of effort, they do not just accept the consequences of increasing redistribution. The attempt to produce equality through taxes and transfers would in our two families model, in which neutral lump sum taxes and transfers could be applied, lead family R as consequence of their uprising envy to reduce their input of labour and capital, thus reducing the welfare of both families.[33] Here again the problem of opportunity costs becomes obvious which are caused by the excessive persecution of the justice of needs concept leading to a reduction of prosperity. Perhaps there is something to be said for the phrase "If the rich are well, then so are the poor".

In case of the realistic assumptions that have been underlined here the maxi min principal does not lead to the egalitarian solution; the formerly often mentioned accusation that *Rawls* was an egalitarian can therefore not be backed up. *Harsanyi*'s (1975) criticism of *Rawls* that the interests of the poor had priority, regardless of how high the opportunity costs were and that the maxi min principal stood in contradiction to the utilitarian as well as ruling social ethics is also inappropriate. Rawls' maxi min principal also only takes the provision with basic goods into account which does not necessarily include high quality luxury goods. If one takes this fact into consideration the maxi min principal is compatible with political ideas in

---

[32] See, e.g., *Petersen* (1981 and 1982).

[33] *Stiglitz* (1988, p. 446) explains the course of the utility possibility curve with the distorting effects of non-neutral (proportional or progressive) taxes or transfers. This is not convincing, because lump sum taxes and transfers can be implemented in a two persons model.

which society is only responsible for the provision of basic security to the needy. In figure 15 the physical minimum of existence U_{min} has been levelled out; if this should be secured then only solutions that come into question lie to the north east of U_{min}. *Rawls*' solution would then be compatible with the search for the highest possible social cultural minimum of existence, without total prosperity being drawn into strong feelings of apathy.[34] The solution is however far from the egalitarian solution E. The welfare function according to *Rawls* certainly proves itself to have the formerly mentioned highest social commitment.

The welfare functions that have been looked at up until now have all been individualistic. In a non-individualistic or collective social welfare function not just individual utilities appear, but also utility differences between the members of society or simple collective utility sizes (e.g. the maximisation of the utility function of the well meaning dictator). One of the first modifications would lie there in that individual utility arguments would continue to appear in the social welfare function, however not in a monotone fashion. Such a welfare function would still be individualistic but not paretian. The implications of non-paretian targets are clarified through the principal of the utility compensation (an extreme case would be the minimum sacrifice principle mentioned above) which is also termed as being an egalitarian principal. The egalitarian target objectives, shown in point E in figure 17, are connected to the utility differences between the individuals. For example is $U_2 > U_1$ and the social welfare function sinks only with the utility of the second economic subject, then point E becomes optimal, and the social indifference curve is in line with the 45° curve.

Certain intermediate targets that take the "trade-off" between utility differences and utility levels into account may exist. For example, according to *Nozick*, in the way that ($U_2 > U_1$ is presupposed) the weighted utility difference appears in the welfare function in the following shape:

$$SW = U_1 - \alpha (U_2 - U_1)$$

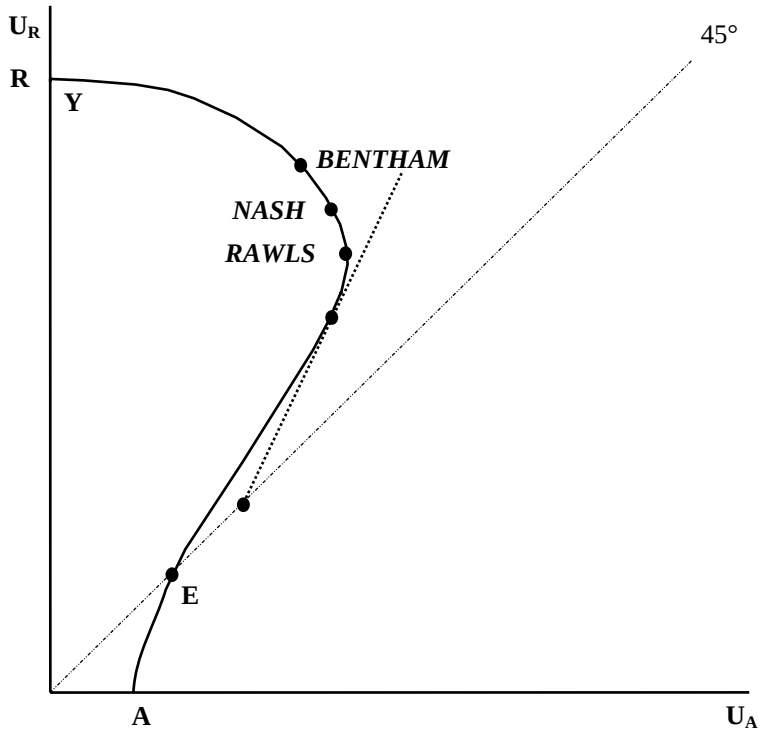
where α determines the extent of the tolerated utility differences.[35] The result is a social indifference curve that runs more steeply than the 45° line (figure 17).

---

[34] In the example of figure 15 the individual utility levels for the poor and the rich families in case of the egalitarian solution are lying below the physical minimum of existence.

[35] In the case $\alpha \to \infty$ utility differences will not be tolerated ($SW \to -\infty$), we receive an egalitarian solution. With $\alpha = 0$ *Rawls*' solution ($SW = U_1$) would result.

Figure 17: Egalitarian Social Preferences



The social optimum lies in the areas between E and *Rawls* solution and is determined by the extent of the tolerated utility differences.

A further deviation from the evaluation of the social welfare for reasons of individual utility can then exist when a paternalistic ideal is connected to the consumption of certain goods. This would be the case with goods like alcohol and tobacco (demerit goods) underlying specific indirect taxes. Beyond this *Tobin* developed the principal of specific equality, because society is not just confronted with the problems of general inequality, but also with the distribution of very specific immaterial goods. Extreme cases would be human rights and the right to vote, but also the supply of basic foods stuffs or health services in times of war. In such cases strict equal distribution is of the utmost importance. On the other hand certain goods exist, where an equal distribution is not necessary but guaranteed minimum consumption (minimum of existence) is (such as food stuffs in peace time, education and sufficient living quarters). These last objectives are already included in *Rawls*' welfare function which is based on individual utilities.[36] In dictatorial welfare functions, the degree of redistribution is dependent on the dictators ideas (or those of the ruling clique) on distribution.

III. The Trade-off Problem

Material preferences, but also ethical ideas are enclosed in the individual utility functions. In certain circumstances the latter are expressed in a positive interdependency of the individual utility functions. With the idea of aggregating the individual preferences by using a social welfare function, the influences that the single members of society have on the total prosperity must be guaranteed. Further ethical ideals continue to go into the kind of aggregation of

[36] Not necessarily in Bentham's welfare function, which allows zero utility by one or more members of society.

individual utility levels (in connection with the decisions on the aggregation rules). The utility levels themselves are equally balanced according to natural law,[37] so that in the two families model family A's utility has no greater or lesser importance for the total prosperity than that of family R.

The various thinkable social welfare functions embody nothing more than a value judgement on the preferred distribution of society's prosperity. Whereby this distribution must lie on the utility possibility curve if it is to obey the basics of economic efficiency. Regardless which method of reasoning the advocates of a single social welfare function bring,[38] it must be mentioned that in an open society the ideas of distribution must always be discussed again and again.[39] Even if the idea of a social welfare function is a purely theoretical construction, that will never be put into practical use in a democratic society, the opinions on the equality of distribution and the extend of redistribution which is striven for nevertheless play an important role in elections.

This means that in practical politics people have differing opinions regarding distributional objectives in the hope of gaining a majority. In our approach we can clarify the differing opinions using social welfare functions and can let these at least hypothetically be decided on. In a two persons (or two families) model the vote following the majority principal should remain unproblematic, there a majority can only be reached with a unanimous decision. Firstly we want to look at this model approach before we consider a more realistic approach with a group of poor and rich members of society, the former of which contains more members than the latter. The conceivable social welfare functions are firstly summarised in one diagram whereby the minimal state by *Nozick* and *Nietzsche*'s welfare function (or maxi max welfare function) will be added. In figure 18 we assume perfect equality (regarding factor entitlements and preferences). It is immediately obvious that the welfare functions according to *Bentham*, *Nash*, and *Rawls* all lead to an egalitarian solution. Because with equality one cannot see the reason to redistribute, *Nozick*'s Minimal State would also be around point E. However *Nietzsche*'s welfare function delivers a corner solution in A and R, so that a cooperative solution between the Families A and R will no longer come into being.

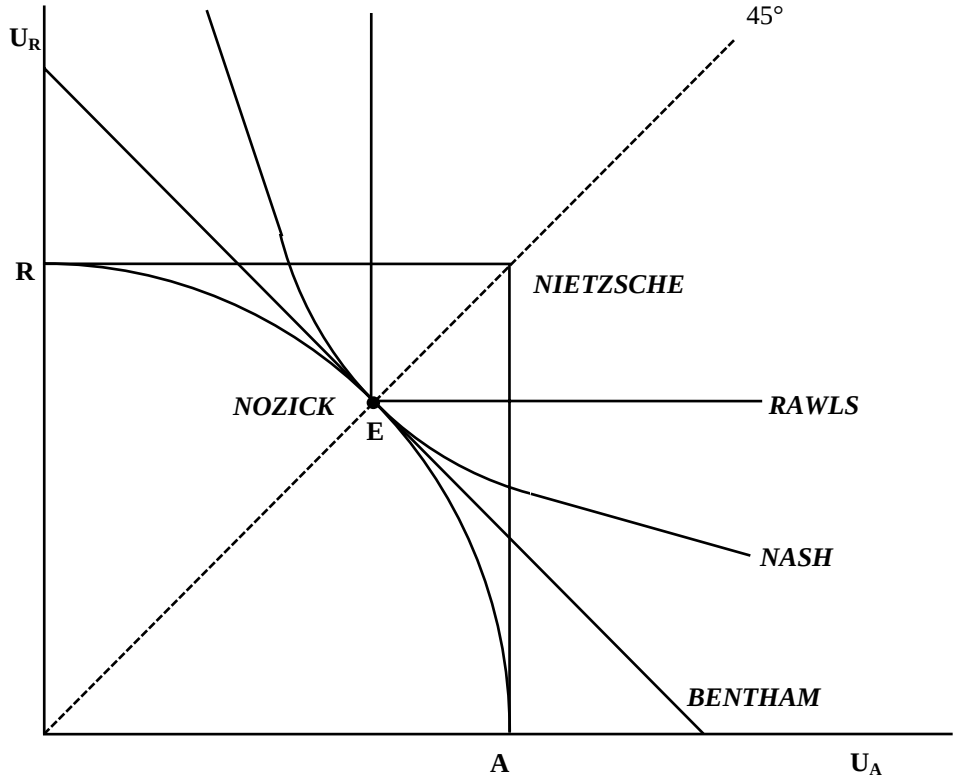
---

[37] Expressed mathematically the isoelastic social welfare function is to be used.

[38] For example a unanimous decision as a result of a veil of ignorance as *Rawls* uses.

[39] *Tanghe* (1987, p. 142) may be right when he says that stable fixed social welfare functions are typical for closed societies. That open societies have to be free anarchistic societies does not have to be examined any more closely.

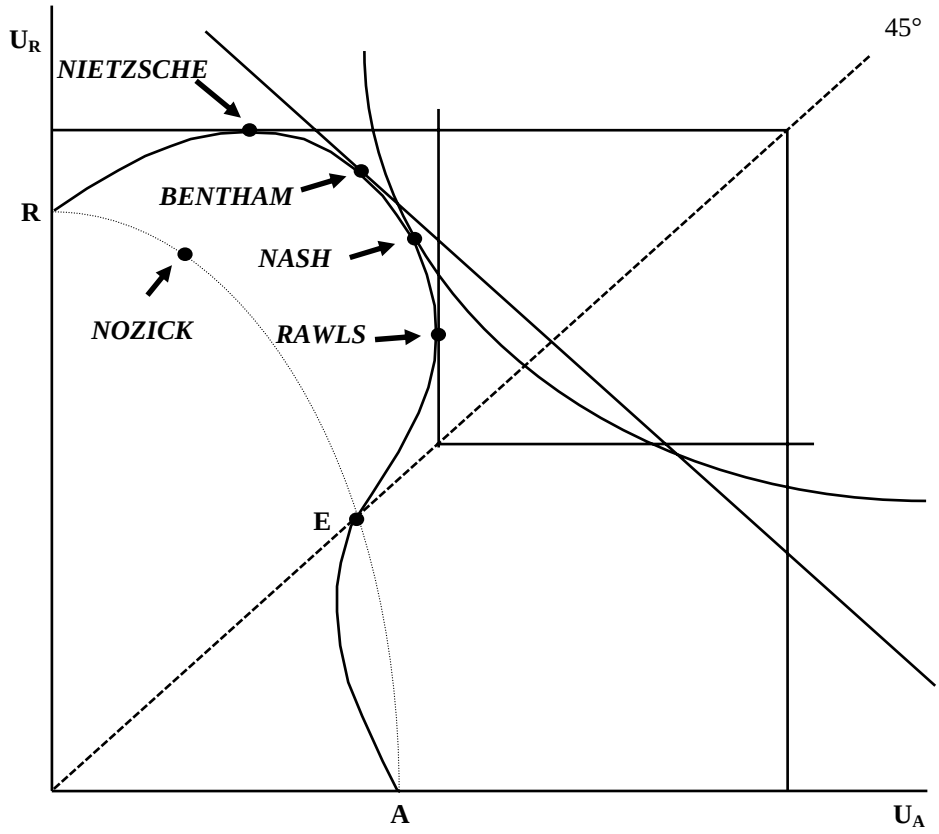
Figure 18: Equality in the State of Nature and Social Indifference Curves



In figure 19 the situations at inequality, altruism, and envy will be portrayed.[40] As with *Atkinson/Stiglitz*, *Notzik*'s minimal state is set autocratically. Because *Nozick* makes no comment in his minimal state regarding altruistic behaviour or that redistribution can be virtually disregarded, we are placing *Nozick*'s minimal state on the dotted egoistic utility possibility curve. This placement explains that *Nozick* (1974) excludes *Pareto* improving redistribution and a voluntary redistribution caused by altruism which does not serve economic efficiency, and from the view of the social welfare functions portrayed here is not justifiable either. In our example *Nozick*'s minimal state does not fulfil the criteria that should be the basis of an efficient and socially minded society. In our two families model, family R carries through a voluntary (*Pareto*-improving) redistribution without any form of ballot mechanism, as far as the point on the utility possibilities curve is at a tangent to *Nietzsche*'s function. From this point onwards a voluntary redistribution without a ballot mechanism does not exist, because the *Pareto*-criteria is violated as family R begin to lose utility.

[40] This depiction follows the portrayal by *Atkinson/Stiglitz* (1980, p. 338), but it is justified differently.

Figure 19: Social Indifference Curves, Modern Normative State Theories at Altruism and Envy



It should be beyond doubt that rational members of society who have no feelings of envy could completely agree with *Nietzsche*'s solution. In a two families model, as long as the families accept the corresponding distributional decisions, unanimous solutions are conceivable with a view to the solutions by *Bentham*, *Nash* and *Rawls* (figure 19). This means a redistribution could be carried out without pressure from the state. On the other side of the solution by *Rawls* (in the direction of an egalitarian solution), there would most probably be no majority consensus, because the behaviour of Family R would change to egoism or envy.[41]

State intervention (or the state as a redistributional agent) is necessary when the two family model goes over to models with groups of people, with differing numbers of people in each one. To stay with the two dimensional approach we will assume that we have a group of rich individuals and a group of poor individuals, whereby firstly the utility levels (income levels) are supposed to be equal in both groups and secondly the groups have the same number of persons. Such a model approach brings with it the problem that the group of rich people, who will pay the price of redistribution, have no complete information about their own situation or that of the poor group. This means that without coordination the transfer payments can overwhelm some of the poor while others remain empty handed. This could result in attempts of transfer fraud.

---

[41] *Rawls* solution would define the outer most acceptable borders on redistribution. This no longer *Pareto* improving redistribution could be agreed to by the family R when for example they believe that family A will be put in the situation where they will improve their provisions with factors of production (labour and capital). This would lead to a utility possibility curve being resituated towards the north east in the future. Family R would also profit from this so they would probably agree unanimously because of a long termed personal interest.

Also on the side of the rich problems will occur. With the interdependency of the utility functions (when the rich behave altruistically) a transfer payment by one of the rich members of society to the poor leads to an increase in utility for all the rich members of society. If these behave as free riders then the redistribution corresponding to the social welfare functions (se figure 19) would be agreed to unanimously, but not be implemented without the use of force, leading to the instability of the altruistic behaviour and an eventual disappearance of such. If the moral laws fail then the only help comes from the wish for redistribution backed up by state pressure (through a tax and transfer system).

Even if the groups are equal in size, a majority (or unanimous) consensus is also possible for a solution that goes beyond *Nietzsche*'s solution. The area from *Nietzsche*'s solution up to *Rawls*' solution on the utility possibilities curve R_A (figure 19) could be termed the area of democratic solutions, meaning the span of possible redistribution that may be achieved with a majority in a social market economy and open society.

The restriction of the redistribution to *Rawls*' solution can only be expected if the groups of rich and poor are equal in size; in reality this is not the case. It is typical that a small group of rich (to varying degrees) people on the one side and on the other a large group of poor (to varying degrees) people exist and in-between there is a more or less heterogeneous middle class. Let us assume for simplification that the group of poor people is larger than that of the rich people, but with regard to utility (income) they are homogeneous. In this case the line of equal distribution is no longer the 45° line, it must now be steeper, because the weighting of the poorer people has increased.[42] Apart from this as a consequence of the basic democratic principle "one man, one vote" the poor still have the majority position.

This is where the fears commented on by *Buchanan* link on, namely that in a democratic society the poor could try to exploit the rich.[43] They are in the majority and could implement a strong progressive system of taxation, and simultaneously set high transfer payments for the less able people, so that in the end *Rawls'* solution is overstepped in the direction of an egalitarian solution. Because politicians want to be voted back into office, in other words their motivation is one of personal power preservation, they will follow the moods of the majority. They are less likely to implement the taxation instruments as they fear the negative reaction of those taxed. Instead of this they will finance the transfer payments that are demanded by the majority through public debts, leading to the democratic societies sinking in national deficits and finally collapsing into bondage. This is a short description of Buchanan's and Wagner's book "Democracy in Deficit" which was described by *Tobin* (1978) as the basis of demagogy.

Whether it be demagogy or not, the historical developments appear to be verifying many of Buchanan's fears.[44] As he is an advocate of the contract theory approach, it is obvious that he is searching for types of constitutional barriers to protect the rich minority from the poor majority. The constitutional protection of minorities is one effective device. Another method would be to make it plainly obvious to the poor or less well off members of society how many opportunity costs are tied to such an excessive redistribution.

---

[42] Formally observed the weights in the social welfare function would no longer be equal, e.g. the partial utility elasticities within the *Nash* function would vary in height.

[43] Especially expressed in *Buchanan/Wagner* (1977).

[44] See for instance *Petersen* (2000).

Our model approach which is in the end a theory on efficiency and justice makes the borders of redistribution very clear. Then the possible behavioural adaptations on the side of the rich and on the side of the poor would lead in case of a strong tendency for egalitarianism to a situation of general poverty. One has to remember that it is the rich who can avoid the burdens of the state with the greatest ease. Their avoidance elasticities are especially high. Capital is a much more mobile factor of production than labour, if it is overtaxed it will migrate to foreign countries.[45] If companies are overly taxed they will take up strategies for tax evasion or the entrepreneurs will privatise their capital and consume it. In every case it means a declining capital stock for society which would turn into a loss in jobs. Therefore the rich are not unarmed and in the hands of the poor. If it is not worth performing then nobody will perform in this society. If the majority is in favour of a egalitarian solution, then these costs must be carried in the form of a lower prosperity. Once this has become common knowledge then democratic majorities for egalitarian policies will no longer be found.

From the view of society's prosperity, the solution according to *Bentham* is the one that lies in the most north easterly position and therefore demonstrates the highest level of welfare. In the movement from *Nietzsche*'s solution to that of *Bentham* R loses utility, which is in turn overcompensated by A's gain in utility. On and on from *Bentham* to *Nash* and from *Nash* to *Rawls*, the loss of utility for R becomes greater than the utility gain for A and society's prosperity level sinks, while a stronger egalitarianism is simultaneously achieved in the utility distribution. The price for this greater social sympathy (or equality) lies in the loss of welfare. If this is demanded by the majority then the solution is economically efficient and socially justifiable.

Under the assumptions made here the judgement regarding the egalitarian solution E is obvious. The rich greatly lower the supply of effort and the rich as well as the poor lose out. Under the assumptions of real human behaviour this model shows exactly the same that real existent socialism brought to the forefront, namely the destruction of society's prosperity. This collective solution is theoretically weak from the start, practically it can only exist until experience of the system is available. In democracies collectivism is not able to hold a majority over any period of time, as the evolutionary process within the system would be destroyed.

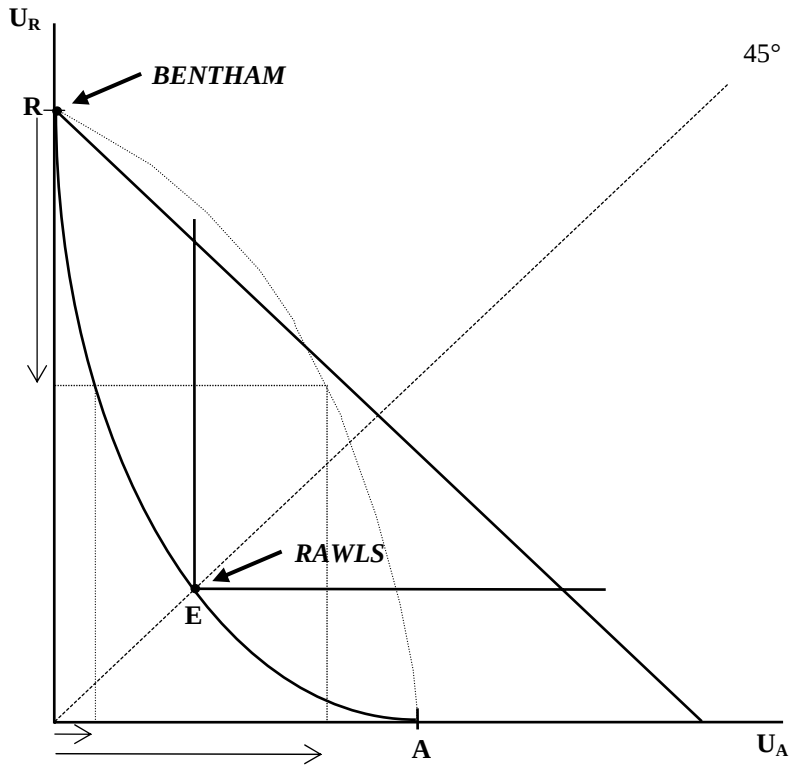
IV. Concluding Remarks

We have shown altruism, but also egoism as positive forms of human behaviour. The problems start then when cohabitation is dominated by envious behaviour. Figure 20 shows the utility possibility curves in the case of mutual envy. As A has a high marginal envy, the sacrifice of a large part of utility by R does not lead to the equivalent increase in the utility of A, which is much lower when compared to mutual egoism (see the dotted utility possibility curve in figure 20).

---

[45] See *Petersen* (forthcoming) and *Petersen/Fischer/Flach* (forthcoming).

Figure 20: Optimal Welfare and the Envy Society



In an envious society further problematic questions appear, namely which social welfare function will be agreed on? In a two families or two class society (both being the same size) *Rawls*' solution will not be agreed upon, which does by the way correspond to the egalitarian solution. The *Nash* solution also falls away as it stems from cooperative negotiations. Envy coupled with egocentricity points to *Bentham*'s solution, the result of which is the (defective) corner solution R (figure 20). In other words the rich family (class) will maximise its utility, because in this situation the highest total social prosperity is attainable. Should the poorer class be in the majority they will try to gain the maximum level of utility A (at the cost of R). Envy, egocentricity, and non-cooperation lead society into catastrophe. Therefore the development of a social ethics has a high priority which excludes envy as basic behavioural pattern. The justice of ability concept is such an approach which - when generally accepted – could avoid envious behaviour as one of the most destructive issues of society.

Economics alone surely cannot overcome the problems connected with the justice of needs concept. Just as important are the social ethics, and politics which possibly through the efficient design of society's institutions enhances individual responsibilities and restricts the often occurring principal/agent problems. Our economic approach however has the advantage of highlighting the opportunity costs of an overdrawn equality due to the justice of needs approach. Open societies will not always be successful in finding the optimal level of distribution and in keeping it in equilibrium in an evolutionary process. However the permanent discourse above and beyond the narrowly defined modern disciplines about the possible costs of redistribution and the disastrous effects of envy, may at least in the long run persistently support the willingness to reform and the search for new solutions.

Literature:

ARISTOTLE: *Die Nikomachische Ethik*. Übersetzung von R. Nickel, München 2001.

ATKINSON, A. B. and J. E. STIGLITZ: *Lectures on Public Economics*. Maidenhead 1980.

BERGSON, A.: A Reformulation of Certain Aspects of Welfare Economics. In: *Quarterly Journal of Economics*, Vol. 52, 1938, pp. 310 – 334.

BRUNNER, J. K.: *Theory of Equitable Taxation. Normative Foundation and Distributive Consequences of Income Taxation*. Berlin, Heidelberg 1989.

BUCHANAN, J.R. and R.E. WAGNER: *Democracy in Deficit*. New York 1977.

EDGEWORTH, F. Y.: *Papers Relating to Political Economy*. New York 1925.

ENDERLE, G.: Sicherung des Existenzminimums für alle Menschen, eine Herausforderung für Ethik und Wirtschaftswissenschaften. G. ENDERLE (Ed.): *Ethik und Wirtschaftswissenschaft*. Berlin 1985, pp. 163 - 189.

FRISCH, R.: *New Methods of Measuring Marginal Utility*. In: E. LEDERER und J. SCHUMPETER (Ed.): *Beiträge zur ökonomischen Theorie*. Bd. 3, Tübingen 1932, pp. 114 - 135.

GABISCH, G.: *Egoismus, Altruismus und ökonomische Effizienz*. In: G. ENDERLE (Ed.): *Ethik und Wirtschaftswissenschaft*. Berlin 1986, pp. 85 – 109.

HACKMANN, J.: *Zur wohlfahrtstheoretischen Behandlung von Verteilungsproblemen*. Berlin 1972.

HARSANYI, J. C: Can the Maximin Principle Serve as a Basis for Morality? A Critique of John Rawls Theory. In: *American Political Science Review*, Vol. 69 , 1975, pp. 594 – 606.

HINTERBERGER, F., K. MUELLER and H.-G. PETERSEN: "Gerechte" Tariftypen bei alternativen Opfertheorien und Nutzenfunktionen. In: *Finanzarchiv*, N.F. Bd. 45, 1987, S. 45 - 69.

HOMANN, K.: Die Rolle ökonomischer Überlegungen in der Grundlegung der Ethik. In: F. BOECKLE and H. HESSE (Ed.): *Wirtschaftswissenschaft und Ethik*. Berlin 1988, pp. 215 - 240.

KERBER, W.: *Sittlich handeln unter dem Druck ökonomischer Sachzwänge*. In: F. BOECKLE and H. HESSE (Ed.): *Wirtschaftswissenschaft und Ethik*. Berlin 1988, pp. 241 – 258.

MARKL, H.: *Natur als Kulturaufgabe. Über die Beziehung des Menschen zur lebendigen Natur*. Münschen 1991.

NASH, J.F.: The Bargaining Problem. In: *Econometrica*, Vol. 18, 1950.

NOZICK, R.: *Anarchy, State and Utopia*. Oxford 1974.

PAQUÉ, K.-H.: *Philantrophie und Steuerpolitik. Eine ökonomische Analyse der Förderung privater Wohltätigkeit*. Tübingen 1986.

PETERSEN, H.-G.: Effects of Growing Incomes on Classified Income Distributions, the Derived Lorenz Curves, and Gini Indices. In: *Econometrica*, Vol. 47, 1979, pp. 183 – 195.

PETERSEN, H.-G.: *Taxes, Tax Systems and Economic Growth*. In: H. GIERSCH (Ed.): *Towards an Explanation of Economic Growth*. Tübingen 1981, pp. 313 – 357.

PETERSEN, H.-G.: Size of the Public Sector, Economic Growth and the Informal Economy – Development Trends in the Federal Republic of Germany. In: *The Review of Income and Wealth*, Series 28, 1982, pp. 191 – 215.

PETERSEN, H.-G.: *Impact of the Tax System – Federal Republic of Germany*. In: W. Block and M. Walker (Eds.): *Taxation: An International Perspective*. Vancouver/B.C. 1984, pp. 283 – 329.

PETERSEN, H.-G.: *Ökonomik, Ethik und Demokratie.Zu einer Theorie der Effizienz und Gerechtigkeit offener Gesellschaften*. Baden-Baden 1993.

PETERSEN, H.-G.: Polit-ökonomische Hinderungsgründe für eine grundlegende Steuer- und Sozialreform. In: *Hamburger Jahrbuch für Wirtschafts- und Gesellschaftspolitik*, Vol. 45, 2000, pp. 79 – 104.

PETERSEN, H.-G.: Werte, Prinzipien und Gerechtigkeit. Zu einem dynamischen Vertändnis von Leistungsfähigkeit. In: M. AHLHEIM, H.-D. WENZEL and W. WIEGARD (Ed.): Steuerpolitik – Von der Theorie zur Praxis. Festschrift für Manfred ROSE. Berlin et. al. 2003, pp. 58 – 100.

PETERSEN, H.-G: Globalisation, Capital Flght and Capital Income Taxation. In: *Finanzwissenschaftliche Diskussionsbeiträge der Universität Potsdam*, forthcoming.

PETERSEN, H.-G. and K. MUELLER: *Volkswirtschaftspolitik*. Bd. III: *Volkswirtschaftslehre im Überblick* (ed. by Helga Luckenbach). München 1999.

PETERSEN, H.-G., A. FISCHER and J. FLACH: Wirkungen der Einfachsteuer auf die Steuerbelastung von Haushalten und Unternehmen. In: *Perspektiven der Wirtschaftspolitik*, Vol. 4, forthcoming.

RAWLS, J.: *Eine Theorie der Gerechtigkeit*. 5. Ed., Frankfurt 1990 (1st Ed. 1975).

SEN, A.: *Collective Choice and Social Welfare*. San Francisco, Edinburgh 1970.

SEN, A: Minimal Liberty. In: *Economica*, Vol. 59, 1992, pp. 139 – 159.

STIGLITZ, J. E.: *Economics of the Public Sector*. 2. Aufl., New York, London 1988.

TANGHE, P.: *Wissenschaft als Resultat der unsichtbaren Hand. Eine Antwort auf die Herausforderung der Wissenschaftskritik an die freiheitliche Gesellschaft*. Berlin 1987.

TOBIN, J.: Comment from an Academic Scribbler. In: *Journal of Monetary Economics*, No. 4. 1978.

WAIBL, E.: Ethische Systeme. In: *Wirtschaftspolitische Blätter*, 35. Jg., 1988. S. 213 - 223.

Chapter 1:

Redistribution – Theory and Measurement

1.1.

Effects of Growing Incomes on Classified Income Distributions, the Derived Lorenz Curves, and Gini Indices

(Econometrica, New Haven/Conn., Vol. 47 (1979), pp 183-195

1.2.

"Just" Tax Scales at Alternative Sacrifice Principles and Utility Functions

Co-authors: Friedrich Hinterberger and Klaus Müller

(FinanzArchiv, Tübingen, N. F. Vol. 45 (1987), pp 45 – 69)

1.3

Redistribution and the Efficiency/Equity Trade-off

(Studi Economici, Milano, No. 82, 2004, pp 5 – 42)

1.4.

Pros and Cons of Negative Income Tax

(Herbert Giersch (Ed): Reforming the Welfare State, Springer Berlin et al. 1997, pp 53 – 82)

Pros and Cons of a Negative Income Tax

Hans-Georg Petersen

See if you can make sense of this.
Major premise: capitalism is a success.
Minor premise: socialism is a failure.
Conclusion: therefore, we need more socialism.

—Milton Friedman, 1994

I Conceptual Framework

This at first glance paradoxical statement by Milton Friedman precisely describes current developments in economic and social policy not only in the United States but also in Germany. In spite of the 1989 victory of individualism over collectivism, socialistic ideas, as a consequence of their long tradition, are so deeply ingrained in the minds of a majority of voters and politicians that the absurd consequences of such political behavior are not recognized. The erosion of social norms and value systems has obviously gone so far that today even Western societies are confronted with chaotic situations. Consequently, almost any political action can be justified by claiming that it improves "social justice"—a term which is used very frequently by politicians because it is so devoid of meaning.[1] Not only are politicians and voters infected, but also a substantial part of the economic profession. Therefore, the

[1] In his preface to *The Mirage of Social Justice*, Hayek concluded "that the Emperor had no clothes on, that is, that the term 'social justice' was entirely empty and meaningless" and "that the people who habitually employ the phrase simply do not know themselves what they mean by it and use it as an assertion that a claim is justified without giving a reason for it" (Hayek, 1976, p. XI).

discussions on minimum income strategies and the negative income tax (NIT) are often puzzling, and surprising coalitions between opponents and proponents of different ideological positions can be observed.

To avoid any further confusion, some very brief remarks on my own position are in order. All existing tax-transfer systems are the result of numerous political decisions made during the past centuries. Conflicting group interests led to tax concessions and transfers (including transfers in kind) which favor not only the poor but almost everybody in our societies. The popular *Murray's Law of Unintended Rewards* gives an impressive example: "Any social transfer increases the net value of being in the condition that prompted the transfer" (Murray, 1984, p. 212). And he goes on to observe that, if "a deficiency is observed—too little money, too little food, too little academic achievement—and a social transfer program tries to fill the gap with a welfare payment then the program, however unintentionally, must be constructed in such a way that it increases the net value of being in the condition that it seeks to change—either by increasing the reward or by reducing the penalties" (Murray, 1984, pp. 212–213).

As a consequence of the eroding income tax base and ever-increasing social expenditures, the tax rates of direct and indirect taxes as well as the contributions to the social security system have been raised sharply. A substantial part of the redistributive measures is directed from one pocket to the other of the same individual or household,[2] accompanied by a socialization of individual responsibilities, thus increasing the influence of public bureaucracies. A diminishing market sector has been replaced by public activities, giving political interventionists the opportunity to further support newly defined group interests with the aim of maximizing their votes. As a result, moral hazard, rent-seeking, and free-rider behavior became dominant, not to mention all the complaints about tax morality, avoidance, and evasion, as well as transfer fraud.

All this has strongly impaired the incentive schemes for market sector activities and improved the conditions within the underground economy, which has been high on the agenda for at least the past two

[2] Following Gordon Tullock, most of the time the redistribution tends towards the middle-income groups. For a detailed description of such effects in the German example, see Petersen (1984).

decades. Therefore, it is time to rethink the role of "social justice," which today is in a serious tradeoff with "economic efficiency." Taking Aristotle's definitions of *justitia commutativa* (or—in modern terms—justice of ability = *Leistungsgerechtigkeit*) and *justitia distributiva* (or justice of need = *Bedarfsgerechtigkeit*), the former is in accordance with *Pareto-efficient* solutions; as long as perfectly competitive markets do exist, there is no justification for governmental intervention. Partial market failures are to be cured by market-improving regulations (*Ordnungspolitik*), not by permanent and arbitrary interventions. Only in the case of total market failure (existence of pure public goods), might a public supply (not production) be justified,[3] and in the case of poverty the justice of need requires a social aid system. Whereas the supply of pure public goods is in accordance with *Pareto efficiency* if the *Samuelson condition* is met, the realization of justice of need leads to welfare losses if social welfare functions are chosen which express more "social sympathy" (or egalitarian preferences) than the *Benthamian solution*. Even if dependent individual utility functions (or partial altruistic behavior) are assumed, increasing redistribution from the rich to the poor is connected with raising welfare losses which are maximized in the egalitarian solution, where both, the rich and the poor, have less utility than under different social welfare functions (see Petersen, 1993b, p. 148).

Obviously, welfare economics do not represent reality, but general trends in the distortive effects of an egalitarian policy have been impressively confirmed by historical events of the past years. Even if hard empirical facts are still not available, the soft evidence of qualitative values gives warnings to be very careful with redistributive measures. Under the label "justice of need" not only the poor—defined in absolute or relative income terms—but, in one way or another, all members of the society are favored; the amount necessary for redistributive purposes is so large that serious disincentives via progressive taxes and high social security contributions are unavoidable. Therefore, it is a very poor strategy for experts in tax and transfer systems to look only at the existing social aid systems (see Siebert, 1994), and to neglect all

[3] Here the research on the private supply of public goods has to be mentioned; see, e.g., Glazer and Konrad (1993), Müller (1995), and the case study on Chile by Larroulet (1993).

other redistributive measures that are partially hidden in the tax system and in numerous transfers in kind. What is badly needed is an inventory of all redistributive measures, especially those which favor groups who do not belong to the poor. The abolishment of those concessions connected with the concentration of redistribution to the "really poor" would greatly decrease redistributive activities, thus providing scope to lower tax and contribution burdens. Such a strategy would increase the disposable income of private households, giving them back the freedom to choose and the base for self-reliant action according to their personal preferences, which might include voluntary payments to the poor via charity. In such a framework, not in the existing German tax and transfer system which is literally more chaos than system, a rationally planned negative income tax could have pride of place, thus reducing the tradeoff in between efficiency and justice. The following explanations will give more elucidation.

II Theory and Impacts of NIT

The NIT concept was already mentioned by Cournot as "impôt négatif" (see Pohmer, 1977, p. 252) and elaborated in detail by Rhys-Williams (1953, pp. 128) in the form of the "social-dividend type," whereas two decades later Friedman (1962) proposed a "poverty-gap type." Both NIT forms are closely connected with the tax system because a basic exemption is usually included in the income tax schedule, with the purpose of exempting a certain minimum income from taxation. Such basic exemptions only provide tax relief for those taxpayers whose taxable income is above the amount of the basic exemption. Therefore the idea was hit upon of giving corresponding relief in the form of a transfer to those whose taxable income was below the amount of the basic exemption. The social-dividend (SD) type guarantees a basic allowance, x_B, or minimum income which has to be paid as a transfer or is credited to the individual income tax yield of every taxpayer. The formula is given as follows:

$$tr = t'y - x_B,$$

where tr is the transfer, y is the market income, and t' is the marginal tax and transfer rate. Once the minimum income x_B and the marginal rate t' are defined, linear tax schedules result in the critical income x_k.

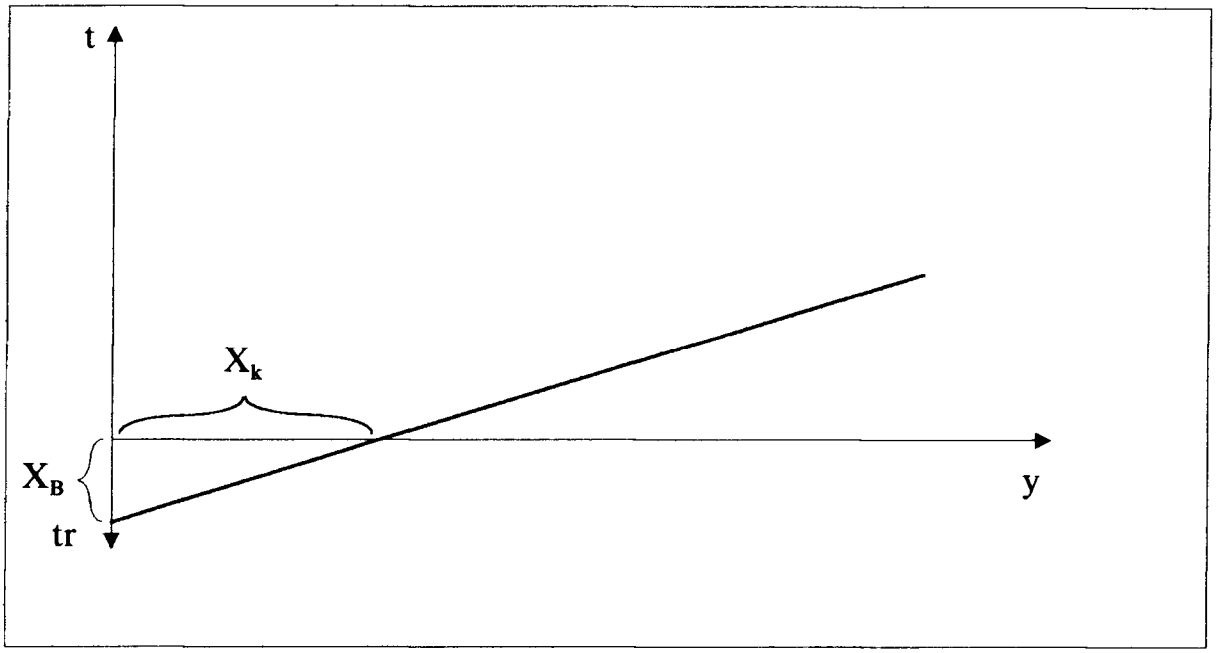


Figure 1. Linear Negative Income Tax Schedule
Source: Petersen (1993a, p. 228).

The corresponding tax schedule is shown in Figure 1, in which x_k is the critical income at which the transfer and the tax yield are equal to zero.

The poverty-gap (PG) type initially fixes the critical income x_k:

$$tr = t'(y - x_k).$$

Whereas the SD formula corresponds to the tax credit, the PG formula represents the tax exemption method.

Assuming linear tax and transfer schedules, there are in principle no differences between the two types—one can easily be transformed into the other. This is true for proportional or indirect progressive tax and transfer schedules, where marginal rates are kept constant (as in the case of a flat rate tax; see Pfähler, 1972/73). The simple linear negative income tax schedule with a single marginal rate for both, the tax and transfer bracket, is only a theoretical model. On the one hand, because of the necessity to limit the transfer volume to an acceptable amount, the marginal transfer rate has in practice to be beyond the 50% margin. On the other hand, marginal tax rates of 50% and more already for the lowest market income brackets are unacceptable, thus leading to serious work disincentives, not to mention the problem of justice of ability. Therefore, different marginal rates for the transfer and the tax

brackets have been proposed in which the latter is much less than the former (see Figure 3 below).

Both proposals, however, are connected with another important feature: whereas the SD type is a nontested transfer program with universal payments, the PG type is an income-tested one. Although Kesselman and Garfinkel (1978) have shown, on the basis of very specific assumptions within a labor/leisure model, that the former might be economically more efficient than the latter, this alleged advantage should not be taken to be a general one. It is obvious that income testing is a labor-intensive procedure for the fiscal and/or social administration and is connected with high administrative costs. But as long as direct (income or expenditure) taxes[4] are levied by complicated assessment procedures, including a detailed declaration of personal income, wealth, and (at least some) expenditure, income testing for the poor is not only a question of social symmetry. In countries in which a right to (or liability for) support payments (German: *Unterhaltsverpflichtung*) exists for spouses and relatives of the first degree (parents, children),[5] the introduction of a nontested transfer program would destroy the important role of "self-responsibility" in the family.[6] As in other areas, the role of the family would be impaired.

Therefore, the liability for support payments connected with income

[4] The NIT concept is closely related to the discussion on the optimal tax base (income or expenditure). Consequently, one should distinguish between NIT and NET (negative expenditure tax) concepts, which has not usually been done in the literature. Because of space limitations, I will merely point out that convincing arguments have been made recently in favor of an expenditure tax base. Obviously because of reasons of political feasibility, Rose (1994) has proposed the term "interest liberated income tax." Such a tax base could be also optimal for a NIT system.

[5] The German civil law (BGB = Bürgerliches Gesetzbuch) determines the liability for (or right to) support payments; for details, see Hinterberger (1991, pp. 174).

[6] Because of the supposed high costs of a nontested NIT, Jerger and Spermann (1995) recently proposed a targeted NIT "for adequately defined persons." Even such definitions of certain groups are due to dangerous political influence. Therefore, the best goal is an income test which includes the liability for support payments. Even the low minimum wage in the United States is not specifically directed towards the poor, just one example being the teenagers in wealthy families who work at McDonalds during their school vacations.

testing for close relatives is a fundamental limitation for transfer programs in using this important role of the family. Because of the reciprocity which rules in "sound" families, voluntary private transfer payments would take place which are not (or are less) connected with disincentives for the payer (or the recipient). In the case of nontested transfer programs, private transfers are very frequently replaced by public transfers which normally lead to serious disincentives for the recipients as well as for the taxpayers who have to finance such programs. Hence, individual or family problems are socialized, and the reduced "self-responsibility" invites unethical behavior, as already mentioned above.[7] In one form or another the taxpayer might feel exploited, and often such a feeling is confirmed by reality. If people in our welfare states were only dependent on social aid payments, life would be very hard and miserable. Combined with income from illicit work or side payments from relatives, the welfare state delivers a convenient safety net which smothers any remaining work incentive. The erosion of social norms and value systems is accompanied by reduced social shame, so that exploitation of transfer programs becomes more likely, thus being one reason for the explosion of social expenditure in the public budgets of our redistributive society—which Jasay (1985, p. 232) aptly called the "churning society."

Besides the problem of income testing, the status of a NIT within the tax and transfer system is of specific importance; the NIT concept is not useful for the further extension of the welfare state. The introduction of a NIT is only efficient as a part of an integrated tax and transfer system; the NIT has in common with an ordinary tax the fact that there is no direct and immediate equivalent (no quid pro quo). The negative term requires that the same norms be applied as in the case of positive tax or a rational or even optimal tax system. Only direct taxes (personal income or expenditure tax) are seen as an integrated component. Transfers out of a NIT are only payments for the purpose of interpersonal redistribution in the case of neediness in accordance with the

[7] Here, the discussions in the United States have to be mentioned. It has been conjectured that social aid payments might have impaired the self-responsible behavior of husbands and fathers, especially in the slum regions of large cities; for more details see Herf (1992, p. 146) and Schlesinger (1992).

social aid principle (*Fürsorgeprinzip*). Private or social instruments which are exclusively based on the insurance (or benefit) principle—leading solely to risk-sharing or an intertemporal equalization of lifetime income—have to be excluded.[8] The NIT is thus the only instrument of interpersonal redistribution which would cover the current social aid systems, the subject-oriented subsidies for housing, the transfers out of the family equalization systems (partly due to income tax exemptions or family benefits) including education grants and transfers in kind connected with tuition-free education at high school and university levels, and—last but not least—the minimum income which is overwhelmingly granted by social insurance systems (especially in the pension, health, and unemployment systems).

The minimum or basic income, x_B, which is the maximum transfer has to be fixed in absolute or relative income (or welfare) terms. Here we are confronted with the time-honored question of absolute and relative poverty (other terms are physical or sociocultural minimum of subsistence)—"what does woman/man really need?" Following Rowntree's (1899) definition, a family lives in absolute poverty when their "total earnings are insufficient to obtain the minimum necessaries for the maintenance of merely physical efficiency" (quoted in Townsend, 1979, p. 33). Hence, absolute poverty can be defined as "a certain food basket ... just sufficient to stay alive," and in addition "a certain amount ... to account for other items like clothes and housing" (Hagenaars and van Praag, 1985, p. 14). Fighting absolute poverty was obviously an unsatisfactory task for social politicians, so that the permanent criticism has led to Sen's (1983, p. 153) observation that "a consensus seems to have emerged in favor of taking a 'relative' view of poverty in the rich countries." A larger number of poor people not only means larger social budgets, but in addition more jobs for social politicians in the welfare institutions.

Whether this development has taken place in the course of ever-increasing social sympathy or—in a perhaps cynical but probably more realistic interpretation—in the course of ever-increasing social envy is a question which has been discussed more recently. Relative poverty (or

[8] It should be mentioned that in existing social insurance systems the erosion of the benefit principle can be observed over the past decades, accompanied by increasing interpersonal redistribution, see, e.g., Rosa (1982).

the poverty line) is overwhelmingly understood as a certain percentage of the median or average income (see Hinterberger, 1991, pp. 71). Especially if incomes above the average income increase—e.g., the income distribution becomes more unequal—the poverty line rises, too, thus producing a larger number of poor in the society. Even with increasing welfare, poverty increases—it becomes an endemic disease which calls for more treatment (see Radnitzky, 1991). Rising inequality is then interpreted as injustice, even if it is the result of the justice of ability in a functioning market economy. The ideological base for such an interpretation has been clearly identified by Radnitzky (1994, p. 5): "The contemporary rhetoric prefers 'Social Security,' 'Social Justice,' 'Solidarity.' The pet formula of the social-democratic propaganda is 'Justice'—the 'Justice Gap.' Unequal purchasing power of citizens is 'unjust.'" Under such a system, the growth of government is a built-in phenomenon. "Prognosis is risky, but it appears a fairly safe prediction that *the general trend towards more of creeping socialism or social democracy will continue*—the 'Road Back to Serfdom'" (Radnitzky, 1994, p. 3).[9]

Certain evidence can be found for this argumentation in development patterns. However, the attempt to close the alleged "Justice Gap" for the poor—for God's sake—opens a "Justice Gap" for the rich—who are not defenseless. With powerful behavioral adaptations like tax evasion and avoidance, as well as international mobility of capital and persons, clear limitations to the Leviathan are set—just to mention the *Laffer curve* argumentation. High amounts of transfers are, in the long run, inevitably connected with high tax rates—which can only be temporarily mitigated by public debt. Serious disincentives on both sides—the favored and the burdened[10]—are forcing academics, voters, and politicians to rethink the poverty concept. More than a decade ago, Sen (1983, p. 159) moved back a step to the absolute concept: "There is, I would argue, an irreducible absolute core in the idea of poverty."

[9] Social democracy is not singular to any particular party, it is found in almost all democratic parties. As is well known, *Hayek* dedicated his *The Road to Serfdom* (1944, First Edition) "To the socialists of all parties."

[10] Under egalitarian conditions, total welfare, and consequently the average income, decreases substantially. Therefore, only the burdened exist, the disincentives are maximized; "egalitarianism is basically an emotional factor, most often fueled by envy (which often is partly subconscious)" (Radnitzky, 1994, p. 6).

But, apart from proper nutrition, certain consumption goods (e.g., clothing) also belong to the necessities. Without appropriate clothes it is nearly impossible to find a job to overcome poverty through self-responsible action. Because of the necessary limitation of social expenditures to maintain the functioning of the incentive schemes in the market economy for both the transfer receiver and the taxpayer, the concept of absolute poverty should be reinforced for people of working age who are obviously not willing to supply labor in the official markets,[11] whereas for others specific transfers should also be paid to improve their reintegration into the official labor markets.

Obviously, such a poverty concept is an ambitious one; and Sen has been criticized sharply by Townsend (1985, p. 664): "He does not say anything about the criteria by which we identify, or prioritize, human needs." This opinion is typically shared by social experts who strongly believe in the scientific proof of "just" tax and transfer schedules. But even if we accepted interpersonal comparisons of utility—which a real liberal fundamentalist would never do (see, e.g., Radnitzky, 1994)—it is well known since Cohen Stuart and Ragnar Frisch that it is impossible to provide scientific proof for just tax schedules (see Frisch, 1932, pp. 114). Whether a tax schedule is progressive, proportional, or even regressive, depends on the form of the individual utility function and the implemented sacrifice rule (see Hinterberger, Müller, and Petersen, 1987; Petersen, 1993a). Therefore, in the case of tax and transfer schedules, political decisions always have to be made which do not solely protect the interests of the poor, but also those of the rich. Without a broad consensus on personal redistribution the long-term existence of the whole of society is endangered—as very recent events have demonstrated.

Besides determining the basic income and the tax and transfer schedule, an integrated system is also characterized by a unique tax and transfer base (income or expenditure definition). The basic income that is chosen—a linear transfer schedule being assumed—determines the marginal transfer reduction rate and the critical income at which the tax schedule starts (see Figure 1, above). The basic income does not have to be defined identically for all citizens, but has to depend on the

[11] Oberender and Fricke (1994, p. 59) have recently proposed that Germany should move towards using an absolute poverty concept.

specific life circumstances of different individuals or households. Consequently, the tax and transfer schedule is a function without concrete parameters—these are determined by the individually defined basic income (see Hüther, 1990; Petersen, Hüther, and Müller, 1992).

Without doubt, the formulation of an integrated tax and transfer system requires a normative-theoretical foundation which has to fulfill the criteria of consistency and reveals the intensity of income redistribution—which is, in our contemporary social security systems, hidden in hundreds or even thousands of specific regulations. The intensity of income redistribution principally determines the impact of a tax and transfer system on the supply of effort. Concentrating on the impacts on the labor supply which are normally analyzed within the neoclassical labor/leisure framework as mentioned above, results in the neglect of some important factors (like the work decision, intensity and quality of work), whereas stress is put on the hours-of-work decision (see Killingworth, 1983). If all the shortcomings of such an approach are taken into consideration, at least those important trends can be isolated which have been partly verified by numerous empirical analyses (see Hüther, 1990, pp. 241–252). The relevant wage per hour and the possible hours of work (possibly additional wealth income) determine the budget line (constraint). The utility-maximizing labor supply is given by the slope of the indifference curve scheme derived from the individual utility function. The budget line and the labor supply decision are modified if taxes and transfers are introduced or marginal tax and transfer rates are changed, perhaps depending on some other family (or household) parameters (e.g., number of family members). The tax and transfer schedules effect the slope of the budget line, whereas in the case of a lump sum tax and transfer it stays unchanged.

Obviously, lump sum taxes and transfers are only connected with income effects, inducing—if only transfers are taken into consideration —a reduction in the hours of work and an increase in leisure; every income dependency changes the slope of the budget line, thus leading to additional substitution effects which again engender more leisure time. Therefore, the NIT is always connected with a certain deadweight loss (or excess burden). In other words, if the aim of justice of need is striven for (and a certain amount of personal income redistribution) by a NIT system, a tradeoff with economic efficiency is unavoidable. But this comparison with a lump sum system or a situation in which no social security system exists is a rather unfair one. The only correct

comparison can be made between the NIT and the existing social security system.

It will be demonstrated below that the budget lines in the German system can hardly be determined—to put it frankly, they are chaotic. Taking only the budget line of the social aid system, this line is parallel to the leisure axis because of a marginal transfer reduction rate of 100%.[12] In such a case, the incentives are always set to maximize leisure. A NIT system is connected with a marginal transfer reduction rate of less than 100%—a realistic percentage lies in between 50% and 60%. As is well known from the literature on optimal taxation, the marginal tax rate determines principally the substitution effect, whereas the average tax rate determines the income effect; the same is true with regard to the transfer rates. Therefore, a NIT is connected with the above-mentioned tradeoff, but compared to most of the existing social aid systems this tradeoff is reduced substantially—especially if the numerous distortions resulting from other components of the social security system are taken into consideration.

III German Social Security: System or Jungle?

The roots of the German welfare state date back more than 110 years; most of its basic principles were formulated with regard to the former social situations and conditions. Obviously, poverty today is quite different from poverty in the last decades of the 19th century, but the basic principles have never been changed substantially. In contrast, the system has been extended to an ever-increasing part of society. Whereas Bismarck concentrated the social security system on the "working classes," his successors extended this system with their latest 1995 "innovation"—the compulsory social old-age nursing insurance—to every individual in society. According to Seldon's (1984) interpretation, Bismarck introduced the German social insurance system because of "cynical political reasons," or, in a modern expression of the public choice theory, he demonstrated vote-maximizing behavior or gave pre-election presents to a clientele who otherwise would have given their

[12] Here the small initial income bracket in which additional market income does not reduce the social aid payment by a marginal rate of 100% is neglected.

votes to the socialists. This decision was the first to have brought the socialist bacillus into conservative and (in the European sense) liberal parties. "Before the war the German (Bismarckian) model of the welfare state even infected societies that had been the paragon examples of a free society—England (Lloyd George), the United States (Roosevelt's 'New Deal'). After the war, it inspired the 'Swedish model' (Gunnar and Alva Myrdal) and infected even Switzerland" (Radnitzky, 1994, p. 3). However, when the "Swedish model" became a "Swedish disease" some drastic reforms were implemented.

The outcome of ongoing social interventionism in Germany is an impressive verification of Murray's law as mentioned above. Neglecting the complicated direct tax system which has led to an ever-increasing number of tax consultants (an ideal proxy measure for the inefficiency of contemporary tax systems), there are over 40 institutions with more than 90 general regulations and laws involved with German social policy (see Kress, 1994, p. 248)—not to mention thousands of guidelines for its administrative execution. There is neither enough space nor time to describe the tax and transfer jungle in detail (see Petersen, 1989), so that only some brief highlights are presented here.

The uncoordinated and arbitrary development of the marginal tax and transfer rate for a two-child household (one spouse employed) is shown in Figure 2. Absurd hikes in the marginal rates can be observed due to the uncoordinated tax and transfer basis and schedules of the existing system, especially because of uncoordinated income brackets and the sudden abolishment of transfers. If additional transfers to households with another social status are taken into consideration, one can observe marginal rates which are considerably higher than 100%. It is quite clear that the labor/leisure model does not in all cases result in dominance of the substitution effect, but in view of this result an enormous indolence would be necessary to ignore the likely disincentives.[13]

Not only does the social aid system's marginal reduction rate of

[13] Under the current income and wage tax regime, especially the most productive households of the (tax-honest) self-employed and the employed are burdened, while the less or nonproductive households of farmers, government officials, and those not in the work force (pensioners etc.) are privileged. Under an expenditure tax base, this situation would be reversed; see Petersen, Hüther, and Müller (1992, p. 188).

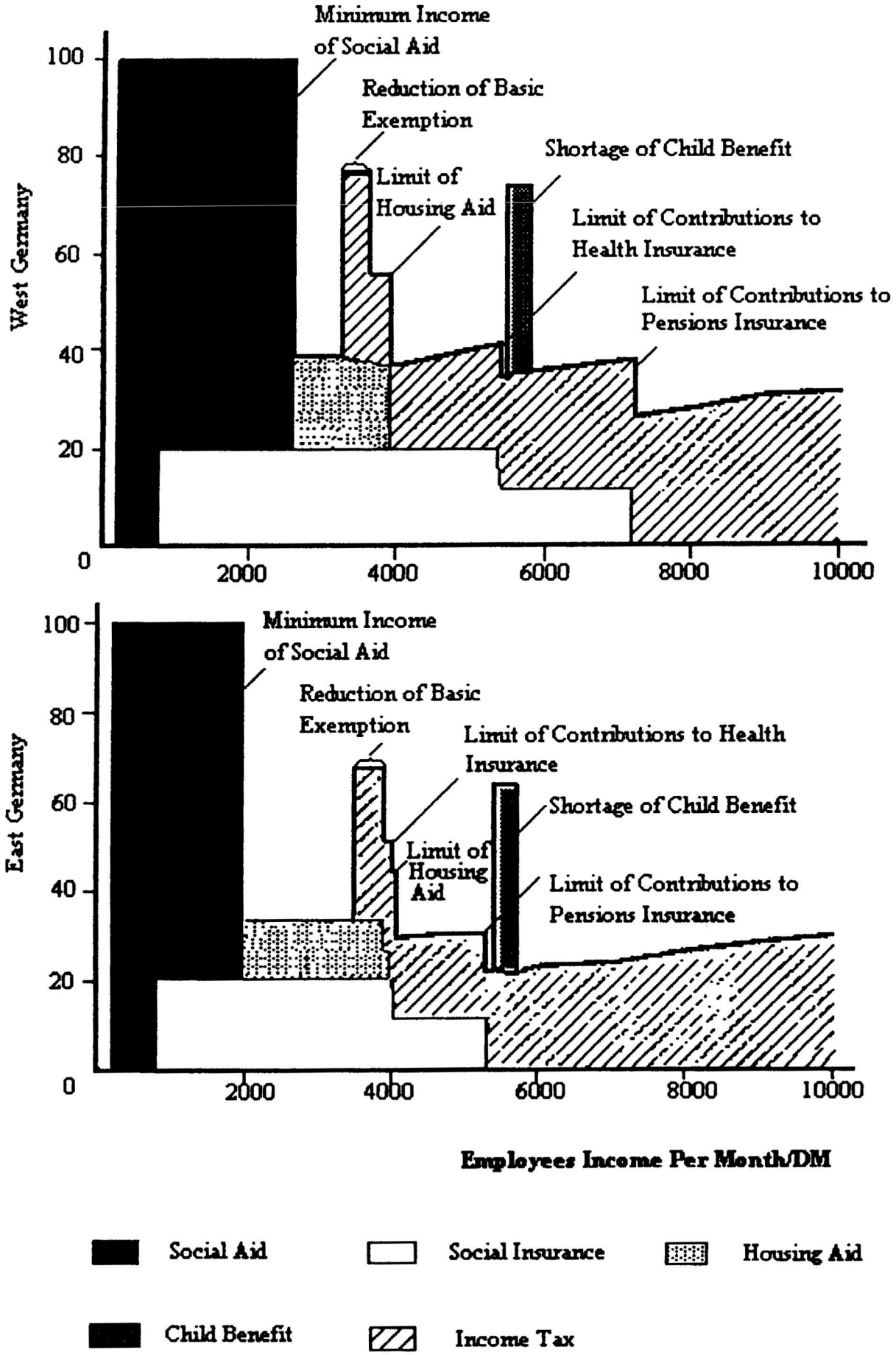


Figure 2. Marginal Tax and Transfer Rates (two-child family, one spouse employed)

Source: Fritzsche and von Loeffelholz (1994, p. 244).

100% for higher market incomes engender serious disincentive problems, another important problem is that wage income (and income from other sources) is taxed even if the gross wage is below the minimum income guaranteed by the social aid system. In some ridiculous examples, households are receiving social aid payments and paying income tax. This has led to a ruling by the German Constitutional Court (BVerfG) that the current taxation of low-income groups is not in accordance with the German Constitution.[14] This ruling ignores the fact that low-wage groups are not only burdened by income tax, but also pay social security contributions (taxes) to the social insurance system, so that their residual income is reduced even further, whereas the social aid recipients get most payments or transfers in kind from the social system without having to make any personal contribution. It is likely that this fact will lead to a new ruling in the near future.

The wage and social security tax burden placed on low-income groups is one important reason why the gap between the net income of employees with low wages and the net income of social aid recipients has narrowed. Two or three decades ago, when the majority of employees were wage-tax free because of high basic exemptions and paid only moderate social security contributions, this net income gap was high enough in favor of the employees. In the following decades, income tax schedules, income brackets, and tax exemptions were not adequately adjusted to inflation and social security contributions rose sharply. Therefore, for almost all types of today's households this gap is so small that again serious disincentives have been created. My own estimates for 1991 have shown that especially in the case of unskilled workers (in German: *Hilfsarbeiter, Lohngruppe 3, Industrie*) the net income is often less than 15% higher than the net income of social aid recipients.[15]

This very approximate average number depends heavily on the spe-

[14] See Bundesverfassungsgericht (1992). For 1993 to 1995 a temporary solution was introduced that consisted in changing the tax schedules; a final solution has to be found by January 1, 1996.

[15] In the case of a single household, social aid payments in 1991 were about 45% of the net income of a comparable unskilled worker, the figure for a single household with one child is 61%, for a two-person household (married) 63%, for a two-person household with two (three) children 83% (84)%. For the methods used to estimate such figures, see Klein (1986).

cific situation of the single household; rents are very high, especially in the downtown areas of large cities, and social aid recipients are reimbursed (within certain limits) for all housing costs, which is not the case for low-income employees, so that the gap is often much smaller. Taking the situation in eastern Germany into consideration, where wages are much lower than in western Germany, the gap is reversed in favor of a large number of the social aid recipients (married, two or more children) whose net income is about 120% or more of a comparable working household.[16] Another illustrative example is provided by comparing the net pension payment of a retired social aid recipient with that of an unskilled worker who has worked all his life. During his retirement period the single unskilled worker gets—again dependent on actual housing costs—nearly the same amount as he could have got out of the social aid system, with the only difference being that his or her income throughout his or her active life income was substantially reduced by contributions made to the social pension system.

Today, the difference principle of the German social law, which requires that there be a considerable gap between wages and social aid payments (about 15% in favor of the employees), is at least partially impaired. As already mentioned above, the combination of social aid payments and income from illicit work is often much more attractive than income from a job in the official labor markets. Serious disincentives have been set with respect to transfer fraud; it is not even possible to give precise information about the magnitude of such because of the impossibility of observing such illegal activities. But the disincentives are only one side of the coin. With regard to the current labor market problems and unemployment, as important as the disincentives is the fact that the increase in wage and social security taxes (which have the character of payroll taxes) have raised the wage extra costs so seriously that, especially for unskilled workers, productivity is often less than their total wage costs—one important reason why unskilled workers in particular are the dominant group among the long-term unemployed. One or two decades ago, firms could afford to hire a certain number of unskilled workers, today such (partially philanthropic) behavior would

[16] In 1991 the wages in eastern Germany were roughly 65% of the wages in western Germany, but the social aid payments were on average about 96%; the figures for the households mentioned in the preceding footnote are: 66%, 90%, 92%, 122%, and 123%.

endanger the existence of the firm and the other jobs. The attempt to improve the situation of the poor under the label of "social justice" has caused just the opposite result:[17] Unskilled workers are being driven out of their jobs into the welfare state network and—if they are unable to find employment in the underground economy—are suffering from deprivation—another impressive verification of Murray's Law.

For this reason, practical economic and social policy have not been able to make a diagnosis nor to find a treatment; attempts by German politicians to implement the Constitutional Court's ruling are reminiscent of blind activism. Under the dictate of exhausted public budgets, even the last—if any should have survived—rational rules of the German income tax system are being sacrificed. It is becoming increasingly obvious that future-oriented perspectives are badly missing with respect to tax policy; the struggle for social justice has led to the dominance of alibi solutions which meet neither the justice of need nor of ability. What remains is a *welfare state with empty pockets*—unable to fulfill the entitlements promised by politicians, thus leaving behind annoyance and feelings of betrayal which strengthen resistance to the tax and welfare state on the part of the citizens. The unethical behavior (free riding, moral hazard, tax evasion, transfer fraud, etc.) which is the consequence of excessive state interventions is, however, assumed by even highly reputable politicians[18] to be a sign of ever-increasing egoism and materialism. Citizens and the market economy are made responsible for the erosion of individual and collective norms which has been engendered by the wrong actions of the politicians themselves because they are overwhelmingly unable to acknowledge that—because of recourse taken to other people's property—"social justice erodes individual responsibility" (Flew, 1994).

---

[17] Trade union policy in particular has increased the wages for unskilled work by demanding higher wage increases for the low-income groups, later on—as is typical for closed shops—they have preferred dues-paying insiders, giving the unemployed outsiders the "kind" advice to wait for jobs which are in accordance with their "real" qualifications.

[18] Only one of many examples is the speech by the former President *Richard von*

should fulfill in a social security system; overwhelmingly the NIT is proposed to complete or to substitute for an existing social aid system. Then the main role is to close existing security or poverty gaps. With regard to the employment situation in particular, Scharpf has proposed using a NIT system that would also subsidize unskilled jobs by decreasing the effective wages for the employers via a reduction in the wage extra costs.[19] This proposal is related to the perception that there is no general shortage of labor, but a shortage of "payable labor." Thousands of low-skilled jobs are vacant in the service sector and private households (see Scharpf, 1994a).

This proposal for partially reforming the existing social security system has been criticized mainly for two reasons. Especially authors who are closely connected with trade unions fear that the creation of new unskilled jobs could have a general impact even on the wages of skilled workers. In addition, they complain about the pressure on the unemployed to accept a job for which they are overqualified (see Bäcker and Steffen, 1994, p. 5). The first argument is determined by the fear of losing influence and power within the collective wage agreements, the second is simply cynical: the message for the unemployed is to remain in the welfare network until they are totally unqualified.

Another counterargument is shared not only by trade unionists but also by Siebert (1994, p. 11): Whereas in the existing social aid system about 1.25 million social aid recipients were of working age in 1992,[20] under a NIT system this number would increase to 10 million persons, thus creating a lot of new disincentives "for a NIT accustomed generation" (Siebert, 1994, p. 11).[21] In terms of partially reforming the social

---

Weizsäcker at the biannual meeting of the Protestant church in Hamburg, June 1995. With such a—hopefully unintended—strategy politicians draw new moral authority from their own failure.

[19] These discussions were conducted under the title "creation of a second labor market"; see Scharpf (1993). In the meantime, he has changed his opinion because of the supposed costs of a NIT (*Bürgergeld*) concept and has proposed just a subsidization of low-income groups; see Scharpf (1994, p. 113). See also Jerger and Spermann (1995).

[20] This number increased in 1994 to more than 2 million, as has been recently published by the Statistisches Bundesamt.

[21] At the current minimum income of approx. 12,000 DM (x_B in Figure 1) per year for a single social aid recipient, at a marginal transfer rate of 50%, a critical income (x_k in Figure 1) of 24,000 DM would result.

security system by introducing NIT as a substitute for a social aid system, Siebert is doubtlessly correct. But no serious proponent of NIT systems has ever proposed such a partial reform.

Regarding our contemporary social security system, not only 10 million individuals but every single household is in the welfare network and is simultaneously burdened and favored by personal redistribution whose net result is usually unknown. However, the majority of experts are still of the opinion that a basic reform of the total tax and transfer system is politically infeasible (see, e.g., Bäcker and Steffen, 1994). Because of the ridiculous pocket-to-pocket redistribution, such a view is simply undignified for intellectuals. A total reconstruction of direct taxation and transfers is inevitable. Such proposals have been made for Germany by Mitschke (1985; 1994) and the Kronberger Kreis (1986) and are supported by an increasing number of experts and even some politicians (Kress, 1994, p. 252). The *Bürgergeld* and the *Bürgersteuer* (in the form of a NIT) are replacing the existing income, corporate, wealth, and inheritance taxes, possibly in conjunction with a change from an income to an expenditure tax base (Rose, 1994). The comprehensive tax base makes it possible to introduce a tax schedule with low marginal rates, even to use a simple flat rate system, thus abolishing direct progression. At the same time, exemptions and tax concessions have to be abolished and the employers' social security contributions have to be added to the individual wage income. All transfers aimed at personal redistribution (as mentioned above) have to be integrated into the *Bürgergeld.* The social insurance system could be liberated from its current tasks of personal redistribution and be changed into a pure insurance system, which could, in the future, compete with the private insurance system.[22] Only if all these demands are met, is there pride of place for a NIT system which would substantially improve the incentive schemes which are essential for competitive market systems.

As demonstrated for different NIT schedules with highly developed simulation models, analysis of the "first-order effects" (Nakamura and Nakamura, 1990) has proved that the Mitschke proposal and some others are much less expensive than the contemporary system (see Hüther, 1990; Petersen, Hüther, and Müller, 1992)—not to mention the

[22] The most successful countries of the former Eastern Bloc are moving in this direction; see Golinowska and Ochocki (1995) and Müller and Petersen (1995).

possible "second-order effects" of the behavioral adaptations away from the underground economy, tax evasion, and tax avoidance, and back to market activity. Even the Deutsches Institut für Wirtschaftsforschung (1994) has estimated the costs of a different NIT system to lie between 65 and 173 billion DM. Especially the higher amount seems to be impressive; but as Oberender and Fricke (1994), among others, have demonstrated, roughly 50% of the German social budget, currently almost 500 billion DM, is in discussion. Even at the highest costs of a NIT system, a substantial reduction of that burden is possible.

This result is not very surprising if one does not consider the marginal rates of the income tax schedule but, rather concentrates on the effective tax rates which include all tax-base-reducing tax concessions and those parts of the individual incomes which have not been reported to the internal revenue service. I have estimated some preliminary effective rates for 1994 for such a broad tax base: the effective average income tax rate (gross income from employment and wealth) is less than 11% for an average household, whereas the effective marginal rate is about 23%. The current income tax rates are 19.5% and 53%,[23] respectively. These figures clearly demonstrate that the scheduled tax rates cannot become effective because of thousands of different concessions and, last but not least, the adaptations on the part of the taxpayers. The very common illusion of taxing the "rich" for the purpose of more egalitarianism is less than an idle wish—it is simply an illusion. For God's sake, the rich, who at least finance housing and jobs for the majority of society, can easily avoid excessive tax burdens by migrating.

Under a broader and unique tax and transfer base, Figure 3 demonstrates in stylized form the direction that further developments could take; the marginal tax and transfer rates for 1996 were given above. By successively broadening the current tax base and integrating all those transfers which are necessary to avoid abrupt changes, especially for the social aid recipients, and to give all citizens some time for self-responsible behavioral adaptations, a clear decrease in the marginal transfer reduction rate as well as in the maximum marginal tax rate is possible. In the long run, even the introduction of a flat rate seems possible, thus avoiding all the disadvantages and disincentives which

[23] Not to mention the high marginal rates in the lowest bracket of the income tax schedule due to adaptations in accordance with the Constitutional Court ruling (see Figure 2).

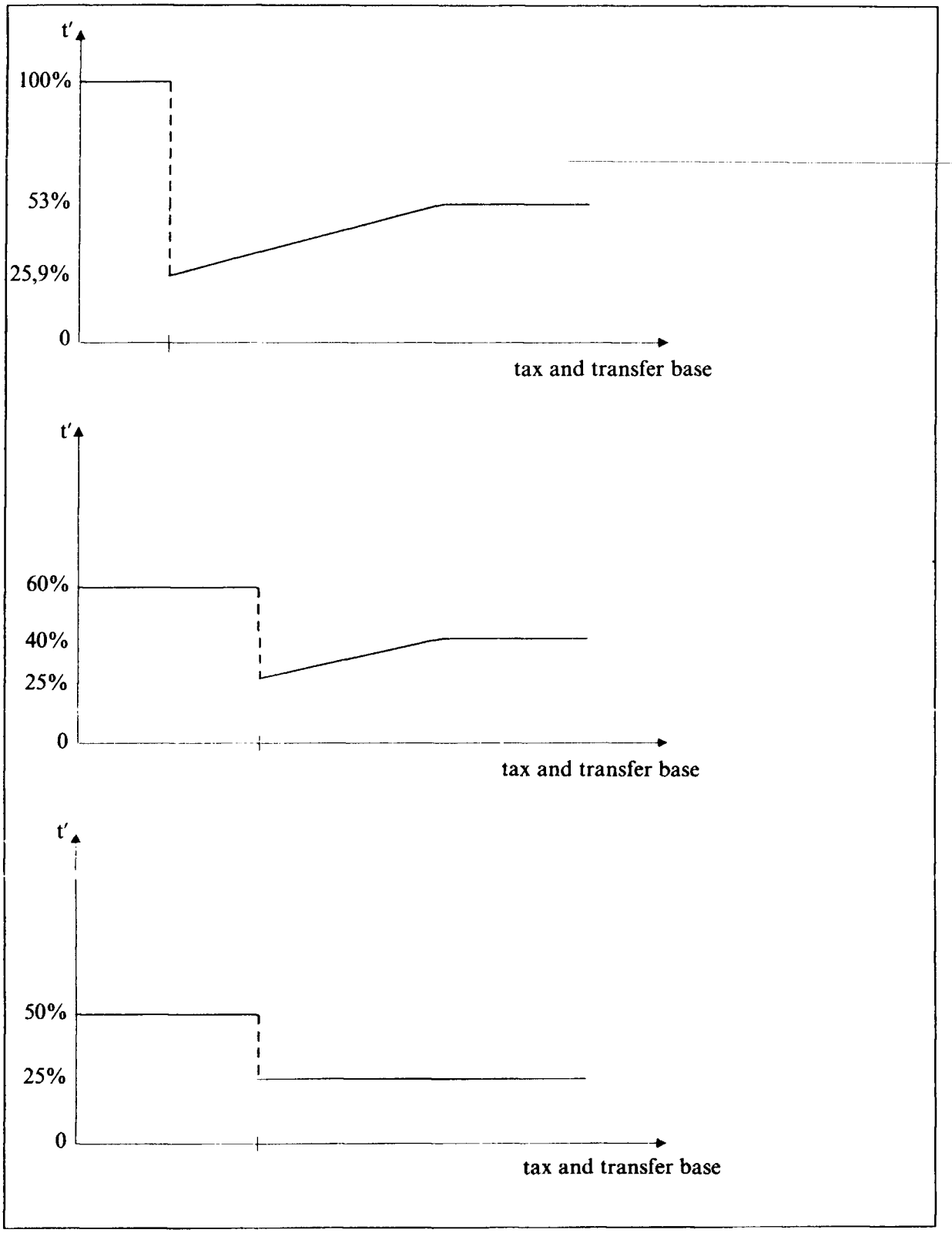


Figure 3. Current and Possible Marginal Rate Development
Source: Own estimates.

are now connected with direct progressions without having any clear impact on the net income distribution. The progressive marginal income tax schedule serves mainly to feed a social envy complex which is misused by politicians for campaign purposes; the redistributive power of this instrument is negligible, as many empirical studies have shown (see, e.g., Petersen, 1988). Because of many concessions and loopholes, it is not the rich but rather the low- and middle-income classes that are hit by the tax progression. The erosion of the tax base has impaired what is often referred to as "the truth of the tax schedule." Therefore, to rely upon a progressive marginal rate structure—the falsehood and deceit of the progression—has become a main element of political dishonesty.

Are the two lower illustrations in Figure 3 real world options or simply utopian ones? The question is hard to answer. But if the view is directed away from Germany (and some other European states) towards the East or Far-East, new, flexible, and dynamic societies which are not burdened by the elements of the "churning society"—namely, egalitarianism and constructivism—have entered and will enter the world stage. Old Europe not only has to compete with these countries on the world market, they are also the optional home for the capital and the rich themselves. If illusions and disinformation that a welfare state can be financed by taxing the rich were to continue to work, perspectives for the future would be gloomy. Competition from the low-wage countries will force the old welfare states into a reduction cure. Via the abolishment of redistribution from one pocket into another, enough reserves exist for a substantial reduction of the extra costs of wages. If all citizens were to realize that transfers have to be financed and do not fall from heaven like manna, current entitlement behavior could be overcome. If one promotes the basic goals of the justice of need and the necessity for a certain personal redistribution, it is a question of honesty not only to close the poverty gap but also to keep the burden on the taxpayers in mind—which also determines international competitiveness. From this point of view and from a medium-term perspective, the NIT concept is one of the last resorts.

V Acceptance and Feasibility: Some Public Choice Remarks

The argumentation has put more stress on the political than on the technical aspects of NIT systems because the latter are obviously more

favorable than those of any other redistributive scheme. But this view is not shared by many representatives of the political parties, the social administration, interest groups, and, last but not least, academics; and even this differentiation is incorrect because one and the same person might be a member of more than one, if not of all, of these groups.[24] Assuming the politicians to be the most important group, then the success of a politician today is dependent on the prevailing picture which society has developed. Politicians' popularity depends mainly on whether they maximize their interventions into public or—even worse—private sector activities. Even if the politicians were to be fully aware of the shortcomings of their personal resorts—an assumption which is, in view of the current personalities, slightly too optimistic—no rational incentives exist to abolish the failures of the system by means of a fundamental reform; on the contrary, such behavior would be a serious mistake. On the one hand, politicians have to intervene into people's personal affairs, thus impairing their popularity. On the other hand, a fundamental reform would mean that politicians would have to destroy the basis of their own jobs—the necessity for permanent interventions. From the politicians' point of view, it is rational to remedy the symptoms rather than the causes, and this strategy is in accordance with moral hazard theory (see Petersen, 1995). Their alleged preference for market solutions is pure lip-service.

Instead of a fundamentally market-oriented reform, temporarily effective measures to decrease the costs of the social security system are much more promising. These will only work until all involved persons and groups have adapted their behavior to the new regulations. If these reforms are coordinated with the reelection cycle, the short-term effects will increase politicians' popularity appropriately. The cost explosion that would follow several months later would not terrify experienced politicians; it is possible for them to demonstrate their importance again in hearings, interviews, TV talk shows, etc., which would renew their popularity. If such political behavior cannot be traced back to a lack of information, ignorance, indolence, or simply stupidity—all not very attractive attributes for a politician—it must follow a certain sys-

[24] Just to mention a personal experience: in a Federal Parliament hearing, among the academics invited were some "Honorar-Professoren" who, in their main occupations, are heads of interest groups.

tem. And that could be seen in the fact that the politicians are able to exploit the systemic failures for their own interests. Every fundamental reform would block their opportunities cast themselves in a politically positive light. Therefore, efficient and frictionless tax and transfer systems are politically counterproductive because of political self-interests.[25] To sum up: we are surrounded by moral hazard.

The NIT approach is in accordance with a revival of *Ordnungspolitik* —namely, a reformulation of institutional settings to obtain a reduction in the discretionary interventions via a strategy of depoliticization. Improving the institutional framework also means strengthening the ethical behavior of responsible persons. Institutional ethics have a higher degree of universal acceptance than individual ethics; therefore politicians and bureaucrats acting in social institutions should have greater societal obligations than private persons. Corruption and scandals point to the fact that many are overstressed by these obligations. The consequence of these moral hazard cases can only be immediate reprivatization.

Is it time for such depoliticization strategies? This is a general question of feasibility. Politicians are gradually facing the fact that during the last decades they took on too many duties formerly performed in a self-responsible manner by families or market participants. Because of increases in the information that politicians must digest and a growing discontent and annoyance on the part of citizens, politicians are increasingly unable to solve the complex societal problems. The arrogance of their assumption that they know (Hayek) what is good for the people or what is allegedly unnecessary, the merit and demerit argumentation, is recognized by well-educated citizens who acknowledge the limited abilities of political planning procedures. Any remnants of euphoria should have been destroyed by the fundamental political changes of recent years, but still the interventionists among the politicians dominate.[26] Some politicians have, however, become aware that

[25] Here one needs to mention the business cycle policy discussions some years ago about flexibility vis-à-vis discretionary interventionism, discussions which ended in favor of the latter.

[26] This was demonstrated in a public discussion between the former State Secretary of the German Ministry of Finance Falthauser (CSU) and Member of Parliament Uldall (CDU). Whereas the influential politician opposed the comprehensive tax base because of the impossibility for further planned interven-

they would like to get rid of the spirits they have summoned. The international discussion on privatization and improving the efficiency of a reduced public sector is only one piece of evidence. The standard role of a successful politician should be changed from one of interventionism to one of causal treatment of imperfect contemporary institutions and instruments. Ongoing and overwhelmingly blind activism is no attribute or political proof of the quality of democratic leaders.

In Germany, the erosion of politicians' ability to deal with matters effectively, especially as concerns the tax and transfer system, has been obvious for more than a decade; almost all substantial interventions into the social network have been attributable to rulings by the Constitutional Court—further evidence of the lack of concepts or courage on the part of tax and social politicians. Their lack of courage is obviously the result of fears that the bureaucrats and interest groups engaged in the numerous welfare institutions might strike back by disinforming the public, thus diminishing politicians' popularity and causing them to lose votes. But even expert advice is not easy to obtain because usually politicians do not have enough expertise to choose experts. They have a preference for experts who confirm their own assumptions or opinions. If political action seems to be entirely unavoidable, then an expert group or a leading economic institute is appointed to analyze the problem. This takes several months or, better, years, giving the politicians an alibi for inaction. In groups of experts there are also many wolves in sheep's clothing. As in the case of the behavior of the politicians mentioned above, more inefficient institutions and inefficient instruments mean more demand for experts and their important reports—not to mention their prevailing assumption that the old (tax) system is a good one.

This assumption might have been correct under conditions in the past when the total public budget was less than 30% of the GNP; the built-in flexibility of our contemporary systems results in ever-increasing state influence which can only be overcome by substantial reform. This is where the next problem lurks: Conservatives are not in

---

tions, Uldall (1994) stressed the neutrality of such a system. With regard to the NIT, Falthauser mentioned Orwells *1984* with regard to the "super-fisc" necessary for the control. But currently Germany has both: a "super-fisc" and a "super-welfare-administration" doing partially the same work under totally different regulatory sets.

favor of reform; but if conservatives and liberals are also infiltrated by socialist ideas, the result of their reforms again leads to more socialism. Hence, the introductory quotation from Friedman is verified.

Nevertheless, even under a NIT regime, the risks of representative democracy still exist; to limit political interventionism Niskanen (1992) demands a "new fiscal constitution." In the houses of parliament, the annual debt limit, the introduction of new taxes, or tax rate hikes would have to be decided with two-thirds majorities. Today's relative or absolute majority would no longer be sufficient; therefore, the danger of exploiting wealthy minorities might be reduced. In addition, opposition politicians would also be included in decision-making processes, thus enhancing the common responsibility of the ruling coalition and the opposition for the future. The limitation on an ever-growing public sector would even be stronger if a NIT system were to be included, and decisions on its marginal and average rates would have to be made, not within the parliaments, but by the plebiscite. Then the influence of politicians, bureaucrats, and interest groups would be substantially reduced (see Vaubel, 1991).

All this is no academic news but, rather, well known by the happy few who still follow some liberal norms. What is badly missing is the transfer of knowledge to the public via education and the mass media. This transfer is delayed because of the aging society in which the elderly do not have the knowledge and the young do not have the power. Even politically mismanaged societies have been capable of spontaneous order. In view of the fundamental upheavals of the very recent past, one can be optimistic: for the young generations open societies which rely upon "self-responsibility" have always been attractive; the NIT system, with a reduced personal redistribution which is controllable by the public, is a call for the young not to drop out but to be involved in all the other serious problems we will have to face in the coming century.

Bibliography

Andel, N. 1993. "Die Folgen des steuerlichen Durchwurstelns." *Wirtschaftsdienst*: 19–21.

Bäcker, G., and J. Steffen. 1995. "Lohnt es sich noch zu arbeiten? Zur Diskussion über Sozialhilfe, Negativsteuer und Niedrigeinkommen." *WSI Mitteilungen*: 3–11.

Belka, M., and H.-G. Petersen (eds.). 1995. *Economic Transformation in Poland. Reforms of Institutional Settings and Macroeconomic Performance*. Frankfurt, New York: Campus.

Brunner, J.K., and H.-G. Petersen (eds.). 1990. *Simulation Models in Tax and Transfer Policy*. Frankfurt, New York: Campus.

Bundesverfassungsgericht. 1992. Urteil des Bundesverfassungsgerichts zur Bemessung des Grundfreibetrages in den Jahren 1978–1984, für 1978–1980 einschließlich des allgemeinen Tariffreibetrages, 1986, 1988 sowie 1991 vom 25.09.1992. BVerfGE 87, pp. 153–181.

Deutsches Institut für Wirtschaftsforschung. 1994. "'Bürgergeld': Keine Zauberformel." *DIW-Wochenberichte* 41:689–696.

Flew, A. 1994. "Social Justice Erodes Individual Responsibility." Cannes: The Mont Pelerin Society General Meeting 1994.

Friedman, M. 1962. *Capitalism and Freedom*. Chicago: University of Chicago Press.

Friedman, M. 1994. "The Second Industrial Revolution." *Fraser Forum* (September):7–11.

Frisch, R. 1932. "New Methods of Measuring Utility." In: E. Lederer and J. Schumpeter (eds.), *Beiträge zur ökonomischen Theorie*, pp. 114–135. Tübingen: Mohr.

Fritzsche, B., and H.D. von Loeffelholz. 1994. "Grenzbelastungen der Einkommen durch das Steuer-Transfer-System. Eine empirische Analyse für Haushalte von Erwerbstätigen in den neuen und alten Bundesländern." *RWI-Mitteilungen* 45:235–260.

Glazer, A., and K.A. Konrad. 1993. "Private Supply of Public Goods, Limited Tax Deductibility, and Crowding Out." *Finanzarchiv N.F.* 50:203–216.

Golinowska, S., and A. Ochocki. 1995. "Reforms of Social Conditions in Central and Eastern Europe 1989–1993." In: M. Belka and H.-G. Petersen (eds.), *Economic Transformation in Poland. Reforms of Institutional Settings and Macroeconomic Performance*, pp. 263–300. Frankfurt, New York: Campus.

Hagenaars, A.J.M., and B.M.S. van Praag. 1985. "A Synthesis of Poverty Line Definitions." *Review of Income and Wealth* 31:139–154.

Hayek, F.A. v. 1976. *The Road to Serfdom*. Second Edition. London: Routledge and Kegan Paul.

Herf, J. 1992. "Macht und Freiheit an amerikanischen Universitäten." In: *Mitteilungen des Hochschulverbandes* (3):145–149.

Hinterberger, F. 1991. *Monetäre Verteilungspolitik*. Berlin: Duncker & Humblot.

Hinterberger, F., K. Müller, and H.-G. Petersen. 1987. "'Gerechte' Tariftypen bei alternativen Opfertheorien und Nutzenfunktionen." *Finanzarchiv N.F.* 45:45–69.

Hinterberger, F., M. Müller, and H.-G. Petersen. 1991. "Simulation eines Ausgabensteuersystems für die Bundesrepublik Deutschland." In: M. Rose (ed.), *Konsumorientierte Neuordnung des Steuersystems*, pp. 399–432. Berlin: Springer.

Hüther, M. 1990. *Integrierte Steuer-Transfer-Systeme für die Bundesrepublik Deutschland.* Berlin: Duncker & Humblot.

Hüther, M., M. Müller, H.-G. Petersen, and B. Schäfer. 1990. "Microsimulation of Alternative Tax and Transfer Systems for the Federal Republic of Germany." In: J.K. Brunner and H.-G. Petersen (eds.), *Simulation Models in Tax and Transfer Policy*, pp. 539–570. Frankfurt, New York: Campus.

Jasay, A. de. 1985. *The State.* Oxford: Blackwell.

Jerger, J., and A. Spermann. 1995. "Alternatives to Subsidize Low-Wage Employment: The Case for a Targeted Negative-Income-Tax Solution in Germany." Freiburg Working Paper, University of Freiburg.

Kesselman, J.R., and I. Garfinkel. 1978. "Professor Friedman, Meet Lady Rhys–Williams: NIT vs. CIT." *Journal of Public Economics* 10:179–216.

Killingworth, M.R. 1983. *Labor Supply.* Cambridge: Cambridge University Press.

Klein, T. 1986. "Sozialhilfeniveau und untere Lohngruppen—die Entwicklung seit 1962 und Unterschiede zwischen den Bundesländern." Arbeitspapier No. 205, Sonderforschungsbereich 3, Universität Frankfurt/M. und Universität Mannheim.

Krause-Junk, G., and J.H. von Oehsen. 1995. "Existenzminimum und Einkommensteuertarif." *Wirtschaftsdienst* 1995:28–35.

Kress, U. 1994. "Die negative Einkommensteuer: Arbeitsmarktwirkungen und sozialpolitische Bedeutung." *MittAB* 94:246–254.

Kronberger Kreis. 1986. Bürgersteuer—Entwurf einer Neuordnung von direkten Steuern und Sozialleistungen. Bad Homburg: Frankfurter Institut für wirtschaftswissenschaftliche Forschung e.V.

Larroulet, C. 1993. *Private Solutions to Public Problems—The Chilean Experience.* Santiago, Chile: Instituto Libertad y Desarollo.

Meade, J.E. 1972. "Poverty in the Welfare State." *Oxford Economic Papers* 24: 289–326.

Mitschke, J. 1985. *Steuer- und Transferordnung aus einem Guß. Entwurf einer Neugestaltung der direkten Steuern und Sozialtransfers in der Bundesrepublik Deutschland.* Baden-Baden: Nomos.

Mitschke, J. 1994. "Integration von Steuer- und Sozialleistungssystem—Chancen und Hürden." *Steuer und Wirtschaft*:153–162.

Mitschke, J. 1995. "Steuer- und Sozialpolitik für mehr reguläre Beschäftigung." *Wirtschaftsdienst*:75–84.

Müller, K. 1995. "Lean Government. Ursachen von Effizienzdefiziten, Ansatzpunkte und Voraussetzungen einer Effizienzsteigerung im öffentlichen Sektor." Finanzwissenschaftliche Arbeitspapiere No. 47. Gießen: Fachbereich Wirtschaftswissenschaften der Justus-Liebig Universität Gießen.

Müller, K., and H.-G. Petersen. 1995. "Towards a Reformulation of the Role of the Tax and Social State in the Polish Transformation Process." In: M. Belka and H.-G. Petersen (eds.), *Economic Transformation in Poland. Reforms of Institutional Settings and Macroeconomic Performance*, pp. 131–141. Frankfurt, New York: Campus.

Nakamura, A., and M. Nakamura. 1990. "Modeling Direct and Indirect Impacts of Tax and Transfer Programs on Household Behavior." In: J.K. Brunner and H.-G. Petersen (eds.), *Simulation Models in Tax and Transfer Policy*, pp. 461–478. Frankfurt, New York: Campus.

Niskanen, W.A. 1992. "The Case for a New Fiscal Constitution." *Journal of Economic Perspectives* 6:13–24.

Oberender, P., and F.U. Fricke. 1994. *Vom Wohlfahrtsstaat zum Sozialstaat—Einsparungspotentiale im Sozialbudget*. Bonn: Unternehmerinstitut der ASU e.V.

Petersen, H.-G. 1984. "The Impact of the Tax System—Federal Republic of Germany." In: W. Block and M. Walker (eds.), *Taxation—An International Perspective*, pp. 283–319. Vancouver: Fraser Institute.

Petersen, H.-G. 1988. *Wer trägt die Einkommensteuerlast?* Stuttgart: Kohlhammer.

Petersen, H.-G. 1989. *Sozialökonomik*. Stuttgart: Kohlhammer.

Petersen, H.-G. 1993a. *Finanzwissenschaft I*. Third Edition. Stuttgart: Kohlhammer.

Petersen, H.-G. 1993b. *Ökonomik, Ethik und Demokratie—Zu einer Theorie der Effizienz und Gerechtigkeit offener Gesellschaften*. Baden-Baden: Nomos.

Petersen, H.-G. 1994a. "Über die Bezahlbarkeit unseres Sozialsystems." *Demokratische Gemeinde* (Sondernummer 1994):20–21, 34–36, 40–42, 46.

Petersen, H.-G. 1994b. "Politische Ökonomie von Nationalismus und Migration." In: R.H. Hasse and W. Schäfer (eds.), *Die Weltwirtschaft vor neuen Herausforderungen*, pp. 229–258. Göttingen: Vandenhoeck & Ruprecht.

Petersen, H.-G. 1995. "Ökonomische Theorie der Politik—Ihr Beitrag zur Lösung der Krise der Demokratie." In: B.-O. Bryde and C. Leggewie (eds.), *Triumpf und Krise der Demokratie*. Gießen: Ferber (forthcoming).

Petersen, H.-G., M. Hüther, and K. Müller (eds.). 1992. *Wirkungsanalyse alternativer Steuer- und Transfersysteme. Das Beispiel der Bundesrepublik Deutschland*. Frankfurt, New York: Campus.

Pfähler, W. 1972/73. "Begriff und Formen der Negativsteuern." *Finanzarchiv. N.F.* 31:234–261.

Pohmer, D. 1977. "Wirkungen finanzpolitischer Instrumente." In: F. Neumark, H. Haller and N. Andel (eds.), *Handbuch der Finanzwissenschaft*, third edition, pp. 193–346. Tübingen: Mohr.

Radnitzky, G. 1991. "Marktwirtschaft: frei oder sozial?" In: G. Radnitzky and H. Bouillon (eds.), *Ordnungstheorie und Ordnungspolitik*, pp. 47–75. Berlin: Springer.

Radnitzky, G. 1994. "Explaining the 'Churning Society' and Its Consequences." Cannes: The Mont Pelerin Society General Meeting 1994.

Rhys-Williams, J. 1953. *Taxation and Incentive*. New York: Oxford University Press.

Rosa, J.-J. 1982. *The World Crisis in Social Security*. San Francisco: Institute for Contemporary Studies.

Rose, M. 1994. "Ein einfaches Steuersystem für Deutschland." *Wirtschaftsdienst*: 423–431.

Scharpf, F.W. 1993. "Von der Finanzierung der Arbeitslosigkeit zur Subventionierung niedriger Erwerbseinkommen." *Gewerkschaftliche Monatshefte* 44: 433–443.

Scharpf, F.W. 1994. "Für eine Subventionierung niedriger Erwerbseinkommen." *Wirtschaftsdienst*:111–114.

Schlesinger, A.M. Jr. 1992. *The Disuniting of America: Reflections on a Multicultural Society*. New York, London: Norton.

Seldon, A. 1984. "Taxation in the United Kingdom." In: W. Block and M. Walker (eds.), *Taxation—An International Perspective*, pp. 157–213. Vancouver: Fraser Institute.

Sen, A. 1983. "Poor, Relatively Speaking." *Oxford Economic Papers* 35:153–169.

Siebert, H. 1994. "Bürgergeld—ein Fehlanreiz." Frankfurter Allgemeine Zeitung, no. 12, p. 11.

Townsend, P. 1979. *Poverty in the United Kingdom*. Berkeley: University of California Press.

Uldall, G. 1994. "Spitzensteuersatz nur noch 28 Prozent?" Frankfurter Allgemeine Zeitung, no. 135, p. 15.

Vaubel, R. 1991. "Der Mißbrauch der Sozialpolitik in Deutschland: Historischer Überblick und Polit-Ökonomische Erklärung." In: G. Radnitzky and H. Bouillon (eds.), *Ordnungstheorie und Ordnungspolitik*, pp. 173–201. Berlin: Springer.