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**Long Run Trends in Economic Inequality
in Five Countries - A Birth
Cohort View**

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- A Birth Cohort View

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Abstract

This paper examines the level and distribution of equivalent after tax, after transfer money income in Canada, the USA, the UK, Germany and Sweden using micro-data from the Luxembourg Income Study from 1969/70 to 1994/95. It concentrates on inequality within and between birth cohorts. At any point in time, less than 11% of aggregate income inequality is due to intergenerational inequality, but the experience of different birth cohorts over the period has varied widely across countries.

The five countries studied differ in the trends observed in aggregate income, poverty, polarization and income inequality. In the USA and the UK, the incomes of the top decile of each cohort have risen dramatically, but the incomes of the bottom quintile have stagnated. In Canada and Sweden both the top and bottom deciles of each cohort have experienced similar trends. Germany is an intermediate case.

Poverty trends are extremely sensitive to the distribution of the gains from growth - if only 10% of the income gains of the top decile of the UK and the USA had been transferred to the bottom decile, poverty in both countries in 1994/95 would have been substantially lower than in 1979, instead of substantially higher. The basic lesson is the diversity of income distribution trends to be observed in international data - and the consequent diversity of implications for political economy.

What trends have there have been in the distribution of income in advanced capitalist countries over the last thirty years, and why do we want to know? One possible reason for interest in income distribution trends is political. “Social cohesion”, social stability and economic inequality are likely to be strongly related. Some would argue that the relationship is reciprocal - that substantive equality and a sense of common shared destiny is a political precondition for the redistributive mechanisms of the welfare state, which in turn reinforce equality and social cohesion. Others might suggest that the relationship is more causal, and that rising inequality will ultimately undermine the political legitimacy of capitalist institutions. As a historical generalization, the inequalities of a liberal capitalist system seem to have been most severely challenged during periods, like the 1930s, when capitalism has failed to “deliver the goods” - i.e. when the general level of economic well-being has fallen while economic inequality has risen. However, if capitalism’s historic justification for economic inequality has been the promise that living standards will rise from one generation to the next, what determines the popular perception of whether or not that promise has been kept?

The literature on economic inequality and average living standards has expanded dramatically in recent years and there are now a number of excellent surveys of the major issues¹ to document:

- (1) the trend in many countries, since the mid 1970s, to increased inequality and polarization of

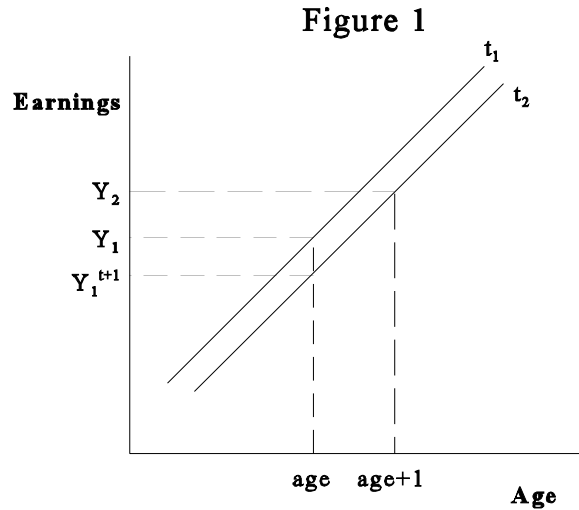
¹The Canadian literature alone is massive - see Beach and Slotsve (1996), Beach, Slotsve and Vaillancourt (1996), Burbidge, Magee and Robb (1996), Doiron and Barrett (1994), MacPhail (1996), Picot (1996), and Richardson (1994), etc. This paper’s methodology is similar to Osberg (1997). Smeeding and Sullivan (1998) discuss US birth cohorts.

the earned income of men (see Jenkins (1995), Gottschalk and Smeeding, (1997)) Although the same has often not been true for women, one might expect such trends to produce greater poverty - but how general is this tendency?.

- (2) the fact that in a number of countries (e.g. USA, Canada), the rapid rise in average hourly real wages of the early 1970s has been followed by a quarter century of stagnation. However, trends in average income hide the differing experiences of particular birth cohorts, and of different segments of the income distribution. How general is the phenomenon of stagnation in living standards?
- (3) rising differentials in earnings between young and old workers, and an absolute decline in the average real earnings of young workers, (especially those with little education²) has been combined with persistently high youth unemployment in many countries. There has been increasing concern with intergenerational inequalities - but how much of aggregate inequality is due to intergenerational differences?

Even if average incomes are stagnant or falling and even if individuals retain the same place in the hierarchy of cohort earnings, it is still possible for each individual to experience, in their own lives, a rising material standard of living, as long as the rate at which earnings increase with age is greater than the rate at which the average earnings of all age cohorts shrink (see Figure 1). As well, although there are many points of comparison in the income distribution debate (e.g. gender, region, race, etc.), a highly salient comparison for most individuals is to compare themselves with other persons of approximately the same age.

²See Green and Beaudry (1999)



$Y_2 - Y_1^{t+1} =$ age differential in earnings

$Y_1 - Y_1^{t+1} =$ secular decline in earnings

$Y_2 - Y_1 =$ personal earnings experience ($Y_2 - Y_1 > 0$ if $Y_2 - Y_1^{t+1} > Y_1 - Y_1^{t+1}$)

Individuals who appraise their own economic well-being in terms of lifetime earnings may also be sanguine about age related differences in income, [even if such differentials influence the aggregate inequality of annual incomes] since they may well expect to receive higher incomes as they age themselves. Sociologically, age related income differentials may also be subject to different norms of equity than are applied to income differentials among those of the same age.

If all this is true, trends in income distribution *among contemporaries* may be particularly important for subjective perceptions, and for the political implications of inequality. Hence, although

this paper presents estimates of the trend in distribution and average level of equivalent income among all people, its main emphasis is on following the fortunes of birth cohorts as they aged from approximately 1969/70 to 1994/95. Because the UK, USA, Canada, Sweden and Germany have been collecting micro data since the early 1970s and making them available to the Luxembourg Income Study, one can follow the fortunes of birth cohorts in these countries. Since the baby-boom cohort born 1946 to 1959 was 12 to 25 in 1971, 16-29 in 1975, 22-35 in 1981, 25-38 in 1984, 30-43 in 1989 and 35-48 in 1994, this paper follows a “pseudo-cohort” methodology to identify the changing fortunes of birth cohorts.

Trends in the equivalent income of baby boomers are compared to trends in the well-being of those born earlier - who can be labelled “Golden Agers” (born 1915 to 1929) or “Pre-boomers” (born 1930-1945). However, it is particularly interesting to compare baby boomers to those born later - “Generation X”, (born 1960-1975) and “Generation Y” (born in 1976 or after).

Clearly, in 1975 “Generation X” were all under 16 years old. To estimate their equivalent income as children one must make strong assumptions about the distribution of resources within families. Estimates of the total effective resources available to families also depend on the equivalence scale used to translate the total income of families of different sizes into estimates of average economic well-being. Section 2 therefore discusses methodology: the data sets used in this paper, the assumptions underlying the computation of equivalent individual income, and the summary statistics of income distribution and poverty used. Section 3 discusses the trends from 1969/70 to 1994/95 in aggregate inequality and in average income and follows the fortunes of the top ten per cent and bottom twenty per cent of birth cohorts. Section 4 discusses the limitations of these trends in income as estimates of changing trends in the distribution of well-being and the possible implications of

income inequality trends in Canada, the USA, Germany, Sweden and the UK.

2. Methodology

2.1 Population

This paper uses Luxembourg Income Study micro data to present point estimates³ of income distribution trends over time for the following economies: Canada (1971, 1975, 1981, 1987, 1991, and 1994), Germany (1981, 1984, 1989 and 1994), Sweden (1975, 1981, 1987, 1992 and 1995), United Kingdom (1969, 1974, 1979, 1986, and 1991, 1995), and United States (1974, 1979, 1986, 1991, and 1994). The focus is on the distribution of equivalent income among individuals, but the statistical starting point is the LIS definition of total household money income after tax (disposable income)⁴ as the basis for calculation of the “equivalent income” of all individuals within households. Trends in equivalent income as distributed among all Canadians⁵, Americans, Swedes, Germans and

³Although estimates of the confidence intervals surrounding these point estimates are not presented here, interested readers can find such estimates (for the population as a whole), as calculated using a bootstrap methodology, in Osberg and Xu (1997).

⁴Disposable income consists of the sum of gross wages and salaries, farm self-employment income, non-farm self-employment income, cash property income, sick pay, disability pay, social retirement benefits, child or family allowances, unemployment compensation, maternity pay, military/veteran/war benefits, other social insurance, means-tested cash benefits, near cash benefits, private pensions, public sector pensions, alimony or child support, other regular private income, and other cash benefits; minus mandatory contributions for self employed, mandatory employee contribution, and income tax.

⁵

A set of data tables presenting detailed results for each cohort are available at <http://is.dal.ca/~osberg/home.html>. Cohorts are set to approximately fifteen years, with slight variations to fit historic dates such as the end of war in 1945/46, and the Depression's onset in 1929/30. An earlier paper (Osberg, 1997) examined trends in the distribution of income among native borne Canadians. Over the period 1975 to 1994 immigration has had a major influence on Canadian society. [For example, Survey of Consumer Finance data indicates that between 1975 and 1994 the number of Canadians born between 1960 and 1975 increased from 6.2 to 7.1 million.] Since immigration has not been nearly as large a factor in the other countries examined here, this paper does not exclude migrants.

Britons and among the members of five birth cohorts -Golden Agers (born 1915 to 1929), Pre-Boomers (born 1930-1945), Baby-Boomers (born 1946-1959), Generation X (born 1960-1975) and Generation Y (born 1976 or later)⁶are considered. All summary statistics refer to the distribution of income among all national residents, as listed by LIS, excluding only those economic families or unattached individuals who reported a zero or negative before tax money income. In all cases, local currency figures for income have been converted to 1994 US dollars using the relevant country price deflator for consumer expenditure and the 1990 OECD PPP estimates of purchasing power parity for consumption by households.⁷

2.2 Equivalent Income

Estimates of the economic well-being of individuals within households depend heavily upon the assumptions made about the degree and pattern of economic sharing within households.⁸ As well, estimates of the total well-being of the household depend upon the equivalence scale which is used to estimate the economies of scale in household consumption.⁹ This paper uses the so-called LIS

⁶In 1973 and 1978 the German data present the age of the respondent in five year intervals which do not align exactly with cohorts as defined here. The results reported are for the ten year age interval which is unambiguously within the cohort - e.g. German “Baby Boomers” in 1973 are those Germans borne from 1948 to 1957.

⁷This paper uses the PPP for Individual Consumption by Households (ICP classification) rather than GDP PPP. The most recent available is for 1990, which is inflated using the implicit price deflator for consumption. Sources: OECD 1998 National Accounts. Main Aggregates. Volume 1. 1960-1996 (1.OECD 1.51) - price deflators; OECD 1990 Purchasing Power Parities and Real Expenditures EKS Results. Volume 1. (Table 1.5, Pages 30-31, 1.OECD 23.8 1 v.1)

⁸See Sharif and Phipps, (1994) for estimates of the impact of different sharing assumptions on the prevalence of child poverty in Canada.

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Phipps and Garner (1994:13) argue that if one uses the same methodology for estimating equivalence scales, US and Canadian results are statistically and practically indistinguishable. Burkhauser, Smeeding, and Merz (1996) emphasize the differences in incidence and patterns of poverty implied by alternative equivalence scale methodologies in official use in Germany and the US and provide

equivalence scale¹⁰ in which the number of equivalent adults in each household is calculated as $N^{0.5}$.

The LIS equivalence scale implies fairly large economies of scale in household consumption - the second person in a household counts as 0.41, the third person receives a weight of 0.32 and a 4-person household is thought of as having the same relative level of consumption needs as two unattached individuals (i.e. with the same total money income, 2 adults living separately could live as well as the 4-person family living together). This paper makes the assumption of equal sharing among all household members, and calculates the equivalent income of each household member as equal to the total money income of the household, divided by the number of equivalent adults in the household. This equivalent income is assigned to all household members, and the distribution of equivalent income across individuals is then calculated.

2.3 Summary Measures of Income Distribution

The most popular summary statistic of inequality is undoubtedly the Gini index, which is most sensitive to changes in the mid-range of the distribution. The Theil index is more sensitive to the bottom end, and also has the advantage of being additively decomposable (for further discussion see Osberg (1984) or Jenkins (1991)). As an indicator of the extremes of the income distribution, we present also the ratio between the average incomes of the top 10% of persons and the average income of the bottom 10%. The percentages of the population with equivalent income greater than 150%, and less than 50%, of the median are also reported, as these statistics have often been used as a guide to

estimates of the sensitivity of the poverty rate in the US and Germany to alternative scale elasticities. See also Buhmann et al. (1988); Coulter, Cowell, and Jenkins (1992);

¹⁰Figini (1998, p. 2) notes that “OECD and other two-parameter equivalence scales empirically used show a similarity of results [in measurement of inequality] to one parameter equivalence scales with elasticity around 0.5.”

the degree of “polarization” in living standards.

Two measures of poverty are presented - the poverty rate (percentage below half the median equivalent income) and the SST index of poverty intensity. This paper takes the view that within each country social norms of poverty may change over time, but at any point in time these norms (which Smith (1776:339) referred to as “those things which the established rules of decency have rendered necessary to the lowest rank of people”) apply to all cohorts - thus within each country the poverty line in real income terms is the same for all birth cohorts in any given year.

In international comparisons, a frequently used relativistic conception of poverty draws the poverty line at one half the median national standard of living (Hagenaars, 1986, 1991) and since this paper calculates the equivalent income of each individual in each year, it is straightforward to define the poverty line as one half the median equivalent income of all individuals¹¹ in that year and compute the poverty rate. However, although the poverty rate is undoubtedly the most commonly used measure of poverty, it does not reflect the amount by which the incomes of the poor fall below the poverty line and it ignores the degree of inequality among the poor.

Sen (1976) proposed a poverty index to address these deficiencies, but its flaws¹² prompted Shorrocks (1995) to propose a modification, which is identical to the limit of Thon’s (1979) modified Sen index as the number of observations goes to infinity - hence we refer to the SST index of poverty

¹¹It is worth stressing that because measures of aggregate inequality (such as the Gini index) are dominated by the income distribution of the non-poor (who are the vast majority of the population) defining the poverty line in this way does not necessarily imply that poverty and aggregate inequality are particularly closely related - see Osberg and Xu (1997). As well, one must caution that since there is a significant “spike” in the income distribution of senior citizens in several countries, the measurement of poverty among senior citizens is particularly sensitive to choice of poverty line.

¹²The original Sen index is not replication invariant, not continuous in individual incomes, and fails to satisfy the strong transfer axiom.

intensity. It can be calculated (see Osberg and Xu, 1997,2000; Zheng, 1997) as:

$$(1) \quad P(Y;z)=\mu(X)[1+G(X)],$$

where $\mu(X)$ and $G(X)$ are the average poverty gap ratio and Gini coefficient of poverty gap ratios,

$$(2) \quad X_i = \frac{z - Y_i}{z}, \quad i=1,2,\dots,N,$$

with the non-poor population's X_i being set to zero. As Osberg and Xu note, the Sen-Shorrocks-Thon index can be further decomposed into:

$$(3) \quad P(Y; z) = (RATE) (GAP) (1+G(X)).$$

Where *RATE* is the poverty rate, and *GAP* is the more familiar average poverty gap ratio among the poor. Since $(1+G(X))$ is in practice nearly constant over time and across countries, the SST index has the appealing property that it is roughly proportional to the expected poverty gap of a randomly selected individual (i.e. the crude probability of poverty multiplied by the expectation of the poverty gap, conditional on being poor).

2.4 Demographic Change and Trends in Equivalent Income

The quarter century leading up to 1994/95 has seen substantial changes in social institutions in developed countries, one sign of which is a shrinkage in the average size of households (In Canada, from 2.86 in 1971 to 2.51 in 1994). Even if average real money income per family were constant, the fact that a given income is shared among fewer individuals within households could be expected to

increase average effective income - and the effect is quite appreciable. Using the LIS scale, a decline from 2.86 members to 2.51 would (holding money income constant) raise equivalent income by about 6.7% - and since this average change is in fact the result of unequal changes at different points in the distribution, demographic change is likely to affect the distribution of effective income as well.

Although the average size of economic families changes rather slowly, change in the family circumstances of individuals is much more dramatic, as they progress through the life cycle. Because substantial changes in household size are associated with predictable demographic transitions (e.g. school completion), cohort comparisons based on either individual income or total household income are likely to be severely misleading. In some cohorts, the quarter century to 1994 saw particularly large changes in family size - e.g in Canada, the average family size of Golden Agers (borne before 1930) fell from 3.6 to 1.95 from 1971 to 1994. Although their average household money income fell by some 19% (after inflation), it was shared by far fewer people - the magnitude of the decline in their average family size implied that average real equivalent income rose by 70%¹³. For both the youth cohort who are leaving the parental home to set up new households and seniors (who often suffer the death of a spouse), change in family size is particularly large, and the adjustment for economies of scale in household consumption is particularly important.

¹³ see data Appendix, Tables 1a to 1e - available at <http://is.dal.ca/~osberg/home.html>.

Table 1
Inequality Across Countries
All Individuals - Equivalent Income (N^{0.5} Equivalence Scale)

	Median	Mean Income	Gini	Theil	% < 0.5 Median	% > 1.5 Median	90/10 ratio	SST Index
Canada 1971	12,083	13,286	0.315	0.168	16.0	21.0	10.13	0.103
1975	15,345	16,630	0.288	0.139	13.8	19.0	7.91	0.085
1981	16,691	18,232	0.283	0.133	12.3	19.8	7.21	0.072
1987	17,230	18,962	0.287	0.137	12.0	19.7	7.27	0.068
1991	17,389	19,267	0.284	0.137	11.4	20.1	7.04	0.063
1994	17,485	19,364	0.286	0.137	11.5	20.4	6.97	0.061
United States 1974	15,906	17,593	0.317	0.171	15.9	21.2	10.17	0.107
1979	17,092	18,640	0.303	0.151	15.9	21.4	8.96	0.102
1986	18,077	20,521	0.336	0.187	17.9	24.7	11.03	0.119
1991	17,715	20,172	0.340	0.190	17.9	24.7	11.14	0.117
1994	17,511	20,736	0.364	0.224	18.5	26.5	13.50	0.126
United Kingdom 1974	11,158	12,397	0.268	0.127	9.0	18.1	5.72	0.032
1979	11,773	12,954	0.268	0.119	9.0	19.3	5.67	0.038
1986	12,211	13,987	0.296	0.149	8.4	22.7	6.73	0.046
1991	14,175	16,805	0.338	0.210	14.5	25.0	8.70	0.064
1995	14,166	16,941	0.343	0.209	13.2	24.9	9.26	0.066
Sweden 1975	11,359	11,719	0.214	0.076	6.4	11.3	4.26	0.032
1981	11,440	11,872	0.196	0.065	5.2	10.4	3.88	0.030
1987	11,623	11,977	0.217	0.087	7.3	10.5	4.76	0.047
1992	13,508	14,295	0.228	0.091	6.5	13.1	4.99	0.045
1995	12,476	13,127	0.220	0.090	6.5	11.8	5.21	0.055
Germany 1981	13,159	14,497	0.245	0.102	5.6	16.6	4.97	0.029
1984	12,948	14,234	0.250	0.111	6.5	16.3	5.16	0.028
1989	14,417	15,849	0.248	0.114	5.6	16.3	5.29	0.035
1994	14,150	15,722	0.272	0.141	8.5	17.7	6.59	0.052
1994*	13,659	15,143	0.264	0.133	7.5	17.2	6.09	0.044

3. Trends in Five Countries

3.1 Overall Diversity

This paper will focus on the experience of different birth cohorts as they age, but Tables 1 and 2 are included in order to set the aggregate scene. The major message of Table 1 has been expressed before by others, but nevertheless deserves repeating. As Atkinson (1998:11) has said:

“There is considerable diversity of national experience with regard to the distributions of income and earnings; it is misleading to talk of a general “trend” toward increased dispersion”

Looking first at the poverty rate - i.e. the percentage of the population with incomes below half the median (Column 5) - one can find in Table 1 a trend to a decreasing poverty rate (Canada), substantially increasing poverty rate (USA and UK), somewhat increasing poverty rate (Germany) and stable poverty rate (Sweden). However, as already noted, the poverty rate is not a particularly good index of poverty. The SST index (Column 9) builds into the measurement of poverty a consideration of the average poverty gap ratio (and the inequality of poverty gaps), and the picture it paints is a bit more complex. Measured by the SST index, Canada still has a substantial decline in poverty, albeit from a relatively high initial level. The USA has both a high initial level, and a substantial increase, in poverty intensity while the UK has an even larger increase in poverty intensity, but started from a lower initial base and therefore ends up at a level comparable to Canada's. In both the USA and the UK, the trend to greater poverty intensity is steady from the early 1980s on and comes from both an increased rate and an increased average poverty gap. On the other hand, although Sweden had a fairly steady poverty rate for the period as a whole, it had an overall increase in poverty intensity, because the average poverty gap widened.

The overall picture for polarization is just as nationally nuanced. In Canada, Sweden and Germany, the percentage of people above 150% of the median income was nearly constant. Hence, if “polarization” is measured by the total percentage of the population with a standard of living outside the band 0.5 to 1.5 the median income, all the change in polarization in those countries was due to the changing percentage below half the median income - i.e. the changes in the poverty rate (which moved down in Canada, slightly up in Germany and remained flat in Sweden). In the USA and UK, on the other hand, substantial increases were observed in both the fraction of the population below half the median income and above 150 percent of the median - so polarization increased at both ends of the income distribution, and increased substantially.

Inequality, as measured by either the Gini or Theil indices, also obeyed no consistent trend across countries after 1980. The Canadian data are marked by an initial decline in inequality in the early 1970s which continued slightly in the late 1970s, but the 1981 to 1994 data for Canada is essentially flat. Inequality in the USA and UK also fell from 1974 to 1979, but both countries show a strong trend to greater inequality from 1979 to 1994/95. In Sweden, inequality fell from 1975 to 1981 before rising through 1992 and falling slightly in 1995. German data from 1981 to 1994 (if one looks only at the former West German states) show an upward trend in inequality. The only consistent part of the story is the decline in inequality observed in all five countries in the 1970s - after which a variety of trends are to be observed.

3.2 Inequality Within and Between Generations

In the popular press, one often hears reference to differences between the “typical” outcomes of different generations and some economists (e.g. Kotlikoff, 1992) have emphasized the idea of “generational accounting” and the study of intergenerational differences¹⁴. Since this paper will discuss differences in the experiences of different birth cohorts, there may be a tendency to overemphasize the relative importance of differences between generations in average incomes, compared to the differences in individual incomes within generations. Table 2 is intended as an antidote to any such tendencies. It uses the additive decomposition property of the Theil index of inequality¹⁵ to present the percentage of aggregate inequality (Column 4 of Table 1) that can be explained as arising from intra-cohort inequality. The remainder of aggregate inequality (i.e. less than 11% for all five countries) can be ascribed to the differences between generations in average incomes, but the point of Table 2 is to emphasize that it is differences among individuals of approximately the same age that dominates the extent of inequality in all countries.

3.3 The Differing Experiences of Different Deciles

Table 3 presents the average income, in 1994 US dollars, of individuals in each decile of the distribution of equivalent income. One must remember that incomes may have changed in the

¹⁴My own opinion is that this literature is fundamentally misleading - see Osberg (1998).

¹⁵The Theil index can be decomposed [where R_g =the cohort Theil index and R =the Theil index for all individuals, n_g =number in cohort g , n =Total .population, Y_g =average income of g th cohort, Y =average income of all persons] as: $R = \sum_g ((n_g Y_g)/(nY)) * R_g + (1/n) \sum_g (n_g (Y_g/Y) \log(Y_g/Y))$
Each cell entry in Table 2 is the ratio of the first left hand side term (i.e. the weighted average of within group inequality) to total inequality.

Table 2 Inequality in Equivalent Income - Percentage of Total Inequality arising from within cohort differences in income using the Theil Index				
	1995	1994	1981	1979
Canada	--	96.3	91.9	--
United States	--	93.9	--	90.1
United Kingdom	94.9	--	--	89.0
Sweden	91.6	--	93.8	--
Germany	--	96.5	90.7	--

Note: each cell entry = $(\sum_g((n_g Y_g)/(nY)) * R_g) / R$
 where R_g =the cohort Theil index and R =the Theil index for all individuals, n_g =number in cohort
 g, n =Total .population, Y_g =average income of g th cohort, Y =average income of all persons

Table 3 Average Equivalent After Tax Income for All Individuals in 1994 US \$ by Decile ($N^{0.5}$ Equivalence scale)										
	Decile									
	1	2	3	4	5	6	7	8	9	10
Canada 94	6003	9720	12,074	14,232	16,417	18,608	21,231	24,450	29,065	41,846
USA 94	3972	7725	10,512	13,201	16,019	19,144	22,675	27,047	33,457	53,610
UK 95	4731	7374	8976	10,876	13,000	15,318	18,002	21,216	26,065	43,826
Sweden 95	4736	8518	9955	11,014	11,961	12,993	14,086	15,548	17,778	24,665
Germany 94	5225	8693	10,419	11,914	13,398	14,949	16,689	19,069	22,394	34,420

1994 to 1999 period and caution that money income is a less than perfect measure of the economic well-being of persons in different countries (see Section 4). In particular, Table 3 captures only the money income of households, and ignores the time which households devote to earning that income. The five countries examined here differ dramatically in the annual number of work hours per adult aged 15 to 64 - in 1994, the US had the highest average hours (1,384.6), followed by Canada

(1,187.3), the UK (1,182.8), Sweden (1173.1) and Germany (992.3)¹⁶. Furthermore, trends over time have differed substantially - between 1980 and 1994 annual working hours per adult rose by 159.8 hours in the US, and 25.9 hours in Sweden, but fell by 162.4 hours in Germany, 31.3 hours in Canada and 70.1 hours in the UK. As well, both the “social wage” of public services that individuals receive from government and the value of implicit income from home ownership and the services of consumer durables owned by households are not captured in Table 3.

Nevertheless, Table 3 is interesting, because in some instances its implications are likely to be accentuated, not reduced, by the omissions noted above. In money income terms, Americans in the bottom decile of the income distribution are absolutely worse off than those in the bottom decile in any of the other four countries, while the top decile is significantly better off than anywhere else. Although the top decile of UK residents is second only to the top US decile in average income, the bottom forty per cent of the UK have less income than the bottom two quintiles anywhere else. However, Canadians in the bottom half of the income distribution have a higher income than comparable people anywhere else.

But do international comparisons of absolute levels of income matter much ? Although the top decile of the income distribution may travel internationally with sufficient frequency to make comparisons of standards of living, and perhaps become envious of life styles elsewhere, most people have little direct observation of the income available to their counterparts in other countries. This is not to underestimate the importance, in political economy, of invidious comparisons among the

¹⁶See Osberg and Sharpe (2000, Table 104-A). Kilfoil (1999) compares married couples in 1991 in Canada, the US, Australia, Finland and Holland and notes that Americans work substantially more at all points in the family earnings distribution. Standardizing for hours worked, pre tax household earnings (in PPP US dollars) are remarkably similar for all except the top quintile.

affluent. However, for most of the income distribution, the relevant issue is whether actual income lives up to expectations, and the relevant comparison of current incomes is to actual experience in the past (which likely dominates expectations for the future). For this reason, Table 4 presents the change over time in the average income of decile groups in the distribution of equivalent income.

Comparing the experience of birth cohorts across different years in LIS data is not a substitute for actual panel data. The sample of people borne 1946 to 1959 who responded to the Canadian Survey of Consumer Finance in 1981 are not, for example, the same people as the respondents in the survey of 1994 who were borne 1946 to 1959. However, both samples are drawn from the same population of individuals (subject to the attrition of mortality and the impact of net migration), and both samples can be used to estimate characteristics of the distribution of income of that population. In the discussion which follows, the income of deciles of the income distribution will be compared over time. To the extent that individuals change their rank in the income distribution, these deciles of the income distribution will consist of different persons, but if one wants to assess trends in inequality, the issue is whether income mobility within cohorts has increased or decreased over time.

Table 4						
Annual Percentage Change in Mean Equivalent Income by Decile						
Decile	Canada 81/94	US 79/94	UK 79/95	Sweden 81/95	Germany 81/94	
All	0.97	-0.77	-0.01	-0.64	-0.88	
2	0.59	-0.44	0.58	0.60	0.15	
3	0.34	-0.37	0.53	0.72	0.39	
4	0.30	-0.24	0.77	0.71	0.50	
5	0.38	0.00	1.09	0.64	0.59	
6	0.37	0.30	1.39	0.63	0.54	
7	0.41	0.51	1.67	0.56	0.50	
8	0.43	0.76	1.87	0.64	0.64	
9	0.44	1.06	2.27	0.73	0.78	
10	0.68	2.21	3.95	1.58	1.34	
Gen. X	1.96	-0.27	-0.28	0.02	-2.03	
2	1.25	0.34	0.09	0.02	-0.27	
3	1.11	0.50	0.69	0.08	0.52	
4	1.17	0.47	1.35	0.16	0.85	
5	1.43	0.60	1.79	0.22	1.20	
6	1.63	0.92	2.24	0.31	1.45	
7	1.84	1.27	2.64	0.35	1.60	
8	1.91	1.59	3.06	0.39	1.83	
9	1.96	1.95	3.48	0.37	1.68	
10	1.93	3.17	5.21	0.69	1.06	
Boomers	1.33	0.14	-0.11	0.93	0.13	
2	0.95	0.59	0.47	0.91	0.73	
3	0.93	0.88	1.18	0.93	1.02	
4	1.02	1.16	1.70	1.06	1.21	
5	1.03	1.44	1.90	1.09	1.25	
6	1.10	1.66	2.06	1.04	1.10	
7	1.14	1.78	2.09	1.12	1.00	
8	1.21	1.98	2.28	1.27	1.12	
9	1.23	2.32	2.72	1.41	1.76	
10	1.68	3.61	4.78	2.37	2.62	
Pre-Boomers	1	-0.98	-0.99	0.09	1.57	-1.16
2	-0.86	-0.35	0.09	1.15	-0.17	
3	-0.42	0.02	0.27	0.99	0.41	
4	-0.05	0.39	0.50	1.03	0.74	
5	0.11	0.75	0.91	1.04	0.72	
6	0.26	1.08	1.17	1.13	0.74	
7	0.27	1.43	1.39	1.26	1.05	
8	0.40	1.79	1.60	1.22	1.16	
9	0.59	2.27	2.05	1.35	1.66	
10	0.98	3.90	4.00	2.57	3.26	
Golden Agers	1	4.13	0.57	1.16	0.86	0.35
2	0.71	-1.12	0.00	-0.24	-0.02	
3	-0.67	-1.52	-0.65	-0.36	-0.06	
4	-1.35	-1.56	-1.05	-0.51	-0.22	
5	-1.73	-1.55	-1.22	-0.74	-0.66	
6	-1.79	-1.49	-1.22	-0.90	-0.78	
7	-1.78	-1.32	-1.16	-0.97	-0.79	
8	-1.66	-1.12	-0.90	-1.04	-0.68	
9	-1.50	-0.68	-0.52	-0.92	-0.38	
10	-0.83	1.02	0.77	0.26	-0.43	

In the US, Mishel et al conclude that: “the rate of mobility appears to have declined since the late 1960s” (1999:89). Dickens’ conclusion for the UK is similar: “earnings mobility has fallen since the late 1970s” (1999:223). On the other hand, Baker (1998) uses income tax data to conclude that the year to year instability of income in Canada has risen over the period 1975 to 1993. Since trends in the average income of income deciles represent shifts in the pattern of ultimate economic rewards across individuals *given* the degree of individual mobility from year to year, and since there is some evidence of *decreased* mobility in the two countries that have demonstrated the greatest increase in income inequality, these trends in inequality of outcomes may understate tendencies to greater inequality of opportunity.

Table 4 summarizes the different long term experience of deciles of the income distribution. It presents the average annual percentage change in the mean equivalent income of each decile of the income distribution, over the period 1980 to 1995 (approximately) when the trend to greater equality of the 1970s may have been reversed. Since the data sets contained in LIS in fact have dates that do not align exactly, the overall change in income has been annualized, as an arithmetic average of total percentage change. This procedure has the advantage that each country can be directly compared but the disadvantage of not fully conveying the cumulative impact of differential rates of growth of income. Over the sixteen year period 1979 to 1995 the incomes of the top decile of UK baby boomers grew by 76.5%, and the top decile of UK Generation X enjoyed an 83.3% increase in average income. Gains at the top of the US income distribution were large (at 54.1% for boomers and 47.6% for Xers), but not nearly as large - and no other country comes close to matching the cumulative gains of the top decile of the US and UK.

Over the period 1980 to 1995, the cohort borne between 1914 and 1929 aged from being 51 to 66 to being 66 to 81. Although most “Golden Agers” were in the paid labour force in 1980, almost all had retired by 1995. As earnings were replaced by pensions, the money incomes of most deciles of the income distribution in all countries fell. However, the structure of the income support system for the elderly matters a lot. In some countries (especially Canada) the presence of a floor to old age security benefits which is higher than social assistance for the non-elderly has meant that the poorest decile are actually better off in their retirement years than in their working years¹⁷.

Countries differ in the extent to which the old age security system emphasizes earnings related pensions over flat rate, needs based benefits. In the USA, there are broadly similar declines in the income of all but the poorest and richest deciles, as the Social Security system replicates for the pensions of the retired much of the inequality in earnings which they experienced as workers. This tendency is less marked in other countries. In both Canada and the UK the bottom quintile was better off in retirement than during their working years. Despite much media comment in the US on the affluence of the elderly, it is notable that the decline in income of the cohort moving into retirement is significantly larger in the USA than it is for most other countries.

The difference between the experience of cohorts as they enter retirement and as they progress through their working years is worth emphasizing because it can shape over all perceptions of income trends. The top panel of Table 4 indicates that among all Americans, the bottom half of the income

¹⁷In Canadian data, there is a distinct “spike” in the income distribution of the elderly, which is due to the fact that many of the elderly have no entitlement to employer pensions and are entirely dependent on the same transfer programmes, with the same benefit entitlement rules. The size of this “spike” in the income distribution data depends on the structure of the old age security system - e.g it is even more pronounced in Australian data, because of the flat rate structure of Australian pension benefits for the elderly.

distribution was better off, in real equivalent money income, in 1979 than in 1994. Over all, the average income of Americans rose by 11.2%, but all the gains in income of this 15 year period (and then some) were concentrated in the top half of the income distribution. Cumulatively, over this fifteen year period the bottom decile had an income drop of 11.62% but the top quintile averaged a 24.6% increase and the top decile had an income gain of 33.2%.

Why have such trends not produced a groundswell of political discontent in the USA? One possible reason may be the fact that declines in average income are not generally found in the lived experience of birth cohorts. As the bottom panels of Table 4 indicate, most deciles of each cohort of Americans experienced some increase in equivalent income over this period. The poorest decile of “Generation X” had a small (cumulatively equal to 4.1%) decline in real income, as did the poorest quintile of “Pre-Boomers”, (which may be due to labour market entry among the former and early retirement among the latter) but in no other case is an actual decline in income observed. Hence, although Americans may be disappointed with their average rate of income increase, within each cohort’s working life the distribution of income has in general been moving up slightly in real terms.

However, have people in each birth cohort been able to attain the real income that the previous generation enjoyed at a comparable age ? Although Table 4 presents the cumulative percentage gains or losses of each decile, it does not enable one to compare the absolute income of cohorts, or the evolution over time of their income. For this, we turn to graphical methods. Figures 2a to 2e follow the fortunes of the poorest quintile of each country as cohorts have aged over the quarter century leading up to 1994/95 and Figures 3a to 3e presents comparable data for the top ten per cent. In each case, average incomes have been converted to 1994 US dollars using the OECD Purchasing Power Parity ratios for consumer expenditure. “Age” is calculated as the mid point of each cohort’s ages, at

each point of observation.

One way of using these figures is to answer the question: “Have the poorest and richest of each generation experienced, in their own lives, an increasing or decreasing absolute standard of living?” During this twenty five year period, the birth cohorts overlap for about ten years, so a second way of looking at the data is to answer the question: “Am I better off, or worse off, than people like me were at the same age, in the previous generation?” The answer to both questions is likely to be important for perceptions of whether capitalism is delivering “progress” in living standards.

3.4 Real Income Trends for the Bottom Twenty Per Cent

For Canada, Figure 2a indicates that the poorest quintile of Canadians in each cohort are generally better off over time (with the sole exception of the pre-boomer cohort in their late forties), and significantly better off than the previous cohort at the same age. Figure 2d indicates that the same is true, with the exception of the 1960-1975 cohort, in Sweden.

Figures 2b and 2c illustrate the fact that the same story of economic progress is not true for the poorest twenty per cent of Americans and Britons. Whatever benefits twenty five years of growth have brought to the affluent of the US and UK, the bottom part of the income distribution has not shared in that growth. With one exception, each cohort of the poor has received a lower income than the previous cohort at the same age, and has ended the period with essentially the same, or a lower, real income than when it started. The one exception is the bottom quintile of baby boomers in the US, who experienced some increase in average equivalent income as they aged (although still ending with less real income than the earlier cohort at the same age).

3.5 Real Income Trends for the Top Ten Per Cent

As Figure 3a illustrates, the incomes of the top ten percent of each Canadian cohort have risen over time, and relative to the income of earlier cohorts at the same age. The 1914-1929 cohort experienced a drop in their income with retirement and the income profile of the 1930-1945 cohort is one of the few age/income profiles to have the nice quadratic shape so beloved in labour economics texts. However, if affluent Canadians looked only to their own history, or that of the previous generation, they would have grounds for quiet satisfaction.

However, affluent Canadians have only to look south of the border to find grounds for envy. The top decile of each cohort of Americans (Figure 3b) has done very much better than their counterparts in Canada - both relative to their initial incomes and relative to earlier cohorts. And envy only intensifies if affluent Canadians should compare themselves to the top decile of Britons (Figure 3c), whose income increase has been truly spectacular. To the extent that Canadian elites live in the cultural periphery of the US and the UK, one may expect to see greater elite dissatisfaction in Canada than their own actual experiences might warrant - while American and British elites have no grounds for dissatisfaction at all.

As Figure 3d indicates, the average money incomes of the top decile of Swedes shows even less increase over time than the Canadian data, either over the life course of particular cohorts or compared to the earlier cohort¹⁸. All cohorts have experienced a real income decline in the 1990s. One wonders whether such trends will produce political discontent, and of what variety.

¹⁸Note, however, that because tuition is free and living costs are supported, Swedish income differentials for the university educated are still sufficient to make investment in higher education privately profitable.

4. Caveats and Conclusions

4.1 Money Income < Economic Well-Being

Although the calculation of equivalent income represents an important improvement over average money income per household, or the distribution of per capita income, the average equivalent income of each household member is not a full measure of economic well-being. This paper has ignored inequalities within the family and has taken household size as exogenous to trends in equivalent income. The household size adjustment used here takes no account of age. Nor is there any recognition of any possible disutility of continuing to depend on parental income - to the extent that adult children in the 1990's are forced by economic circumstance to stay at, or return to, the parental home, this paper will over-estimate the well being of Generation X¹⁹. As well, to the extent that youth are delaying family formation, or reducing their child bearing, because of economic insecurity, this paper's calculation of equivalent income will overstate their economic well being.

As well, the calculation of equivalent income is based on the LIS definition of measured money income, which ignores the economic well-being entailed by the ownership of wealth, or the receipt of in-kind income. In the comparison of birth cohorts, a particularly important issue is the imputed rent and capital gains arising from home ownership. For example, the cohort of Canadians who were fortunate enough to purchase their homes during the era of low real interest rates and low housing prices (i.e., pre-1975) benefited significantly from capital gains in housing equity during the late 1970's and early 1980's. However, the stagnation of real housing prices in Canada since the early 1980's has

¹⁹Comparisons between Sweden and other countries for the youth cohort are also bedevilled by the fact that Swedish statistics, unlike those of other LIS countries, assume that persons over 18 are independent households, even if co-resident with their parents.

meant that younger cohorts have not received comparable capital gains²⁰. As well, older cohorts who have retired their mortgage debt benefit annually from a stream of housing services, while most of the members of the younger cohorts are either paying rents or mortgages.

The calculation of household money income also ignores the opportunity cost of the time supplied by households to the paid labour market in order to earn income. There are significant differences across countries in the level and trend of working hours over this period. As well, the period 1975 to 1994 has seen a substantial increase in economic insecurity, which is greatest among youth (see Osberg et al, 1998). The combination of higher unemployment, decreased private sector guarantees of job security and decreased income protection from unemployment insurance has meant that, as the OECD has noted, “A widespread and, in some countries, very sharp increase in the number of individuals perceiving employment insecurity took place between the 1980s and the 1990s.” (1997:129)^{21, 22}

Implicit income from home ownership, changing patterns of work hours and the greater economic insecurity of a labour market environment of higher unemployment and decreased social protections - all three issues represent important aspects of economic well being which are unmeasured in this paper’s calculation of trends in the distribution of equivalent income and which

²⁰Part of capital gains will presumably be spent on current consumption and part will pass by inheritance to subsequent generations. Evaluation of the impact on measured intergenerational inequality of the omission of capital gains must therefore consider the mediating role of intergenerational transfers within families.

²¹See Chapter 5 OECD Employment Outlook July 1997 for an overview of subjective polling data and trends in layoffs and job tenure in OECD nations. Osberg (1998b) discusses difficulties in the measurement of trends in economic insecurity.

²²See Osberg, Erksoy and Phipps (1998a, 1998b) for a model of the change in certainty equivalent income associated with greater income risk due to higher unemployment and decreased unemployment insurance coverage.

likely impinge differentially on the experience of different birth cohorts.

In international comparisons, one must also add the “social wage” of public services. Smeeding et al (1993:229) conclude that “noncash income reinforces the redistributive impact of conventional (cash) tax-transfer mechanisms rather than acting to offset them in any major way”, so the qualitative conclusions of this paper on inequality differences across countries are unlikely to be reversed. However, this paper’s omission of the social wage means that comparisons of the absolute level of money income between, for example, countries such as the US and Sweden are a misleading indicator of absolute levels of economic well-being.

Finally, one must note that although this paper uses the most recent internationally comparable LIS data available²³, it does stop at 1994/95. Since then, there has been change. For example, the USA has enjoyed a continued period of low unemployment, which is beginning to have positive impacts on the earnings of the low paid, while Canada has made major cuts to many of the transfer programmes for working age adults that have mitigated poverty in the past.

4.2 Choices to Make

In the large literature on economic inequality that now exists, it is depressingly common to observe such statements as: “what holds true for earnings holds true for income as well” (Higgins and Williamson,1999:6). Based on such an assertion, the author’s next step is usually to construct a highly simplified model of the labour market and argue that a general trend to greater inequality is due to one (or perhaps two) major inexorable causes - such as cohort size (Higgins and Williamson,1999), or “skill” biased technological change or globalization of trade. If such causal factors are arguably

²³LIS data includes 1997 data for the USA, but for no other country.

difficult to affect by public policy, one may find the author urging the TINA - There Is No Alternative - position.

However, market forces always operate within an institutional context, and changes in such institutions as minimum wages and unionization have been responsible for a significant fraction of the rise in inequality of hourly wages observed in the US (DiNardo, Fortin and Lemieux, 1996).

Furthermore, even if changing market forces are driving part of the changes in the “price” of labour, it is the hourly wages of individuals which are affected, and it is a long way from there to the distribution of annual equivalent income.

At any point in time, countries make choices about the institutional context of the labour market and also about the macro economic demand management policies that help determine how many people are working, and for how many hours per year. There is substantial evidence that individuals cannot necessarily get all the hours of work they desire at the going wage, and that demand side constraints are particularly important for the lower paid (see Osberg and Phipps, 1993). Trends in the inequality of hourly wages therefore have to be combined with trends in the determinants of annual hours, before the inequality of individual earnings can be derived. Combined with individual preferences, public choices on macro economic policy heavily influence the distinction between inequality of wages and inequality of earnings. Over time, countries also make choices about their public investments in the education and training of each generation of workers which affect the structure of supply of human capital and the industrial policy which influences the structure of the demand side. Given the variety of public policy choices which affect individual labour market outcomes, it is not surprising that countries differ in the trends observed in inequality of individual

earnings²⁴.

Household income depends on household composition (i.e. on the processes determining formation, dissolution and size of households), on the total market income of all household members from capital (which is influenced by inheritance patterns and taxation) as well as from labour, on the transfer incomes for which household members are eligible and on the household's treatment by the tax system. Trends in the inequality of household income depend on changes in all these variables, some of which are heavily influenced by the public policies of governments, but some of which depend more on shifts in culture and society (both of which vary by country). National differences in culture and politics, and the vagaries of the evolution of such differences, thus have many channels of influence - and no segment of the income distribution is insulated from the impact of political decisions and public policy.

It is not, therefore, really surprising to find a diversity of national experiences - as Brandolini (1998:38) puts it: "Neatly defined and unambiguous trends are unlikely to result from this multiplicity of factors." This paper has found a diversity of trends, both in aggregate and in the experience of particular birth cohorts, and there is every reason to expect that diversity to continue.

However, one lesson from the data is how quickly the income distribution can change. Although the prevailing wisdom in the early 1970s was that studying the income distribution was "like watching grass grow", because change was so slow, the period since 1980 has seen real differences emerge. There has been a substantial increase in inequality and polarization in the USA and UK in a fifteen year period. In the early 1970s, Canada and the USA were very similar in income distribution,

²⁴For example. in the USA, a widening of the university/high school earnings differential has been observed, but the same is not true of Canada - see Bar-Or et al(1995)

and both were high inequality countries compared to the UK. By 1994/95, Canada and the USA were clearly different from each other and the UK had emerged as a relatively high inequality, high poverty country by European standards. Changes in Germany and Sweden were much more muted.

It should not be particularly surprising that the position of the poor can change quickly. Precisely because they have little to begin with and relatively small real transfers can make a big percentage difference, the poor can benefit a lot (or lose a lot) from policy changes that make relatively little difference to the more affluent.

For example, the top decile in the UK experienced a \$16,961 *increase* in real equivalent income from 1979 to 1995, which was more than twice the *total* average income of the bottom twenty percent (\$6053 in 1995). The comparable change for the top decile in the USA from 1979 to 1994 was +\$13,362 per person (on a base of \$40,248), an increase which was also more than twice the average level of income of the bottom twenty per cent (who in fact averaged a decline of \$668 for each person in the bottom quintile from 1979 to 1994, ending up with an average income of \$5,849.)

Table 5 presents the results of a thought experiment. Suppose that the tax transfer system in the USA and UK had been marginally more redistributive and ten percent of the gains of the top decile had been transferred to the bottom decile in those countries. What difference would this transfer have made to poverty? Had the already affluent shared only 10% *of their gains* (i.e. about 3% of total income) through the tax/transfer system, the poverty rate in the UK would have dropped from 13.2% to 8.1% and the intensity of poverty, as measured by the SST index, would have more than halved. By any measure, poverty in Britain would have fallen dramatically from its actual 1995 levels, to levels well below those of 1979. Since the income gains of the affluent were not quite as

Table 5			
Hypothetical Transfer of One Tenth of Top Decile's Income Gain to Bottom Decile			
	Poverty Rate (%)	Average Relative Poverty Gap	SST Index
UK*			
Actual 1979	9.0	0.218	0.038
Actual 1995	13.2	0.259	0.066
Hypothetical 1995	8.1	0.186	0.030
US**			
Actual 1979	15.9	0.335	0.102
Actual 1994	18.5	0.360	0.126
Hypothetical 1994	18.5	0.278	0.097
* UK 1979-1995 Average equivalent income of top decile increased from \$26,865 to \$43,826 (1994 US \$) - transfer to bottom decile of \$1696 per capita simulated.			
** US 1979-1994 Average equivalent income of top decile increased from \$40,248 to \$53,610 (1994 US \$) - transfer to bottom decile of \$1336 per capita simulated.			

dramatic in the USA as in the UK, and because the USA starts from a much higher level of poverty, a similar transfer would not be enough to push the poorest ten per cent of Americans over the poverty line - but the depth of their poverty would be cut by about a quarter and the intensity of poverty, as measured by the SST index, would be somewhat less than in 1979.

The point of this example is not political realism - rather it is to stress the sensitivity of poverty outcomes to shifts in income that are rather small fractions of the recent income gains of upper income

groups. In Table 5, only ten per cent of the income gains of the top 10% are being redistributed - none of their previous income, and none of the income of the bottom 90%, is being touched. A relatively small change in the tax/transfer system could have entirely forestalled the increase in poverty intensity that actually occurred in these countries. Implicitly, therefore, Table 5 reinforces the potential importance of the politics of income distribution - over and above any influences of labour market changes.

If one thinks about potential discontent with the distribution of income, the issue for the USA and UK is whether or not pressure will arise for the fruits of growth to be shared. The evidence is fairly clear in these countries that the bottom deciles of each cohort are not seeing much sign of economic progress, either over their own lives, or compared to the earlier generation at a similar point in their lives. However, although the political pressure for change may come from the bottom in the USA and UK, in Canada and Sweden the more likely locus for political discontent is the top of the distribution. The “demonstration effect” of the USA and the UK has shown how the fruits of growth can be appropriated by the already affluent - and the envious rich in Canada and Sweden may desire to emulate this model. Time will tell whether the political process responds with more alacrity to pressure from the top, or from the bottom, of the income distribution.

Figure 2a
Mean Equivalent After-Tax Income
Bottom Quintile
Canada

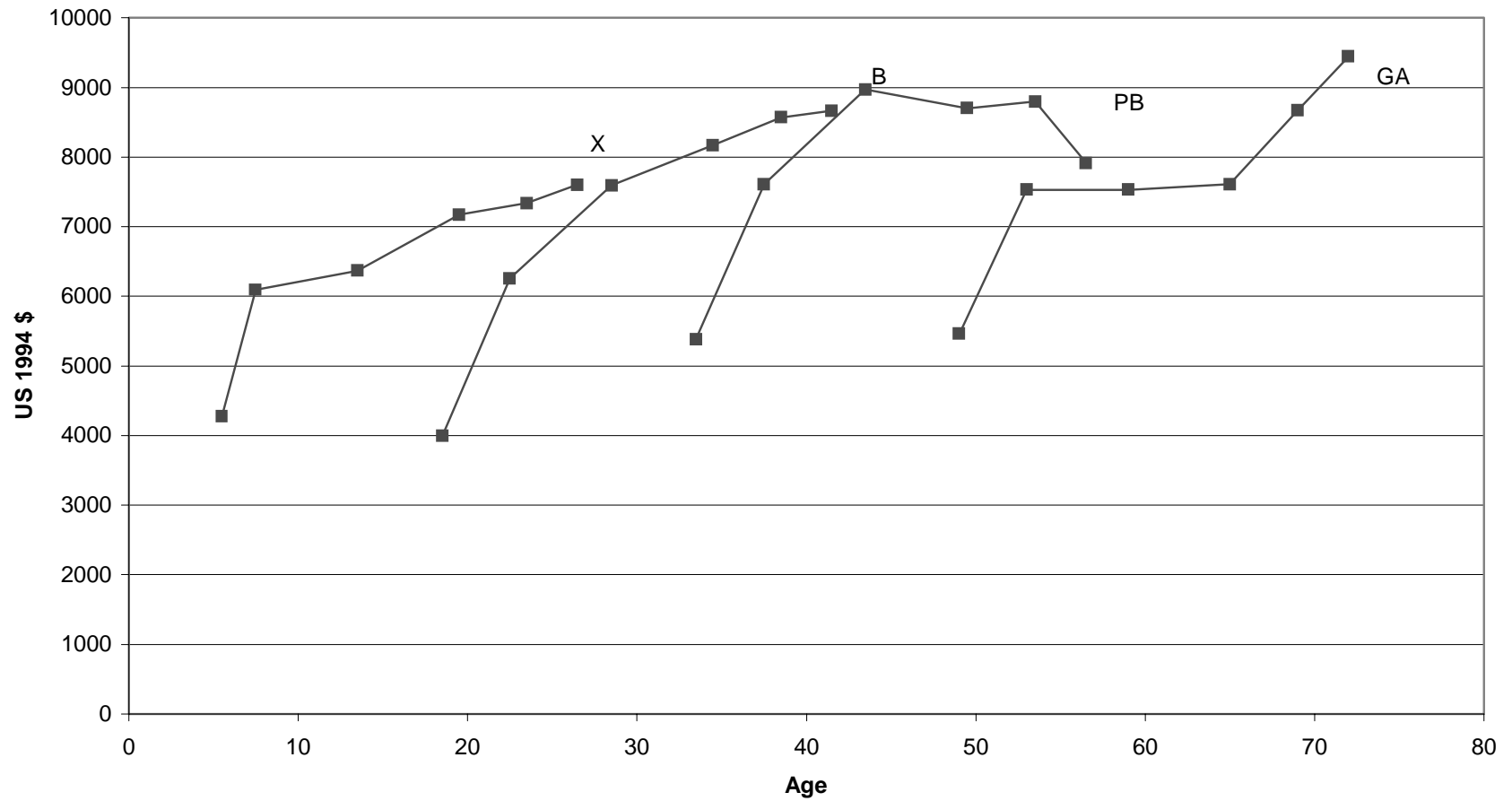


Figure 2b
Mean Equivalent After-Tax Income
Bottom Quintile
United States

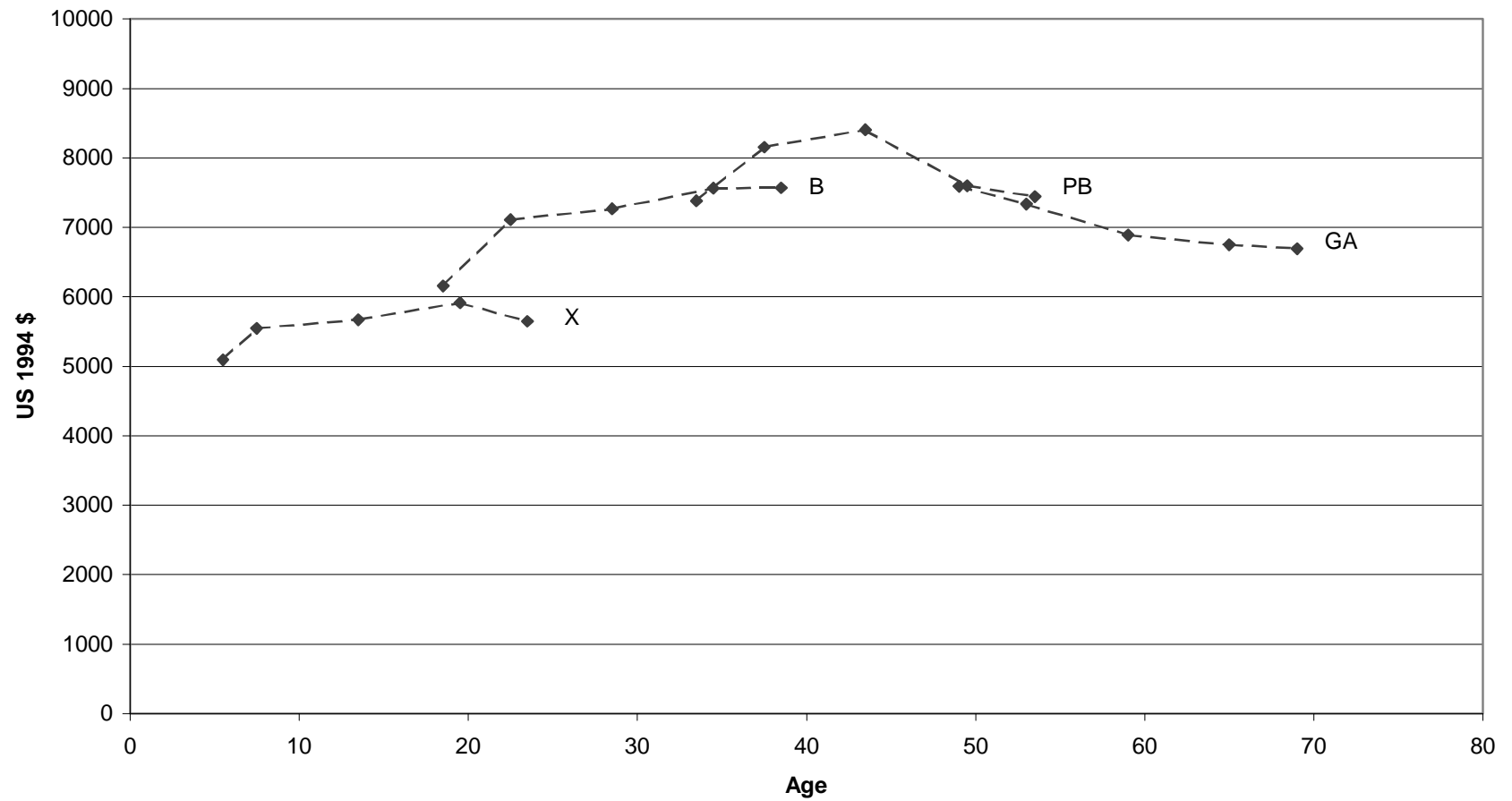


Figure 2c
Mean Equivalent After-Tax Income
Bottom Quintile
United Kingdom

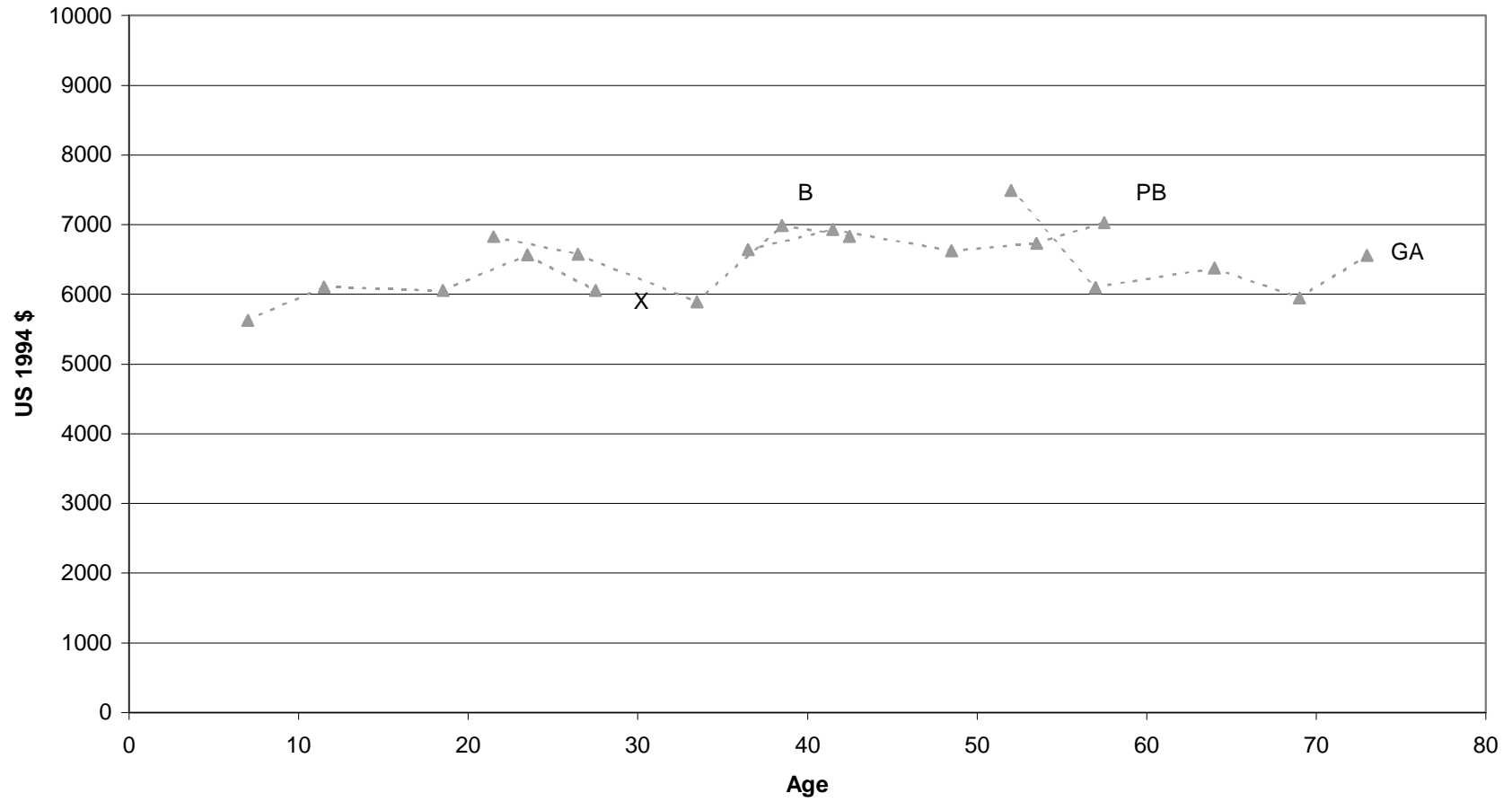


Figure 2d
Mean Equivalent After-Tax Income
Bottom Quintile
Sweden

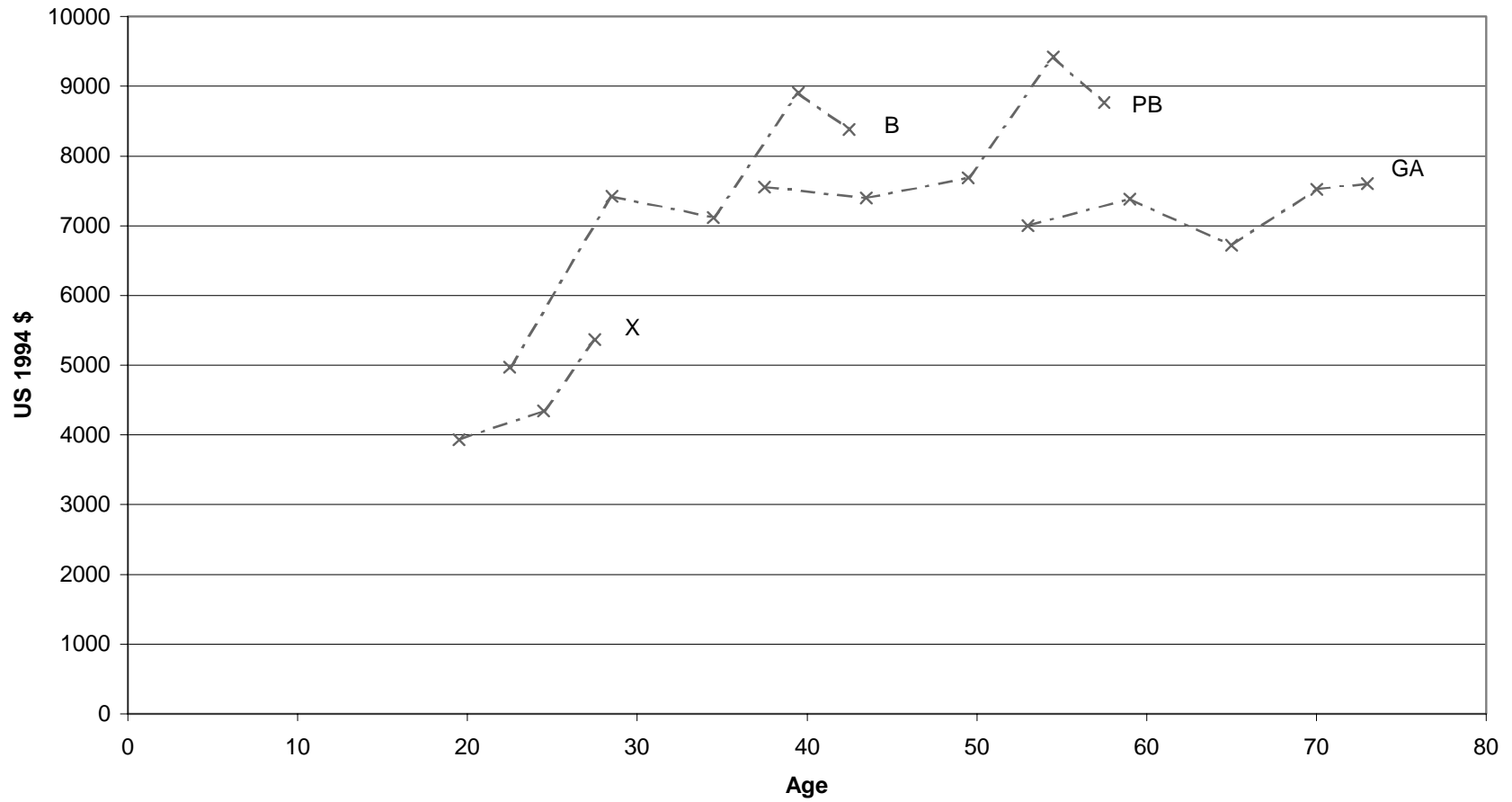


Figure 2e
Mean Equivalent After-Tax Income
Bottom Quintile
Germany

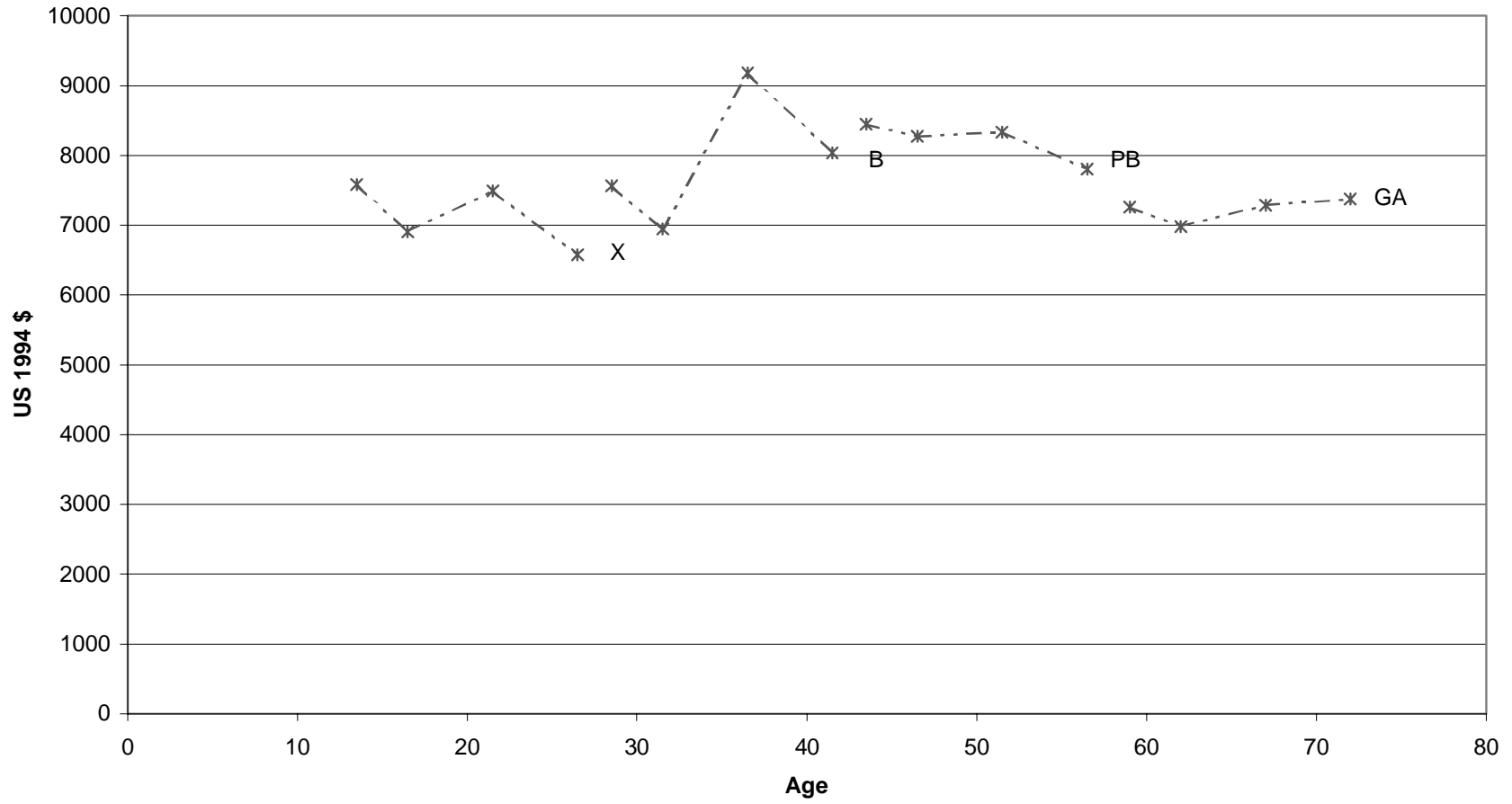


Figure 3a
Mean Equivalent After-Tax Income
Top Decile
Canada

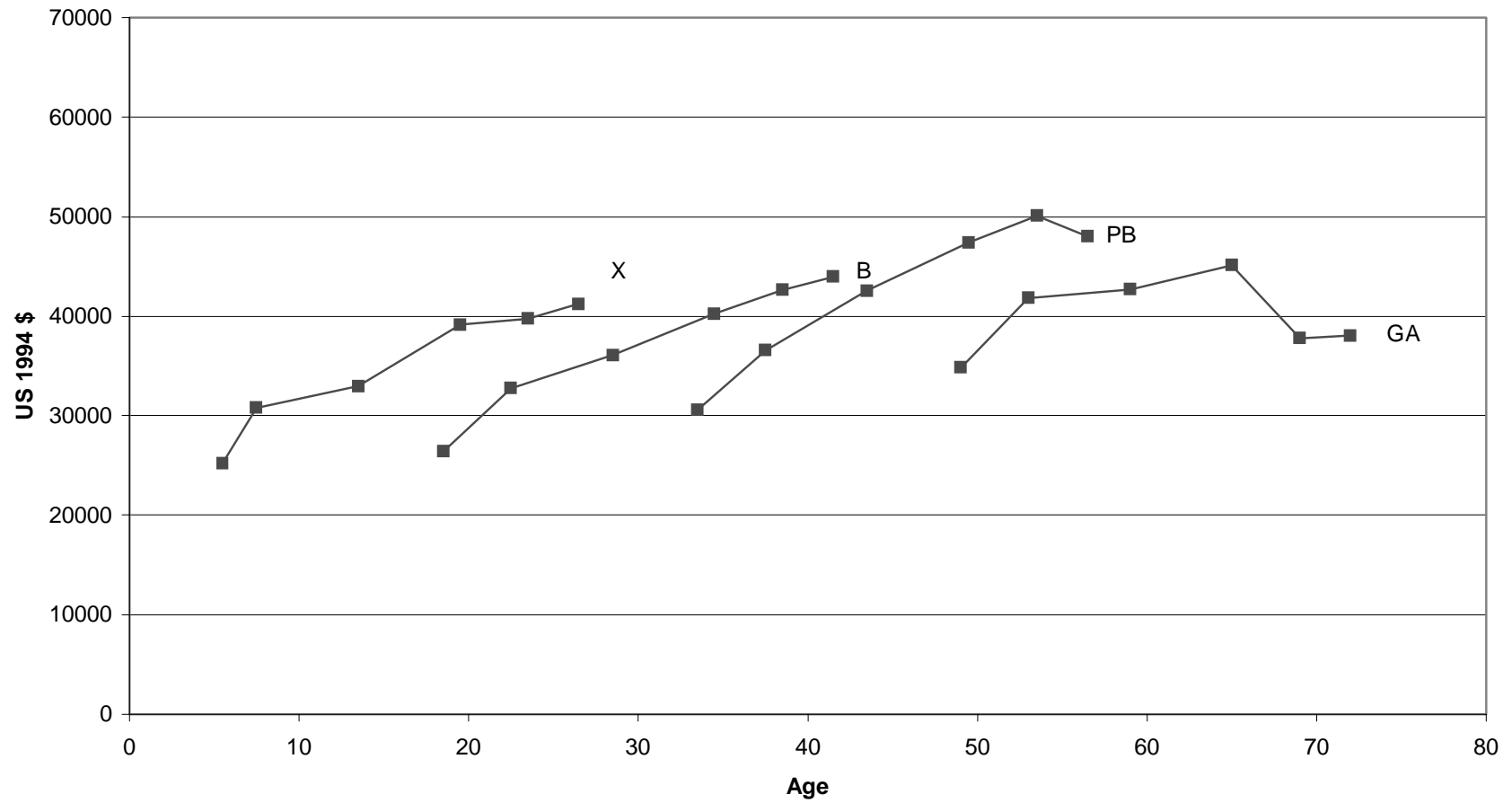


Figure 3b
Mean Equivalent After-Tax Income
Top Decile
United States

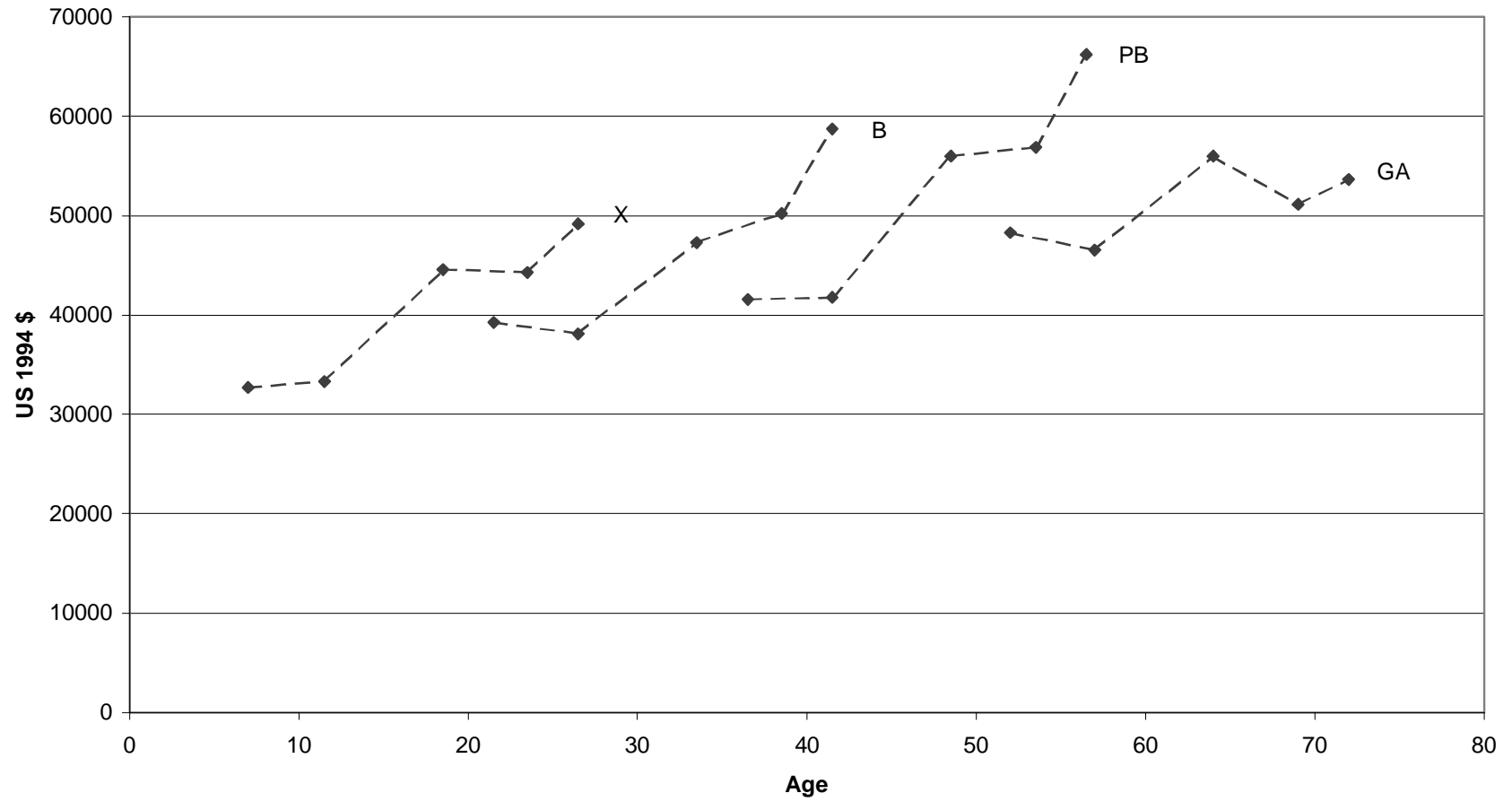


Figure 3c
Mean Equivalent After-Tax Income
Top Decile
United Kingdom

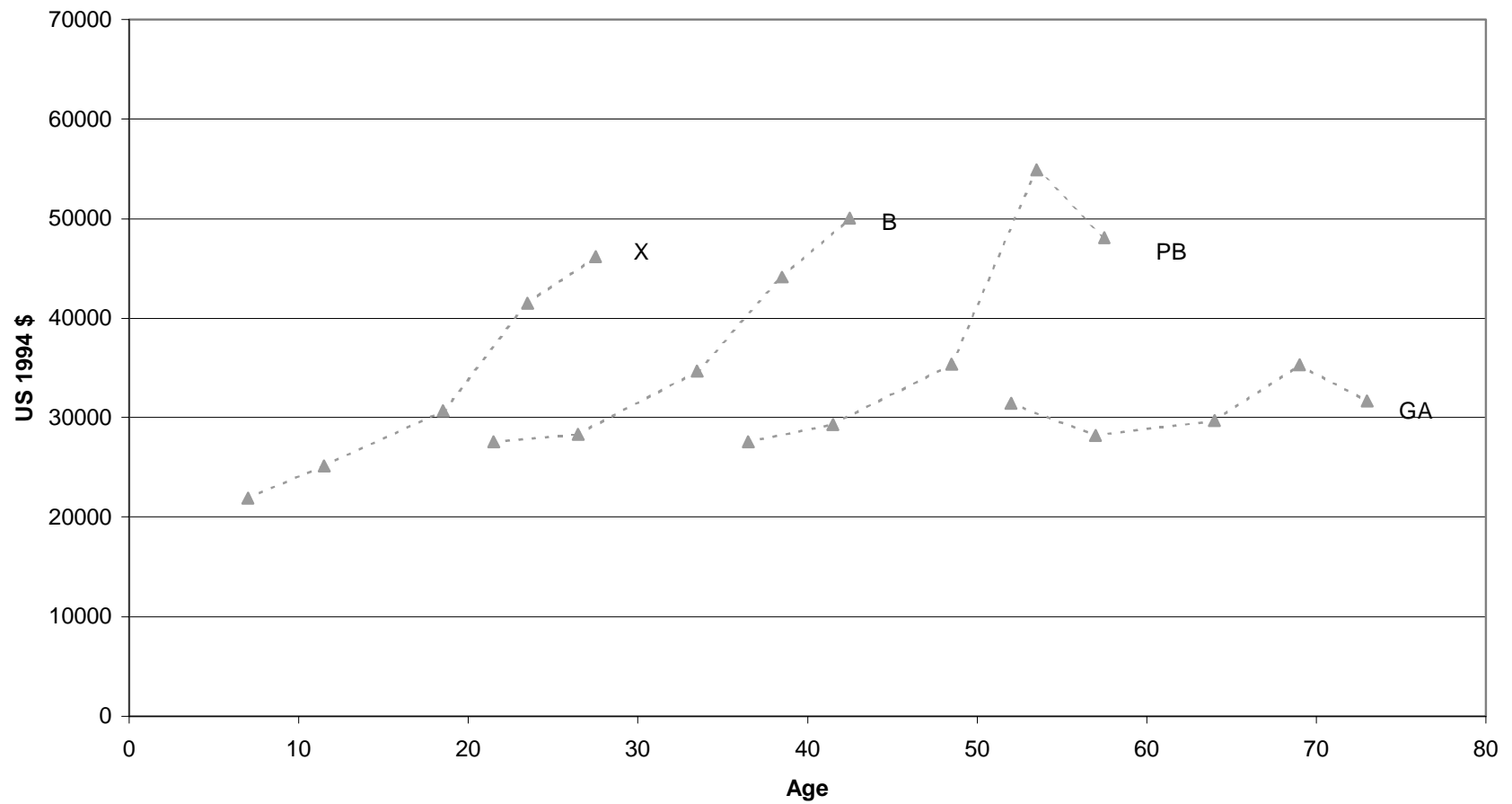


Figure 3d
Mean Equivalent After-Tax Income
Top Decile
Sweden

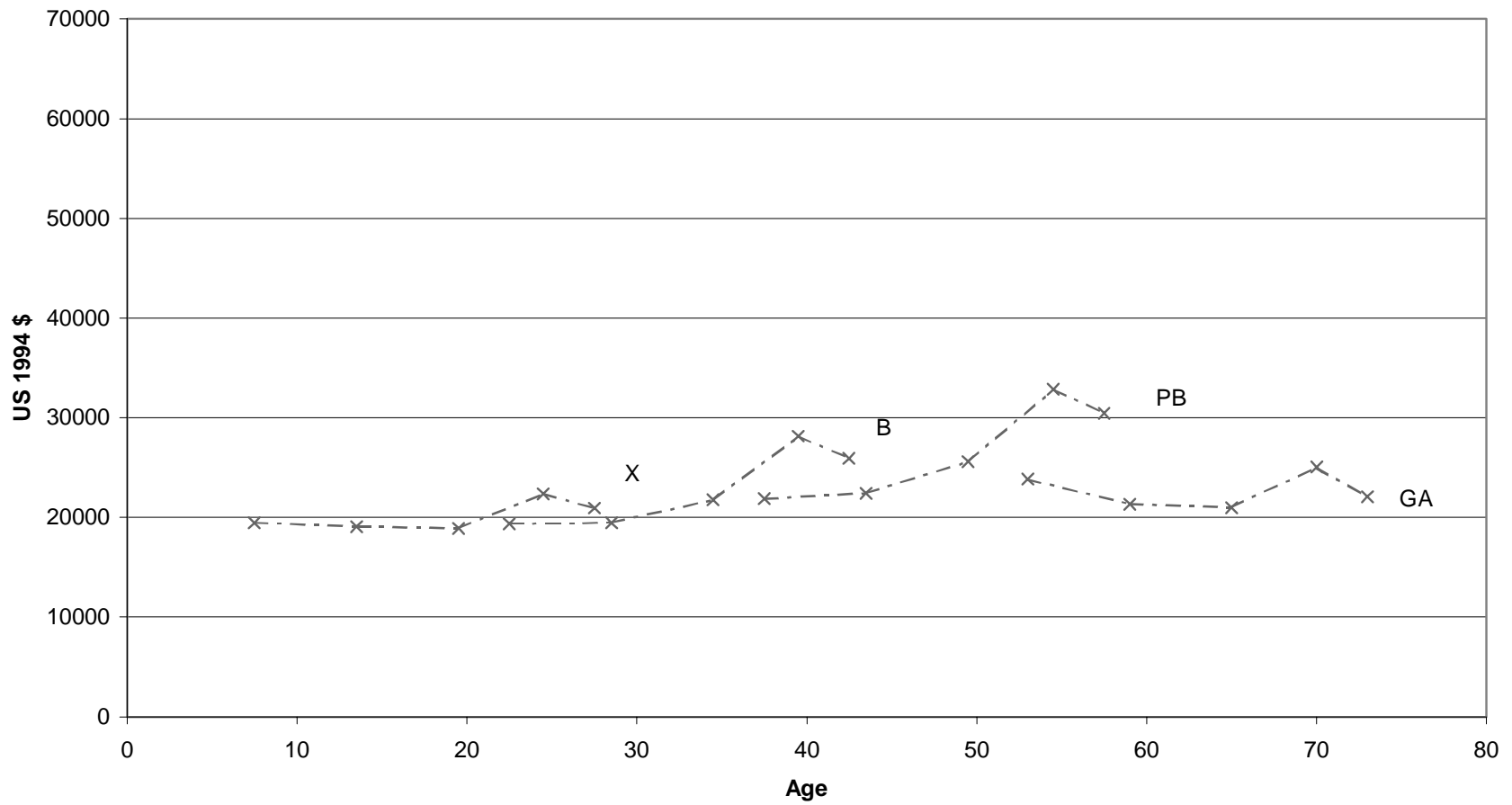
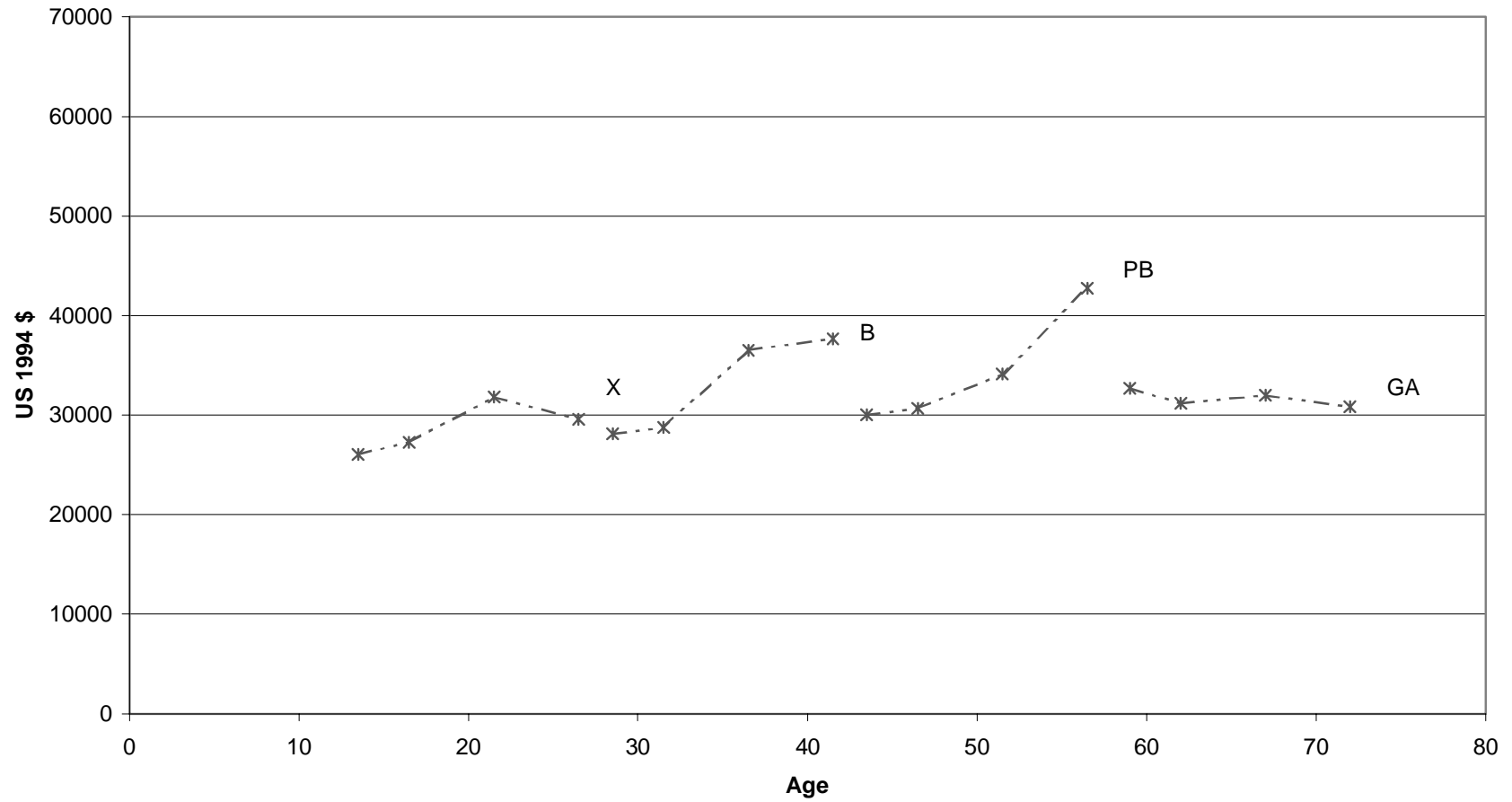


Figure 3e
Mean Equivalent After-Tax Income
Top Decile
Germany



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