The Distribution of Earnings in Austria, 1972-1991.

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Abstract

In this paper we study the distribution of earnings in Austria from 1972 to 1991 using previously not available data. We find income compression in the early eighties, followed by a gradual reversal by the end of the observation period. Overall the lowest quartile and the highest decile gained at the expense of the middle class. Decompositon of the overall trend into sex and skill categories shows that within-group changes explain most of the development: inequality within blue-collar workers decreased, the opposite applies to white-collar workers.

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1. Introduction

Changes in personal income distribution are a major social phenomenon in several countries. Whereas in the fifties and the sixties income distribution seemed to be stable as a kind of "natural law", especially the U.S. and the UK experienced a tremendous increase in inequality in the recent decades (Freeman and Katz, 1994, Machin, 1996). This trend towards more inequality has even emerged in Sweden, where the vast income compression of the seventies has been partly reversed in the late eighties (Hibbs and Locking, 1996). Nonetheless, wages in most European countries as well as in Europe as a whole are still more compressed as compared to the U.S. (Atkinson, 1996)[1]

Explaining these trends of higher wage differentials for skilled workers as well as the higher employment of skilled labor in terms of supply and demand requires a demand shift favoring high-skilled workers. The two most popular candidates are increased trade and skilled-biased technical change. Trade theorists generally find the contribution of trade relatively small (Krugman, 1995, Lawrence and Slaughter, 1993)[2]. Evidence on the importance of technical change is given by Berman et al. (1994) who show that skill-upgrading occurred mainly within industries and not between industries, as structural change in product demands via trade would require.

Given the quick spread of new technologies all over the world, it is difficult to reconcile different international inequality patterns by skilled-biased technological change alone, which should in principle have similar effects in all countries. It seems therefore worthwhile to look at different institutional settings of countries. Freeman and Katz (1994) argue that countries experienced stable wage structures when wage-setting institutions

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[1] Atkinson (1996) combines household income for all European countries and compares this inequality measure with one for the U.S. to control for the different population size of the economies.
[2] See Aiginger, Winter-Ebmer and Zweimüller (1996) for an assessment of labor market effects of the opening of the eastern borders on Austria.

have not been altered very much and attribute some of the rising inequality in the U.S. and UK to the weakening of trade unions and the loosening of minimum wage legislation.

The development of income distribution over time should be especially interesting for the case of Austria. Austria is famous for being one of the most corporatist and centralized countries (Calmfors and Drifill, 1988)[3]. The tradition of "social partnership" institutionalizes social compromise between unions and employers' federations - giving both organizations also considerable influence over law-making and economic policy. Wage bargaining is held on an industry level, but metal workers have generally taken the lead in the bargaining rounds, being followed by the other industry negotiations. In contrast to the Scandinavian countries unionization in Austria has been slightly falling over the last two decades and is now approximately 60%. Union contracts are generally extended to all workers in the industry: therefore no union wage differentials exist once industry affiliation is accounted for (Blanchflower and Freeman, 1992, p. 78).

These institutions have lead to very low strike statistics and generally to favorable employment records, with unemployment rates far below the average in the European Union. Moreover, starting from 1970, Austria was governed by a social-democrat chancellor throughout, which gives rise to the suspicion that income re-distribution should be a major political issue. Although the institution of "social partnership" has been increasingly criticized in the last couple of years for being inflexible, no major changes in the bargaining institutions occurred. In fact, the Austrian situation can be mainly described as relatively constant labor market institutions over the period we are going to cover, i.e. 1972-1991. This is in sharp contrast to Sweden, another corporatist economy. Sweden experienced a long period of solidaristic wage policy strictly aimed at sharp pay compression.

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[3] See Green, Henley and Tsakalatos (1994) for a comparison of income inequality in corporatist and more market-oriented economies.

But after 1983 the scheme of centralized wage bargaining broke down in favor of industry-wide and even firm-level bargaining.

In this study we present a comprehensive analysis of income distribution for Austrian wage earners based on individual data. Whereas several studies exist covering specific years (Christl, 1980, Guger, 1989), no uniform series exist for the past two decades. We concentrate on wage earners only and exclude self-employed persons. Measurement of personal income distribution including the self-employed suffers from the problem of the inclusion of very different income concepts, making intertemporal comparisons difficult (e.g. Streissler, 1994). Furthermore, we are using individual data from social security records, a data base which has not yet been exploited in Austria for these purposes.

In the next section we describe the data set and the indicators for personal income distribution. Section 3 contains general results showing tendency towards compression in the first part of the period, and a corresponding backward shift afterwards. Then the analysis is expanded to a decomposition of the development into the distribution within and between sex/skill categories. Section 4 concludes.

2. Data and methodology

We use individual data from Austrian social security records from 1972-1991. The data result from a two-step sampling. At first, 5000 firm codes were sampled at random from the files of the social security administration. This gives us full employment histories for all the workers ever employed in these firms, regardless how long they stayed with the initially chosen firm[4]. The second sampling scheme uses every employed worker on the 31 of May of any year. This stock procedure results in a representative sample of the whole

working population on a point in time, thus avoiding over-representation of workers with short employment spells, which is the case in the first firm sample. The resulting sample size is between 40524 for 1972 to 58936 for 1991. The sample includes white- and blue-collar private sector workers as well as untenured government employees. Apprentice trainees and people earning below the minimum social security level (appr. $270 per month in 1991) are excluded[5].

Earnings data are monthly pre-tax earnings, for workers holding more than one employment ocntract all incomes from non-self-employed work were added. No capital income is available, neither is family affiliation, so that household income distribution schemes cannot be calculated. Incomes were top-coded, affecting about 9% of the sample. The administrative social security ceiling, causing the top-coding problem, increased year by year, so that no comparability problems arise.

To tackle the problem of top-coding we follow Fichtenbaum and Shahidi (1988). Suppose, the upper tail of the income distribution follows a Pareto distribution

$$(1) \qquad n = kz^{\alpha}$$

with z as an income level and n the number of persons with an income above z; k and α are parameters. Then we can estimate the parameters easily using a logarithmic transformation

$$(2) \qquad \ln n = k + \alpha \ln z.$$

As the assumption of a Pareto distribution is only applicable for the high incomes, we need a cutoff point for the empirical procedure. Kakwani (1980, p. 20) suggests that 40% of all workers belong to the pareto form, whereas Lydall (1968, p. 16) is opting only for 15-20%. We chose a uniform cutoff level of 30% for all years, which leaves us with 21% of the available complete data to extrapolate about 9%.[6] Following Coultier (1988) we can extrapolate the top-coded earnings as follows: Denote m(z(n),z(n-1)) the mean of the income interval, where person n is located and m(z(1),∞) the income of the richest person: This income extrapolation is performed for all top-coded workers.

$$(3) \qquad m\big[z(n), z(n-1)\big] = \left[\frac{\alpha}{\alpha+1}\right]\left[\frac{z(n-1)^{\alpha+1} - z(n)^{\alpha+1}}{z(n-1)^{\alpha} - z(n)^{\alpha}}\right]$$

$$(4) \qquad m\big[z(1), \infty\big] = \left[\frac{\alpha}{\alpha+1}\right]z(1).$$

3. Results

3.1. Trends and Comparison to other countries.

Figure 1 presents the general inequality trend for Austria as measured by the Gini-coefficient. The Gini coefficient in Austria for individual incomes shows considerable changes over the period under consideration. The Gini-coefficient for the whole sample - covering all private sector dependent employees except apprentices amounted to 0.267 in 1972. The period from 1972 until 1977 was characterized by a trend towards more equality. By 1977 the Gini fell to 0.243. The period thereafter - our sample covers the

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[6] See Gusenleitner (1995) for a sensitivity analysis of the cutoff point.

years until 1991 - showed a steady increase in inequality, the Gini rose to 0.263. That is by the beginning of the 1990s the extent of inequality seems to have reached again the level of the beginning of the 1970s.

<div align="center">Figure 1</div>

Previous studies for Austria used aggregated data from the same data source we use (the social security records). Christl (1979) found a sharp rise in inequality from 1953-1964; the Gini rose from 0.26 to 0.309. In the late sixties and early seventies he found some compression, for the eighties Guger (1989) - using the same methodology - found a slight increase in inequality afterwards. Data including apprentices and tenured public servants show higher inequality (Streissler, 1994), but no trend from 1973 to 1987.[7]

<div align="center">Table 1</div>

It is of interest to compare these inequality trends with the experience of other countries. Table 1 shows data for earnings dispersion in the U.S., the UK, France, Japan, Germany and Sweden, separately for men and for women, for the period 1979 until 1990. Table 1 shows the log differential between the 9th and the 1st decile. Thus it measures inequality change with respect to income shares of the highest relative to the lowest incomes. This inequality measure focuses on the range of the distribution between the high and low income earners, but leaves changes within the "middle class" out of consideration.

As far as Austria is concerned, the trend toward inequality is observable also with respect to this inequality measure. In our sample, the 90/10 log differential for males amounted to 0.89 in 1979 and rose to 0.92 in 1990. The comparable figures for women - 1.07 in 1979 and 1.17 in 1990 - are both higher in absolute value and show a stronger increase in inequality. There is an obvious reason behind this. Since our data refer to gross monthly earnings, the variation in incomes is partly due to variations in hours of work.

Since the share of part-time employment is much higher for women as compared to men, this may account for the higher degree of inequality among the former. In addition, there is some evidence that part-time work has gained importance among Austrian women during the 1980s. The share of part-time working women (<35 hours a week) increased from 15% in 1979 to 18.7% in 1990 (Bartunek, 1993). It is therefore likely that the larger increase in inequality among women is due to the increase in the variation of hours of work rather than due to hourly wages.

The figures in Table 1 locate earnings inequality among Austrian men in the medium range. It seems to be somewhat higher than in Sweden where the log 90/10 differential was 0.77, but also considerably lower than in Canada or the U.S. where the corresponding measure has a value of 1.38 and 1.40 respectively. Again we should mention that all figures in Table 1 - except Austria and Japan - refer to full time workers. Insofar as working hours may account for some variation, wage inequality is likely to be overestimated.[8]

This latter fact seems to be of particular importance once we compare earnings inequality among women. The log 90/10 differential among women is among the higher ones of all countries listed in Table 1. Because of the importance of hours dispersion among women, it is most likely that inequality is considerably overestimated, compared to other countries. In all countries - Italy being the exception - inequality has increased during the 1980s. In comparison, the increase in inequality in Austria has been modest, for men but also for women.

Although the situation in 1991 seems to be almost exactly like the one in 1972 a closer look reveals an interesting phenomenon: Over the whole period the "middle class"

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[7] The difference in the levels of the Gini coefficient with other Austrian studies is mainly due to differences in the data base. Streissler's (1994) study uses data from income tax statistics (Einkommensteuerstatistik) whereas Guger (1989) employs data from the earnings tax statistics (Lohnstufenstatistik).

[8] Note that this is not necessarily so. If hours and hourly wages are negatively correlated, wage inequality may even be higher than earnings inequality in extreme situations. If no such correlation exists, wage

lost in favor of the poor as well as the rich. To see this more closely, consider Figure 2, showing the growth in income shares between 1972-1977 and between 1977-1991.

Figure 2

In the period 1972-1977, the first, second, and third decile experienced a rise in their income share. This was at the cost of the all other percentile groups except that fourth decile, which stayed constant over this period. The strongest decrease is observable among the eighth and the ninth decile. The most likely reason for this relatively strong movement to more equality was probably caused by the "high-days" of the first social-democrat government in Austria which came into power at the beginning of the 1970s. After 1977 things have changed considerably. Between 1977 and 1991 the highest percentile gained in terms of income shares. This was at the expense of all other groups, but the lowest decile lost disproportionately. Over the whole period 1972 to 1991, the poorest 24% of the wage earners and the 8% richest gained at the expense of medium incomes.

3.2. Looking at Different Inequality Indicators

As is well known, comparing income distributions may lead to different conclusions about the direction of change if Lorenz curves cross. This is in fact the case if we compare the overall change between 1972 and 1991. As mentioned above, over that period both the very poor and the very rich gained at the cost of medium incomes. As a result the 1991 Lorenz-curve lies above the 1972-curve in the lower deciles, but below for the highest deciles.

To assess changes in the distribution over the past two decades it may therefore be interesting to compare various inequality measures and look at the trends they uncover. We

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inequality is always smaller than earnings inequality. In 1990 only 1.5% of males worked part time in Austria

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will examine three different measures: (i) the generalized Gini-Index developed by Kakwani (1980), (ii) the index suggested by Atkinson (1970) and (iii) the entropy measure of Theil (1967).

All chosen indicators satisfy the principle of transfers, i.e. a transfer from a high paid worker to a less highly paid worker should reduce inequality. The Gini is more sensitive to changes in the middle of the earnings distribution rather than at the tails. Kakwani's generalization accounts for this problem: it introduces an additional parameter which weighs transfers at the lower tail of the income distribution differently. Theil's entropy measure has a similar property: higher values of the critical parameter give more weight to transfers at the upper tail of the distribution. Moreover, overall inequality using the Theil index can be decomposed into between and within group differences. Finally, the Atkinson index is explicitly based on a social welfare function.

Kakwani's (1980) inequality measure is a generalization of the Gini-index. It is defined as:

(5) $$G(k) = \frac{(N-1)}{N\left(\sum_{i=1}^{N} i^k - N\right)} \frac{1}{\bar{y}} \sum_{i=1}^{N} \left(\bar{y} - y_i\right)(N+1-i)^k$$

where i indexes individuals, N denotes the population size, and y_i and $\bar{y}$ denote the income of individual i and average income, respectively. The critical parameter in equation (5) is k. For $k=1$ we get the Gini-index. The Gini-index, which measures the area between the Lorenz-curve and the diagonal (equality) gives equal weight to all income classes. By varying the parameter k the weights attached to various income groups can be changed. For $k>1$ more weight is given to lower incomes.

Figure 3

(Bartunek, 1993).

Figure 3 shows the development of the generalized Gini for various values of k. Until 1977 incomes in the lower range have risen disproportionately. As a result, higher values of k count this change as a stronger decrease in inequality than higher values of k. Whereas the neutral Gini-index ($k=1$) leads to the conclusion that inequality was first decreasing but has finally reached its original value, giving more weight to income gains of the relatively poorer individuals would support the view that inequality in the 1990s is still lower than at the beginning of the 1970s. Nevertheless, all measures reported in Figure 3 show the same picture: a downward trend until 1977 followed by increasing inequality thereafter.

A different measure of inequality is the index developed by Atkinson (1970).

$$(6) \qquad A(\varepsilon) = 1 - \left[\frac{1}{N} \sum_{i=1}^{N} \left(\frac{y_i}{\bar{y}} \right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}} \qquad \text{for } \varepsilon > 0 \text{ and } \varepsilon \neq 1$$

$$A(1) = 1 - \frac{1}{\bar{y}} \prod_{i=1}^{N} \left(y_i \right)^{\frac{1}{N}} \qquad \text{for } \varepsilon = 1$$

The parameter ε can be interpreted as inequality aversion. A value of $\varepsilon=1$ ($\varepsilon=2$) would mean: A redistribution of one dollar from a rich to a poor would be considered as socially worthwhile, even if the poor would receive only 50 cents (25 cents). The choice of this parameter is related to the choice of a specific social welfare function with a specific inequality aversion.

<u>Figure 4</u>

Figure 4 plots the inequality trends for various values of ε. Also here we see pretty much the same picture as far as the general trends are concerned, a relatively strong initial decrease followed by a increase after 1977. However, here it needs very small values of inequality aversion (ε) to come to the conclusion that inequality is larger at the beginning

of the 1990s compared to the starting point. Higher values of ε support the conclusion that inequality in 1991 was lower than in 1972.

Finally, consider Theil's (1967) entropy measure. This indicator is defined as:

$$(7) \qquad T(c) = \frac{1}{N}\frac{1}{c(c-1)}\sum_{i=1}^{N}\left[\left(\frac{y_i}{\bar{y}}\right)^{c} - 1\right] \quad \text{for } c \neq 0,1 \text{ and}$$

$$T(0) = \frac{1}{N}\sum_{i=1}^{N}\ln\frac{y_i}{\bar{y}} \;, \qquad\qquad T(1) = \frac{1}{N}\sum_{i=1}^{N}\frac{y_i}{\bar{y}}\ln\frac{y_i}{\bar{y}}$$

This measure has the advantage that it is readily decomposable, a property which will be used in the following.

Figure 5

Here the picture is somewhat different than before. High positive values of the parameter c would suggest that inequality has increased over the past two decades, showing only a minor decrease in the early seventies. Strong negative c's would lead to the opposite conclusion: a relatively strong initial decrease, followed by a relative stability since the late 1970s.

So far, the analysis has concentrated on developments and trends in Austrian earnings inequality among the whole private sector. This may disguise important structural changes which underlie this development. The two most obvious trends - and perhaps the most important - are the increasing share of women in the labor force and the changing skill structure. While the data set lacks information on formal schooling, it reports whether an individual was employed as a wage earner (blue-collar worker) or as a salaried worker (white-collar employee). This may serve as a crude, but meaningful measure of the skill-structure of the workforce.

We divide the total sample into four subgroups. (i) male white-collar, (ii) male blue-collar, (iii) female white-collar, and (iv) female blue-collar workers. Table 2 reports within group inequality for three different indicators: the Gini-coefficient, Atkinson's measure (for $\varepsilon=1$), and the Theil-index (for c=1).

Table 2

Table 2 shows that inequality among white collar workers is much higher than among blue collar workers, both for men and for women. This may be due to minimum wage legislation which sets a lower bound on earnings for both groups. Furthermore, there does not seem to be much difference between men and women. The fact that overall inequality among women is higher than among men is therefore due to the fact that the share of white-collar workers is higher among female employees compared to males.

As far as changes over time are concerned, Table 2 reveals two important develop-ments. First, earnings inequality among blue-collar workers is quite different from white-collar workers. Among men blue-collars, inequality has been decreasing over the whole period, whereas among female blue-collars inequality increased modestly since the late

1970s. This holds for all inequality measures displayed in Table 2. Second, the trend towards more overall inequality is very pronounced among male white-collar workers. Again, this is visible form all measures in Table 2. In comparison, the changes among female white-collar workers are relatively small.

3.4. Decomposition of Within- and Between-Group Inequality

The discussion in the last section leaves the question open, to which extent the trends in the various groups account for overall earnings inequality. Evidently, within-group changes are only a part of the whole story. Changes in the population shares of the various groups, as well as relative earnings between these groups shape overall inequality.

Inequality accounting requires strong conditions on an inequality indicator, namely additive decomposability. In other words, aggregate inequality should be equal to the sum of between-group inequality and a weighted sum of inequality within groups, the weights depending on relative earnings as well as on the population share of the respective groups. The most commonly used indicator which satisfies this property is Theil's entropy-index. There seems to be a consensus in the literature that this measure is most appropriate - given the ease of its computation as well as its scale-invariance property.

Taking c=1, we can decompose the Theil-measure as follows

$$(8) \qquad T(1) = \frac{1}{N} \sum_{i=1}^{N} \frac{y_i}{\overline{y}} \ln \frac{y_i}{\overline{y}} = \sum_g s_g \frac{1}{N_g} \sum_{i=1}^{N_g} \frac{y_i}{\overline{y}_g} \ln \frac{y_i}{\overline{y}_g} + \sum_g s_g \frac{\overline{y}_g}{\overline{y}} \ln \frac{\overline{y}_g}{\overline{y}}$$

where g now is a group index, N_g is the size and $\overline{y}_g$ is the mean income of group g s_g is a weighting parameter which is equal to the share of group g in total income. The first expression on the right-hand-side of (8) is *within-group* inequality. This term is

nothing else but a weighted sum of within group-inequality measures. The second term accounts for inequality between the various groups.

<center>Table 4</center>

Table 4 reveals that within group inequality accounts for the overall trend in income inequality. The within-group component was sharply decreasing at the beginning of the 1970s. Inequality in all groups - except white-collar women - was decreasing. The strongest contribution came from male blue-collar workers. Here the decrease in inequality was particularly pronounced. Furthermore, this group had a disproportionate share in total income. From 1976 onwards, the increase in within-group inequality was due to an increase in earnings-dispersions among white collar workers. This trend was aggravated by the fact that due to structural changes in the work force the share of income of white-collar workers - both for males and for females - has been increasing.

In contrast, between-group inequality did not follow a clear trend over the period under consideration. In fact, as Table 4 shows, inequality between groups was even increasing in the first part of the 1970s. Also thereafter there has not been a clear trend. The reasons seem to be obvious. Both the share of women, as well as the share of white-collar workers in total income has been increasing over the whole period. The former development gives more weight to a low income group, whereas the latter gives more weight to a high income group. Moreover, relative wages for blue-collar workers have been slightly decreasing, whereas the male-female wage differential was slightly increasing. Taken these trends together, it is not surprising to find no clear trends in between-group inequality.

4. Conclusions

In the recent past, many industrialized countries have seen major changes in the distribution of income. However, the actual distributional outcomes were very different between countries. Whereas the U.S. and the UK have experienced a tremendous increase in inequality, in most countries in continental Europe the wage structure is still more compressed. The development in Austria fits into this picture.

The aim of this paper was to study the Austrian situation in more detail. In doing so we have exploited an individual data set from the Austrian social security records reporting monthly earnings of individuals. The development of income distribution over time should be especially interesting for the case of Austria being a country with strong corporatist institutions.

Since the year 1970, Austria was governed by a social-democrat government, which gives rise to the suspicion that income re-distribution should be a major political issue. We show in this paper that in the first years of the social-democratic period, in fact a strong trend towards more equality could be observed. However, from 1977 onwards, this situation was reversed. We find a continuous increase in inequality, which is supported by (almost) all indicators we analyze.

By looking at trends among various subgroups we find a striking difference in the development of inequality between blue-collar and white-collar workers. Whereas among the former group inequality was decreasing throughout the whole period (especially for males), we observe a sharp increase among white collar workers since the late seventies. Given the fact that no major institutional changes took place during the analyzed period, it is most likely that technological factors, or a changing international division of labor are the most likely candidates for explaining this facet of the Austrian experience.

References

Aiginger, Karl, Winter-Ebmer, Rudolf and Josef Zweimüller: Eastern European Trade and the Austrian Labour Market, *Weltwirtschaftliches Archiv*, 1996 forthcoming.

Atkinson, Anthony B.: On the Measurement of Income Inequality, *Journal of Economic Theory,* 2, 1970, 244-263.

Atkinson, Anthony B.: Income Distribution in Europe and the United States, *Oxford Review of Economic Policy* 12/1, 1996, 15-28.

Bartunek, Ewald: *Teilzeitbeschäftigung in Österreich*, Bundesministerium für Arbeit und Soziales, Wien, 1993.

Blanchflower, David G. and Richard B. Freeman: Unionism in the United States and other Advanced OECD Countries, *Industrial Relations* 31/1, 1992, 56-79.

Calmfors, Lars and Drifill, John: Bargaining Structure, Corporatism and Macroeconomic Performance, *Economic Policy* 6, 1988, 13-62.

Christl, Josef: Entwicklungstendenzen in der österreichischen Lohn- und Gehaltspyramide zwischen 1953 und 1979, *Empirica*, 1980.

Cloutier, Norman R.: Pareto Extrapolation Using Grouped Income Data, *Journal of Regional Science* 28, 1988, 415-419.

Fichtenbaum, Rudy and Hushang Shahidi: Truncation Bias and the Measurement of Income Inequality, *Journal of Business and Economic Statistics* 6, 1988, 335-337.

Freeman, Richard B. and Larry Katz: Rising Inequality: The United States versus Other Advanced Countries, in: R. Freeman (ed.), *Working Under Different Rules*, New York, Russel Sage Foundation, 1994.

Freeman, Richard B. and Larry Katz: Introduction and Summary, in: Freeman, Richard B. and Larry Katz (eds.), *Differences and Changes in Wage Structures,* NBER Comparative Labor Market Series, University of Chicago Press, Chicago and London, 1995.

Green, Francis, Henley, Andrew and Euclid Tsakalotos: Income Inequality in Corporatist and Liberal Economies: A Comparison of Trends within OECD Countries, *International Review of Applied Economics* 8, 1994, 303-331.

Guger, Alois: Einkommensverteilung und -verteilungspolitik in Österreich, in: Abele, A. et al (eds.): *Handbuch der Österreichischen Wirtschaftspolitik*, Manz, Vienna, 1989.

Gusenleitner, Markus: *Trends in der Entwicklung der Einkommensungleichheit*, mimeo, University of Linz, 1995.

Hibbs, Douglas A. Jr. and Håkan Locking: *Wage Dispersion and Productive Efficiency: Evidence for Sweden*, mimeo, Trade Union Institute for Economic Research, Stockholm, 1995.

Kakwani, Nanak C.: *Income Inequality and Poverty*, Oxford, Oxford University Press, 1980.

Krugman, Paul: Growing World Trade: Causes and Consequences, *Brookings Papers on Economic Activity* 1995, 327-362.

Lawrence, Robert Z. and Matthew J. Slaughter: International Trade and American Wages in the 1980s: Giant Sucking Sound or Small Hickup, *Brookings Papers on Economic Activity Microeconomics* 1993, 161-226.

Lydall, H.: *The Structure of Earnings*, Oxford, Clarendon Press, 1968.

Machin, Stephen: Wage Inequality in the UK, *Oxford Review of Economic Policy* 12, 1996, 47-64.

Streissler, Agnes: Die Einkommensentwicklung seit 1973 im Spiegel der Einkommens-

steuerstatistik, *Wirtschaft und Gesellschaft* 20, 1994, 169-194.

Theil, Henri: *Economics and Information Theory*, North-Holland, 1967.

Winter-Ebmer, Rudolf and Josef Zweimüller: *Intra-Firm Wage Dispersion and Firm Per-

formance*, mimeo, University of California, Berkeley, 1996.

Table 1: 90/10 log differentials, various countries

Country	1979	1984	1987	1990	Change 1979/1990
Men					
Austria	0.89	0.92	0.92	0.92	+ 0.03
U.K.	0.88	1.04	1.10	1.16	+ 0.28
U.S.	1.23	1.36	1.38	1.40	+ 0.17
Canada	1.25	1.39	1.34	1.38	+ 0.13
Japan	0.95	1.02	1.01	1.04	+ 0.09
France	1.19	1.18	1.22	1.23	+ 0.04
Italy	0.74	0.69	0.73	na	na
Sweden	0.77	0.72	0.72	0.77	0.00
Women					
Austria	1.07	1.13	1.13	1.17	+ 0.10
U.K.	0.84	0.98	1.02	1.11	+ 0.27
U.S.	0.96	1.16	1.23	1.27	+ 0.31
Canada	1.32	1.46	na	1.38	+ 0.06
Japan	0.79	0.79	0.84	0.85	+ 0.06
France	0.96	0.93	1.00	1.02	+ 0.06
Italy	0.87	0.69	0.69	na	na
Sweden	0.53	0.57	0.56	0.60	+ 0.07

Source: Own calculations for Austria; for all other countries Freeman and Katz (1985), p.13.

All number refer to full-time employees except for Austria and Japan (all workers). For

Sweden and Canada figures in the first column (1979) are for 1981.

Table 2: Inequality within groups

Subgroup	1972	1976	1981	1986	1991
Gini(1)					
men, blue-collar	0.218	0.171	0.168	0.164	0.163
men, white-collar	0.260	0.223	0.286	0.279	0.292
women, blue-collar	0.210	0.197	0.187	0.193	0.197
women, white-collar	0.258	0.248	0.258	0.267	0.271
Atkinson, A(1)					
men, blue-collar	0.102	0.051	0.049	0.047	0.047
men, white-collar	0.124	0.092	0.135	0.130	0.143
women, blue-collar	0.083	0.071	0.062	0.066	0.069
women, white-collar	0.116	0.102	0.109	0.115	0.119
Theil, T(1)					
men, blue-collar	0.086	0.050	0.048	0.046	0.045
men, white-collar	0.117	0.084	0.151	0.138	0.159
women, blue-collar	0.078	0.067	0.060	0.063	0.066
women, white-collar	0.114	0.108	0.118	0.125	0.131

Source: own calculations

Table 3: Within- and Between-Group Inequality

	1972	1976	1981	1986	1991	Δ72/76	Δ76/91
Theil, T(1), total population	0.123	0.105	0.112	0.121	0.127	- 0.018	+ 0.022
Within-group component	0.094	0.068	0.087	0.085	0.097	- 0.026	+ 0.029
contribution of:							
men, blue-collar	0.046	0.024	0.022	0.020	0.018	- 0.022	- 0.006
men, white-collar	0.023	0.018	0.039	0.037	0.047	- 0.005	+ 0.029
women, blue-collar	0.011	0.009	0.007	0.008	0.007	- 0.002	- 0.002
women, white-collar	0.014	0.016	0.018	0.021	0.025	+ 0.002	+ 0.009
Between-group component	0.029	0.037	0.025	0.036	0.030	+ 0.011	- 0.007

Source: own calculations

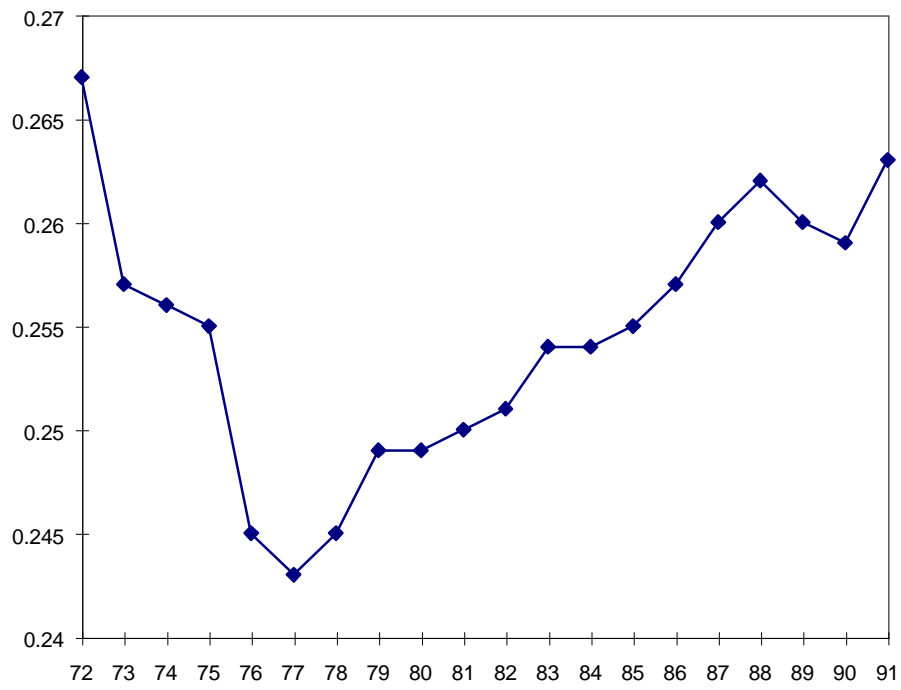**Figure 1: Gini-coefficient in Austria, 1972-1991.**

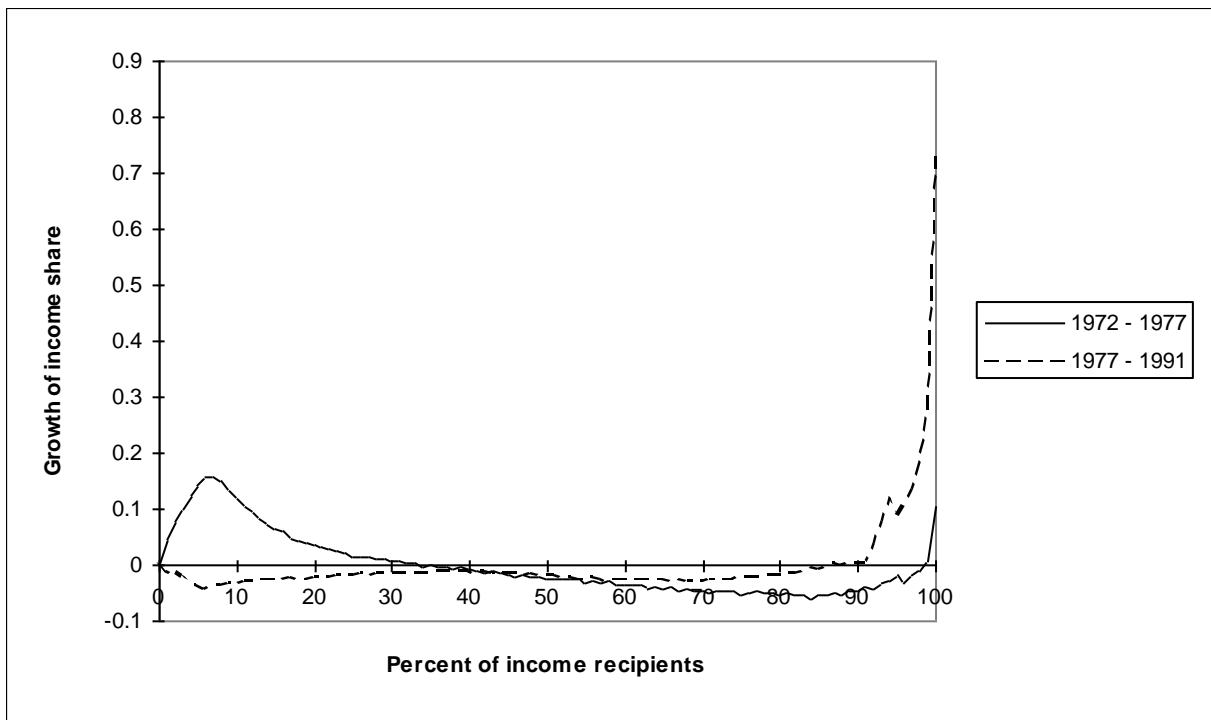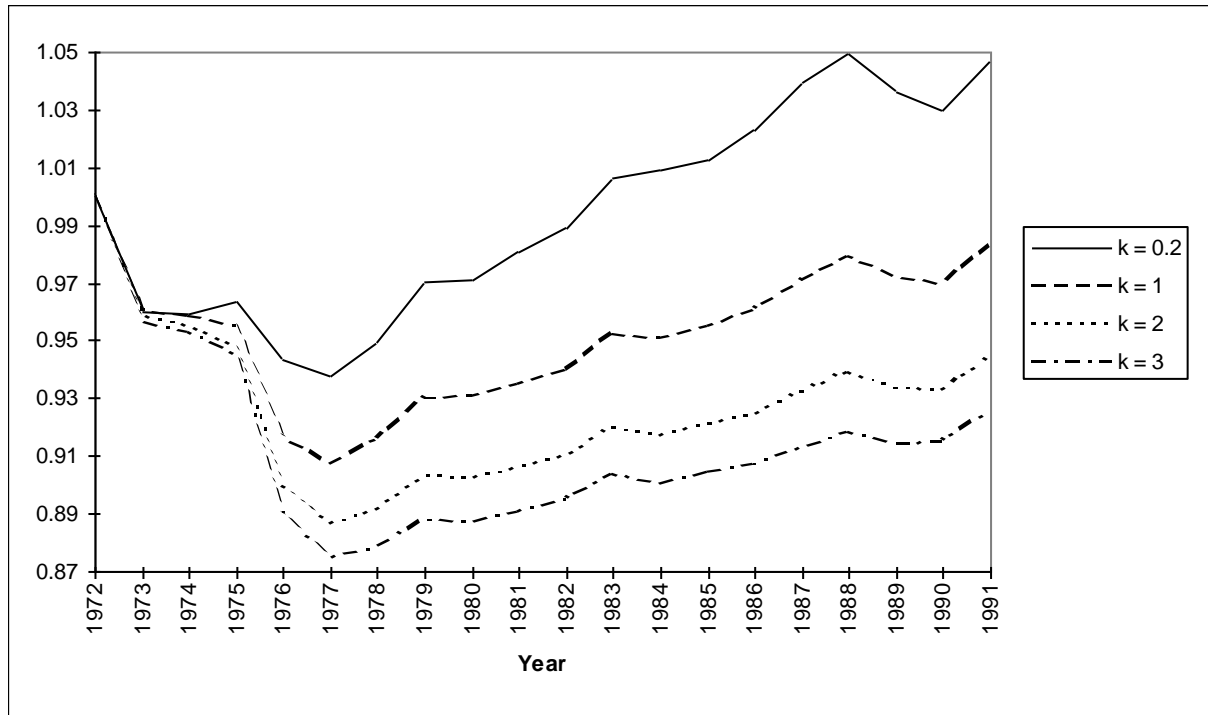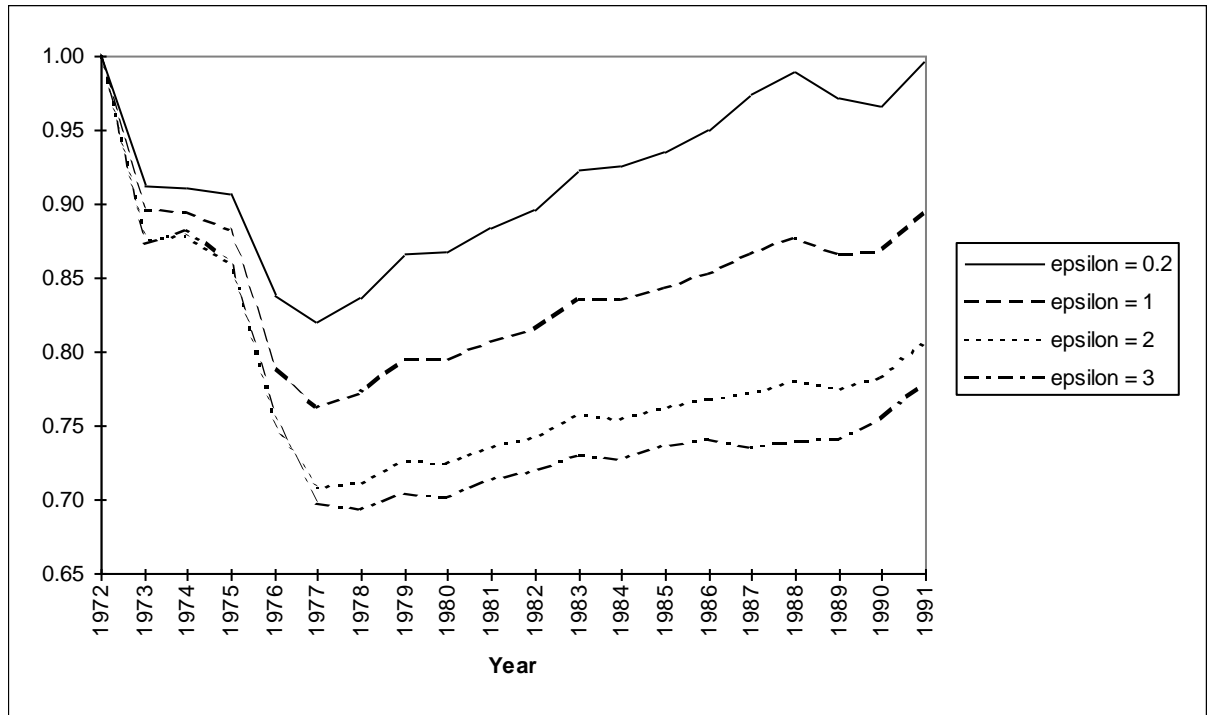**Figure 2: Change in income shares 1972-1977 and 1977-1991.**

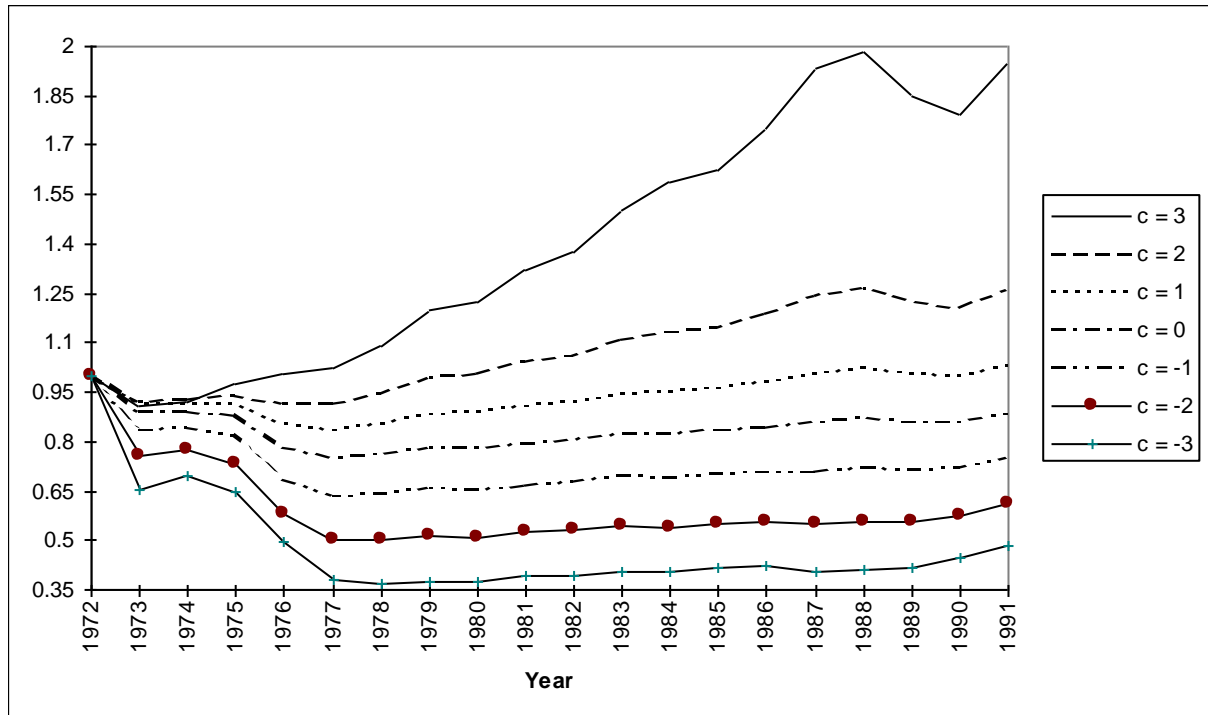**Figure 3: Gini-index following Kakwani with different parameters.**

Relative development, taking 1972=1.0.

Figure 4: Atkinson-index with different parameters.

Relative development, taking 1972=1.0.

Figure 5: Theil-index with different parameters.

Relative development, taking 1972=1.0.