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The Evolving Retirement Income Package

TRENDS IN ADEQUACY AND EQUALITY IN NINE
OECD COUNTRIES

Atsuhiko Yamada

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IN NINE OECD COUNTRIES**

Atsuhiko Yamada

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SUMMARY

1. In 1998, the OECD issued a report, *Maintaining Prosperity in an Ageing Society*, on the widespread policy implications of ageing. This study is a background paper for one of the follow-up studies, *Ageing and Income: Financial Resources and Retirement in Nine OECD countries*, which was published by OECD in 2001. Canada, Finland, Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom and the United States participated in this activity. Japan played a major role in initiating and funding the project.

2. This paper explores various questions related to the income situation of persons at retirement-age. It is based on the most comprehensive data available for the nine participating countries (including, for the first time, Japanese data) in a consistent and comparative way. Recently developed techniques were employed to examine the interactions between the evolution of the retirement income package, and trends in income adequacy and equality.

3. There are four main findings: first, persons at retirement age have similar income levels relative to the working-age population despite large differences in the composition of income packages across countries. Second, the income of persons at retirement age tends to be more equally distributed than that of the working-age population. Third, retirement income packages are diversified in terms of income source only among middle and upper-income groups. The composition of retirement income packages in the low-income groups has not changed much during recent decades. Fourth, the evolution of retirement income packages and changes of household structure, *i.e.* size and work attachment, have ambiguous effects on income inequality. Changing the shares of capital or income from work in the package can affect inequality in different ways.

4. Our analysis shows that the interactions between the evolving retirement income package and trends in income adequacy and equality of income among the retirement-age population are complex and difficult to predict. Due to these interaction effects, reforms of retirement income systems undertaken by one country will not yield the same results for another. Policy makers need to bear these complex relationships in mind when suggesting reforms to retirement income policies.

RESUME

5. En 1998, l'OCDE a publié un rapport, *Préserver la prospérité dans une société vieillissante*, sur les conséquences importantes du vieillissement sur les politiques. Cette étude a servi de document de base pour une des études qui a suivi, *Viellissement et revenus – Les ressources des retraités dans 9 pays de l'OCDE*, qui a été publiée par l'OCDE en 2001. Le Canada, la Finlande, l'Allemagne, l'Italie, le Japon, les Pays-Bas, la Suède, le Royaume-Uni et les Etats-Unis ont participé à cette activité. Le Japon a lui joué un rôle majeur dans le lancement et le financement du projet.

6. Ce document explore diverses questions liées à la situation financière des personnes en âge de la retraite. Il se base sur les données les plus complètes disponibles pour les neuf pays participant (y compris, pour la première fois, les données du Japon) d'une manière comparative et constante. Des techniques récemment élaborées ont été utilisées pour examiner la relation qui existe entre l'évolution de l'ensemble des revenus de retraite et les tendances observées dans la suffisance et l'égalité des revenus.

7. Les quatre principaux résultats sont les suivants : premièrement, les personnes à l'âge de la retraite ont des niveaux de revenus semblables à ceux de la population en âge de travailler malgré les grandes différences dans la composition de l'ensemble des revenus dans les pays. Deuxièmement, les revenus des personnes à l'âge de la retraite tendent à être mieux distribués de manière égale que ceux de la population en âge de travailler. Troisièmement, l'ensemble des revenus liés à la retraite varie en terme de source de revenus seulement s'il s'agit de groupes avec des revenus moyens ou supérieurs. La composition de l'ensemble des revenus liés à la retraite dans les groupes à faibles revenus n'a pas beaucoup changé pendant les récentes décennies. Quatrièmement, l'évolution de l'ensemble des revenus liés à la retraite et les changements de la structure des ménages, par exemple la taille des ménages et si quelqu'un travaille dans ces ménages, a des effets ambigus sur l'inégalité des revenus. Changer les parts du capital ou des revenus du travail dans l'ensemble des revenus peut avoir des conséquences inégales de différentes manières.

8. Notre analyse montre que la relation qui existe entre l'évolution de l'ensemble des revenus de la retraite et les tendances par rapport à la suffisance et l'égalité des revenus de la population à l'âge de la retraite est complexe et difficile à prévoir. A cause de ces effets d'interaction, les réformes des systèmes de revenus liés à la retraite adoptées par un pays ne parviendront pas forcément aux mêmes résultats dans un autre pays. Les décideurs ont besoin de garder à l'esprit ces relations complexes quand ils suggèrent des réformes touchant aux politiques des revenus liés à la retraite.

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1. INTRODUCTION

1.1 The context for this paper: Ageing and Income. Financial Resources and Retirement in Nine OECD Countries

9. In 1998, the OECD issued a report, *Maintaining Prosperity in an Ageing Society*, on the widespread policy implications of ageing. It dealt with implications for fiscal, labour market, financial market, health and long-term care policies, as well as pension policies. A series of seven principles were proposed to guide reforms in these areas.

10. One of the follow-up activities to that report was the establishment of a more intensive comparative examination of the retirement income policies in nine selected countries. This project was undertaken from 1999 to 2001 and was supported by a number of separate pieces of analysis.¹ They served to provide the basic data on this topic that was used in the *Ageing and Income* study.²

11. This paper analyses the trends in the income situation of older people in nine countries, including issues related to adequacy and equality and a review of changing patterns in sources of income among selected OECD countries. The nine countries are Canada, Finland, Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom and the United States.

12. It is the first time that Japanese data set in time series on the retirement-age population has been included in nationally comparative way.³ Recently developed techniques were employed to examine the complicated interaction between evolving retirement income packages and trends in the income adequacy and equality of the retirement-age population. A companion analysis⁴ was undertaken that looks at data for the mid-1990s in more depth;⁵ this was based mainly on data from the Luxembourg Income Study.

1. These included a comparative analysis of the institutional arrangements, policies and reforms that support retirement income, the effective retirement age, the national opinions related to retirement income policies, a model of pensions and taxation for hypothetical individuals by earnings or income level, and the time use of older people. These related works are available on the Internet <<http://www.oecd.org/ageing>>. There is also an independent work by the Economics Department on age-related fiscal projection (Dang *et al.* (2001).

2. The final report was published as OECD (2001) *Ageing and Income. Financial Resources and Retirement in Nine OECD Countries*.

3. An earlier comprehensive analysis by Disney *et al.* (1998) included Japanese data for one time period, the mid-1990s.

4. This includes information on the role of assets and a better identification of differences in the situation of men and women. The spending pattern of older people and its level relative to the working-age population were also examined. It provided some important supporting information that supplements the analysis found in this paper.

5. See Yamada and Casey (2002).

Policy Context

13. Two of the seven principles outlined in *Maintaining Prosperity in an Ageing Society* are pertinent to this paper. Fiscal consolidation, including phased reductions in public pension benefits, and diversification of the sources of retirement income. Fiscal consolidation inevitably raises questions about the generosity of public pensions and a related series of questions about the adequacy of the overall retirement income package and the distribution of retirement income. The emphasis on the mix of resources in retirement is a reminder that these issues must be explored looking at the entire retirement income system, not only at public pensions.

14. The analysis in *Ageing and Income* placed emphasis on:

- Issues surrounding the adequacy of income in retirement, distributional issues, and the design and cost of pensions that are the main sources of retirement income. In this paper, the focus will be on disaggregation – recognition that policy needs to take account of the large differences among groups of people as they approach retirement and as they grow older throughout the retirement years.
- Issues surrounding the duration of retirement, which are likely to have more immediate consequences for policy than the level of income in any given year of retirement. Here, the focus is on public policies that affect the timing and transition to retirement.
- Related issues surrounding the workings of the whole system that provides income to older people, and on the interactions that occur within that system – including not only pensions and income from work, but also taxation and other sources of support.

1.2 Scope of the present paper and its purpose

15. The aim of this paper is to compare the evolution of the retirement income package in each of the nine OECD countries and its effects as they relate to policy concerns. The comparisons were made in a relative context⁶ in *each* country. In other words, we talk about the share of income in a country in particular going to different groups. We focused on trends in each country and the economic situation of the retirement-age population relative to the working-age population in the same country. We do not compare income levels across countries on terms.

16. The main objectives of this paper are:

- To provide a general overview of recent trends in the adequacy and the equality of the income of older people.
- To confirm recent research which shows that older people are becoming relatively better off compared with younger people.

6. Concepts of income adequacy and equality are ultimately relative and the paper does not attempt to rank countries in terms of their retirement income distributions in any absolute fashion. The selected nine OECD countries are not representative of the organisation's members, and it is not appropriate to generalise the findings here to all OECD Member countries. The original data in each country, on which this study is based, were not gathered in an identical way (the definition of households, the data coverage, sampling rate from the universe, use of simulation for tax and social security contributions and so on). See Annex 1 for further technical information on data limitations.

- To investigate the dominant influences on income adequacy and inequality of older people by income components, household size and working attachment.

1.3 Outline of the paper

17. The next two sections open the discussion of income adequacy and equality among persons of retirement age providing descriptive statistics to illustrate common patterns in the nine countries. The analysis shows that the situation of retirement-age population relative to the working-age population has improved during recent years.

18. Section 4 sheds light on the evolution of the retirement income package, which consists of income from work, net social transfers, and capital income, including private pensions. Contrary to the common patterns found in the previous two sections, this section illustrates how the evolution of the income package in the last decades differs among the nine countries.

19. Linking the issues discussed in the previous sections, Section 5 explains how different evolutions of the retirement income package can still produce similar consequences on income adequacy and equality. It also shows how changes in the household structure affect income inequality.

20. Finally, there is a short conclusion, including directions for future research and some policy implications.

21. Data sources, assumptions and definitions of terms used in this paper can be found in the Annex. Household income data are vulnerable to problems of interpretation and it is important to emphasise the background and limitations of the data used in this paper.

2. ADEQUACY OF INCOME AMONG OLDER PEOPLE

2.1 Approaches to measuring adequacy

22. There are two ways of examining the adequacy of income⁷ in older ages. Since "adequacy" is a relative concept (at least above some minimal subsistence level), a good place to begin is by comparing the income of the retirement-age population with that of the working-age population. It is then necessary to look at particular groups of older people. While incomes may be adequate for older people taken as a whole, there could be particular groups that are experiencing difficulties. This problem is examined by looking at income quintiles and specific household structures.

7. Throughout this analysis, only cash income is taken into account, and benefits in kind are excluded. All income is assumed to be shared within a household, which implies that some of the income of older people could come from the income of their adult children living with them. Further technical information is available in Annex 1. For further discussion of the relationship between "own" income and share in household income, see Yamada and Casey (2002).

23. A second approach would be to examine groups where there is a high probability that incomes will be inadequate. Low-income cut-off lines are often used for this purpose. Since it is possible that many people are clustered around low-income lines, this approach can produce misleading comparisons. They should therefore only be used together with other measures, such as the income levels of low-income groups.

2.2 Relative incomes of older people

24. Chart 2.1 shows the disposable income of people in their earlier retirement years – people aged 65-74 - as a proportion of disposable income of people of working age.

- The disposable income of older people has been growing relative to that of the working-age population in the past few decades (except in the period from the mid-1980s to mid- 1990s in Japan and the Netherlands, where there was little change).
- In past decades there was greater variation among nine countries. However, the variance becomes smaller in recent years. The ratios range from around 80 to 90% (except the United Kingdom, where the ratio is close to 70%). This means that the disposable income of people 65 to 74 is a little lower than that for the working-age population.

[Chart 2.1 Ratio of disposable incomes of people aged 65 to 74 to those of people aged 18 to 64]

Relative disposable income of older people to detailed age category

25. Table 2.1 shows the ratio of disposable income of people aged 65 to 74 (or 75 and over) to the disposable income of various groups of younger people.

[Table 2.1 Disposable income of older age groups]

26. In most countries, people aged 65-74 (and age 75 and over) have disposable incomes of at least 70% of that of people in various younger age groups. Relative to the disposable income of people aged 18-24, the numbers are very close to 100% or even higher. This is a reflection of relatively high unemployment rates among younger people and more time spent in higher education, resulting in low incomes for this age group.

27. Considering that people aged 51 to 64 are in transition from work to retirement, the disposable income of people aged 41 to 50 is an appropriate basis for comparison with the disposable income of the retirement-age population. Furthermore, in some countries, the calculation of the earnings-related public pension is based on only a few best years of earnings. As earnings usually reach a maximum between the ages of 41 to 50,⁸ this comparison is also an approximation of the replacement rate target for those countries.

28. Table 2.1 shows that disposable income of the population aged 65 to 74 relative to that of the population aged 41 to 50 was around 80%⁹ in the mid-1990s in most countries. For the population aged 75

8. See OECD (1998b), p.133 for the national comparison of wage curves.

9. This number is somewhat lower than the number found in Disney *et al.* (1998). This difference can be explained by two factors; first, our calculation assumed economies of scale (Further technical method is available in Annex 1). Second, while the data set used here covers the entire retirement-age population, the

and over the ratio is lower, but still at a level of about 70%; only in the United Kingdom is the level considerably lower, at 60%.

29. These numbers suggest that – at least on average¹⁰ – older people probably have an adequate level of income, at least it is the assumption that older people have lower expenses in several areas, *e.g.* childcare, saving for housing and retirement. Expenses for medical care, however, can be substantially higher for older people.

30. A more detailed approach to investigating the adequacy of income for low-income groups is to compare the income of older people relative to working-age population by income decile as shown in Table 2.2. Income deciles are calculated for the older population and the working-age population separately. The mean in each decile of the older population group is expressed in this table as a proportion of the means of the equivalent decile of the working-age group.

[Table 2.2 Disposable income of the population aged 65 and over by income decile]

31. Taking the case of Canada, for example, the table shows that the lowest income decile of older people have incomes that are 48% higher than their counterparts in the working-age population. Note that the numbers are based on a relative concept. If the income of the lowest income group of the working-age population is high, this number automatically becomes small. Also, these numbers refer to averages of groups of people. Results could be quite different if particular individuals were compared over time.

32. Table 2.2 shows that income inequality is higher among the working-age population than among older people, except in the US, and particularly in Japan. It shows that:

- Except in Japan and the United States,¹¹ the 1st and 2nd deciles have the highest disposable income relative to their working age counterparts.
- In the highest income groups, older people do have somewhat lower incomes than their working age counterparts, but even here levels are usually around at least 80%.
- In Canada, Japan, and the United States, the highest-income group of retirement-age population have almost same level of disposable income as the same group in the working-age population.

33. Another way of looking at low-income is to compare the lowest income group of retirement-age population with the mean disposable income of the working-age population. Chart 2.2 compares the disposable income of the lowest income group of the population aged 18 to 64, and of the group aged 65 and over, to the mean disposable income of the population aged 18 to 64.

34. For example, Chart 2.2 shows that, in Sweden, older people in the lowest quintile had incomes that were about 43% of the average income of the working-age population in the mid-1970s, and that number has increased since then. The lowest-income group of the working-age population had an income of about 50% of the average in the mid-1970s, but their relative income level has fallen since.

reference age group in Disney *et al.* is around age 67. Considering these two factors, the numbers are quite similar.

10. For further discussion on spending pattern, see Yamada and Casey (2002).

11. Note that even in the United States and Japan, the ratio for the lower income group exceeds 70%.

[Chart 2.2 Mean disposable income of the lowest income quintile]

35. This observation can be generalised for most countries. The common pattern is that average incomes in the lowest income quintile of the two age groups have been moving closer to each other in recent years. However, by the mid-1990s, in Canada, Italy, the Netherlands and Sweden, the lowest income group of older people had reached higher income levels than the working-age population.

36. Chart 2.3 shows the growth of real disposable income by age group. Real income is defined as nominal disposable income deflated by the consumer price index, and the calculation of the growth rate is based on the income of each age group in the mid 1980s. In six of the nine countries, disposable income of the older age group has grown faster than that of younger people. In Canada, Italy and Sweden, the income growth of older old people is the fastest among all age groups. In Japan, the Netherlands and the United States, the income growth has been the fastest in the middle age group, but income growth of the population aged 65 to 74 has still exceeded income growth in the youngest age group.

[Chart 2.3 Real income growth rates by age group]

2.3 Relative income ratio by household types

37. The household structure has changed during past decades as well. Chart 2.4 shows these changes by household size and work attachment. Note that, due to data limitations, this chart refers to older people in household headed by a person aged 65 and over only. It excludes people in households who are aged 65 and, for example, are living with their adult children as subordinate household members. This type of arrangement is relatively important in Italy and Japan.

Chart 2.4 Changing household structure by household size and work attachment

38. As people age, they stop working and frequently live alone. In most countries, the majority of households headed by a person aged 65 and over has two or more adults with no one in the labour market. More than 40% of the population aged 65 and over fall in this category. Only in Japan do the majority of households have two or more members in the labour market. This reflects the fact that co-residence is common in Japan and that the labour force participation rate of the population aged 65 and over is high. The second-largest group are people living in non-working single households.

39. The chart shows that the common trend in all countries is an increasing number of older people living in non-working single households and in two or more member households with no worker. The number of persons living in households with two or more workers has also decreased by more than 10% in Japan during the last decade.

40. Relative income levels of people in each household type have also changed in the last decade. Table 2.3 illustrates the change of relative income levels of older people in "retired" households to average disposable income of the population aged 65 and over total. Here, "retired" household means those older households with no one in the labour market - non-working single households and two or more member households with no worker.

[Table 2.3 Ratio of disposable income of older people in "retired" households to disposable income of people aged 18 to 64]

41. Table 2.3 shows that relative disposable income of the non-working single households, consisting mainly of older women, has increased more than 5% in Canada, Italy, Japan and the United Kingdom between mid-1980s and mid-1990s. In all four countries relative disposable income grew fast from low

levels in the mid-1980s. The increase in income amongst two adult (or more) households with no worker was larger than that of non-working single households. In most countries, the increase was more than 5%: Canada and Sweden recorded increases of 12%.

42. This observation suggests that the retirement income policies seem to have been successful in targeting people in "retired" households. However, overall, non-working single households are still economically disadvantaged in terms of both relative income levels and their rate of growth.

2.4 Older people below low-income cut-off lines

43. Another way of looking at adequacy is to examine groups who are at the greatest risk of having low incomes, *i.e.* those who fall below low-income cut-off lines. There are many ways of calculating these lines. A widely accepted approach is to examine the number of people who have less than 50% of the median disposable income of the entire population in each year.¹² Low-income cut-off lines are a standard tool for assessment of the goal of eliminating very low incomes in old age. Since it is possible that many people are clustered around low-income lines, results of this assessment can sometimes be misleading. Low-income cut-off lines should thus be used in conjunction with other measures. In this case, these do not materially affect the results. Chart 2.5 provides basic information by age groups.

[Chart 2.5 Percentage of population aged 65 and over that is below the low income cut-off line by age group]

44. Take the Swedish case as an example.

- The *dotted line* shows that in the mid-1970s, most people below the low-income cut-offs were older people aged 65 and over.
- The *thin line* shows that in the mid-1980s, there were very few older people aged 65 to 74, who were below the low-income line. Numbers started to increase slightly after the age 75.
- The *bold line* shows that in the mid-1990s a strong shift in the concentration of low incomes has taken place with a higher proportion of younger people below the low-income cut-off line. (See Annex A2.)

45. Canada, Finland and the United Kingdom also show large declines in the number of older people living below the low income cut-offs. There has been less change over time in the other countries. Several countries have succeeded in reducing the number of persons above the age of 74 below the low-income line, but in Germany, the Netherlands, Japan and the United States no such reduction among the oldest age groups is observed.

12. The low-income cut-off line as 50% of the median disposable income of entire population in each year would not be an ideal measure. This is because, even if there were no real changes in income in the society, the cut-off line would change over time as the population ages and household size changes. See Rainwater and Smeeding (1997) for an example of the adjustment for different age structures or different living arrangements.

3. EQUALITY OF INCOME AMONG OLDER PEOPLE

3.1 Measuring income inequality

46. Apart from the number of persons living on low income in old age, policy makers are also concerned with income inequality between younger and older groups of the population as well amongst older persons. This section of the paper examines income inequality issues. It starts by examining the overall trends in income inequality measured by Gini coefficients of the sub-populations - the population aged 18 to 64 and the population aged 65 and over - in recent decades. Then, a closer look is taken at the concentration of the population by income decile by different age group, including an examination of the likelihood that a person of a certain age has a high or low income. Finally the question is addressed how policies have changed the allocation of disposable income for different income groups.

3.2 Income inequality measured by Gini coefficients

47. Table 3.1 shows inequality trends for the working- and retirement-age population measured by Gini coefficients.¹³ The first 6 columns show the change of Gini coefficients between the mid-1970s and mid-1980s and between the mid-1980s and mid-1990s. The last three columns show the relative difference of Gini coefficients between the retirement- and the working-age population.

[Table 3.1 Overall trends in income distribution: summary results]

48. In seven countries income inequality increases were higher for the working-age population than for the retirement-age population between the mid-1980s and mid-1990s. In Canada, Germany and Finland, the Gini coefficients of the retirement-age population actually decreased during the same period.

49. Data for six countries are available for the period between the mid-1970s and mid-1980s. The data show that income inequality fell by more than 12% during this period in Canada, Finland and Sweden.

50. The last column shows to what extent the income inequality among the retirement-age population was lower than among the working-age population in the mid 1990s in most countries. Only in Japan and the United States were the Gini coefficients of the retirement-age population larger than in the working-age population, but the difference had declined by the mid 1990s.¹⁴

51. Overall, Table 3.1 suggests that income inequality among the retirement-age population was not significantly different from income inequality among the working-age population.

13. There are several indexes used for measuring income inequality and each index differs in its sensitivity to changes at various points in the distribution. The Gini coefficient gives particular weight to changes around the middle of the income distribution; the Squared Coefficient of Variation (SCV) and the Mean Log Deviation (MLD) overweight changes at both extremes; and the ratio of the income of the 90th percentile to the 10th percentile ignores any income changes other than those which affect these two points. Despite these differences, changes in these measures over time are generally (but by no means universally) in the same direction, regardless of which measure is used.

14. The symbols, which indicate the relative difference of Gini coefficients between the working-age population and the retirement-age population, are the same for the mid 1980s and for the mid 1990s. However, the difference actually shrunk almost 10% in that period.

3.3 A graphical way of showing the probability of having different incomes

52. Chart 3.1 provides a particularly powerful way of examining how incomes and age are inter-related and, especially, how patterns are changing over time. This 3-D graph shows the probability of having high or low incomes for persons of different ages:

- Income deciles on the x-axis at the bottom. The income deciles are calculated on the basis of the entire population. The lowest income groups are towards the left (1st decile) and highest (10th decile) are towards the right
- The y-axis shows the share of persons in the different age groups who are in different income deciles. All age groups in each decile add up to 100%.
- If the income distribution is the same in each age group, the 3-D graph will be flat at the 10% level. However, a flatter graph does *not* necessarily mean that the income distribution in one country is more equal, since the graph shows population density in each decile rather than income levels in each decile.
- Age groups are shown on the z-axis, running from the front to the back. Older age groups are toward the back (age 75 and over) of the chart and younger ages are near the front (age 18 to 24).

53. For example, the graph for Canada in the mid-1970s shows a peak near the back left-hand side of the map. This indicates that some 40% of the oldest age group were in the lowest income decile. The rest of the map is relatively flat. Over to the right, it takes an inverted "U" shape because middle-aged people are more concentrated in the highest deciles of the income distribution. The chart for Canada in the mid-1980s shows that the peak has been shrinking. By the mid-1990s the top of the peak was sliced off and shifted over to the second decile. This means that in the mid-1990s, older people had a lower probability of being in the first income decile.

[Chart 3.1 Population of income deciles as a percentage of each age category]

54. Chart 3.1 shows a common pattern of change in income distribution for most countries. Generally, the peak shifts from the lowest to the 2nd or 3rd decile, *i.e.* the risk of poverty in old age has fallen considerably since the mid-1970s.

3.4 Changes in shares of disposable income

55. While incomes have grown for almost all age groups in recent decades (See Chart 2.3 for real income growth by age group in the last decade), income distribution has changed. Chart 3.2 illustrates the changing share of disposable income of each decile during the last two decades for the working-age and the retirement-age populations.

[Chart 3.2 Gains and losses of disposable income by income quintile]

56. Amongst the population aged 18 to 64, the biggest gainers were the fifth quintiles, *i.e.* the richest groups in all countries between the mid 1980s and mid 1990s. In most countries, the lower income groups, in particular the first quintiles, experienced the greatest losses. Only in Canada and in the United States did the first quintile gain slightly. The same holds true for the period between the mid-1970s and mid-1980s in

those countries where data are available, except in Finland, where the lower income groups gained during this period.

57. Compared with the working-age population, the chart for the retirement-age population shows a more diverse picture. Only in Canada and Finland have the lower income quintiles gained substantially in the past two decades. There have been gains among the highest income groups of older people in many of the countries – in the United States, the United Kingdom, Sweden, the Netherlands, Italy and Japan. But the bottom quintiles did not lose the most in these countries. For example, in Italy, Japan and United States, the largest relative losses were borne by the third and fourth quintiles. In the Netherlands and Sweden, the lower quintiles systematically experienced the largest relative losses during the most recent decade, but experienced the largest such gains between mid 1970s and 1980s.

58. In most countries the retirement-age population in the lower income quintiles gained more than the working-age population in the lower income quintiles, *i.e.* the situation of the retirement-age population in terms of income equality as well as income adequacy has improved relative to that of persons of working age.

4. THE EVOLUTION OF THE RETIREMENT INCOME PACKAGE

4.1 Three components of the retirement income package

59. In this section we identify each component of disposable retirement income: income from work (salary income and self-employed income), capital income (private pensions and interest) and net social transfers (social transfers minus social security contributions and direct tax).¹⁵

60. Generally, "capital income" means interest income for the working-age population, and private pension or occupational pension for the retirement-age population. "Social transfers" means only public *cash* benefits, such as basic pensions, earnings-related public pensions, means-tested cash benefits, housing cash benefits, etc. Benefits in kind are not taken into account.

61. Regarding "net" social transfers, the majority of the working-age population pays more into the social transfer system through taxes or social security contributions than it receives. The public benefit and tax system, however, pays benefits to the majority of the retirement-age population.

62. It is important to recall that all income is assumed to be shared within a household. For example, the category "income from work" includes work-related incomes earned by non-elderly members of joint households, which are important determinants of the living standards of the elderly in Japan and Italy.

15. Please note that the concept of net social transfers is simply defined as the gross social security transfer minus direct tax and social security contributions. However the tax levies are not only on gross social transfers but also on market income and therefore the concept is not consistent with the one used in the OECD Net Social Expenditure Database.

4.2 The evolution of the income package for the retirement-age population

63. Chart 4.1 shows a picture of the income package for people aged 65 and over, and how they have evolved since the 1970s. The vertical axis refers to the contribution of each income component to disposable income. The chart illustrates that the share of income from work has been declining in all countries since the mid-1970s. This evolution is strongly related to early retirement trends. Only in the United States is there a slight increase in the proportion of income from work between the mid 1980s and mid 1990s. In the mid-1990s, income from work still played a significant role in Japan and Italy.

64. The decline of income from work was not everywhere compensated by a growing share of net social transfers in the income package. In many countries, income from work was replaced with increasing shares of capital income rather than net social transfers. This seems to reflect the importance of private pension schemes. In several countries, the trend in growing importance of capital incomes and the trends of falling importance of income from work have been of about the same size (thereby leaving the share of net social transfers about the same). In Finland, Italy, Japan and Sweden, however, the drop in income from work was compensated for by an increase in net social transfers.

[Chart 4.1 Disposable income by source of income, age 65 and over]

4.3 Diversified income packages can only be found in the higher income groups

65. The evolution of the retirement income package differs by income groups. In most countries, only the highest income groups have reasonably diversified income packages. Chart 4.2 shows the income package separately for low-, medium- and high- income groups. The top section of the chart shows people with the lowest 30% of income (deciles 1, 2 and 3). The middle section shows middle income people (those with incomes in deciles 4, 5, 6 and 7) while the 30% with the highest income are at the bottom of the chart 4.2.

[Chart 4.2 Trends in income sources, by income group, age 65 and over]

66. Social transfers account for 85% or more of the disposable income of low-income older people in almost all countries and the situation has not changed significantly since the mid-1980s. Only Japan recorded a 20% decrease of income from work relative to disposable income, which was compensated for by an increase in net social transfers. A slight increase of capital income can be observed in the Netherlands and the United Kingdom.

67. Capital income plays a more important role among middle- and higher-income groups, particularly in Canada, the Netherlands, the United Kingdom and the United States. In these countries, higher income groups receive far more income from capital than from social transfers

68. Income from work also plays a more important role in higher-income groups than for lower-income groups. In Japan, the share of income from work is high in all income groups, but its importance has rapidly decreased among middle-income group in the recent decade. The share of net social transfers tripled in middle-income groups, while the share of income from work decreased by almost half.

69. In Finland, Germany, Italy and Sweden, net social transfers account for a relatively large share of the income package in middle- and higher income groups. The middle-income group in Germany saw a slight decrease in net social transfers in their income package which was compensated by an increase in capital incomes between the mid 1980s and mid 1990s.

4.4 An indication of the earlier retirement trend in the evolving income package

70. The evolution of retirement income packages reflects the trend towards early retirement over the past decades. Chart 4.3 provides a comparison of the income package in three age categories: 41-50 years old, 51-64 years old and 65-74 years old. These three age categories can be seen as being the pre-retirement-age population (people aged 41-50), the transition age population (people aged 51-64) and the retirement-age population (people aged 65-74).

71. The concept of Chart 4.3 is similar to that in Chart 4.1 and 4.2. The value of net social transfer is negative in most countries for the pre-retirement-age population, since this age group pays more into the social transfer and tax system than it receives.

[Chart 4.3 Trends in the percentage of disposable income by age group]

72. The top panel of Chart 4.3 shows that most of the population aged 41-50 rely on income from work. The bottom panel, which shows the situation for the population aged 65 to 74, illustrates almost the same patterns found in Chart 4.1. These two panels can be used as a benchmark for the comparisons with the middle panel.

73. The work-retirement transition typically takes place between 51 and 64. It is not surprising to see that income from work is still high in most countries as many people aged 51 to 64 are still working. However, compared with the top panel, the proportion of the income from work is lower, while capital income and net social transfers (mainly pensions) increase.

74. In Canada, the Netherlands, the United Kingdom and the United States, the proportion of capital incomes among the population aged 51 to 64 is larger than among the population aged 41 to 50. This proportion has been growing over past decades and was exceeding 20% of the income package by the mid-1990s.

75. In Finland and Italy, the share of net social transfers has been positive and increasing since the mid-1980s reflecting early retirement pension payments to people aged 51 to 64.

5. THE INCOME COMPONENTS AND HOW THEY INTERACT

5.1 Linking the discussions

76. The previous sections provided descriptions of income adequacy, income inequality and the evolution of income package among older people. This section examines the linkages – how the various elements of income package contribute to the adequacy of retirement incomes and to the equality of incomes. It also looks at the effect of changing household structures.

5.2 How the evolution of income package affects income adequacy

77. The relative income position of the retirement-age population and the working-age population reflects the growth of mean disposable income in different older income groups. Table 5.1 shows real disposable income growth by income quintile, based on the income of each quintile in the mid 1980s. Absolute cross-country comparisons of real incomes are very difficult to interpret, but comparisons of income growth of lower relative to higher income quintiles or to the total population in the same country are revealing.

[Table 5.1 Real income growth, retirement age, by income quintile]

78. Table 5.1 shows that lower-income groups had the highest growth rates in Canada, Finland, Germany and Japan. In Sweden and the United Kingdom, incomes grew stronger in higher income groups. The situation was mixed in Italy, and in the Netherlands and the United States income gains were fairly equally distributed by income quintile. In these two countries, as in Japan, income growth was higher in the total population than among the older people so that aggregate replacement rates did not rise during this time period.

79. Changes in the retirement income package have played an important role in income growth. Chart 5.1 shows how each component of the retirement income package contributed to income growth. The sums of the boxes in each quintile are equal to the numbers in Table 5.1.

[Chart 5.1 Real income growth rates by income component and income quintile]

80. In most of the countries, income growth among the older lower-income people comes from growth in social transfers and from reductions in direct taxes. However, offsetting changes in other components have also played a part. In Japan, for instance, the first three quintiles experienced almost the same growth in social transfers, but this was offset in the third quintile by a large reduction of income from work. The situation in the upper-income quintiles is quite mixed. Increased capital income played a positive role in many countries, often partially offset by declines in incomes from work. In most countries, increased social transfers also benefited higher income groups, particularly so in Sweden, Finland and Germany.

5.3 Substitutions among different social transfer programs

81. An interesting policy issue is the role old age pension benefits play vis-à-vis other benefits, such as disability benefits, means-tested cash benefit, or housing benefits.

82. The data do not support the hypothesis that there may be a large-scale substitution of old age pension benefits by other benefits. Chart 5.2 provides more details of real growth of social transfers; it should be read in same way as Chart 5.1. The grey boxes correspond to public pensions, old-age and survivors' benefits. The white boxes correspond to other social transfers, which include disability, occupational injury, sickness, family cash, unemployment, and housing benefits as well as any other benefits, following the OECD Social Expenditure Classification. The sums of the grey and white boxes in Chart 5.2 is equal to the black boxes in Chart 5.1, which corresponded to total social transfers. For most countries, unfortunately, the white boxes cannot be decomposed further.

[Chart 5.2 Real social transfer growth rates by program and income quintile]

83. As expected, the growth of the old age cash benefits and survivors' benefit is much faster than the growth of the other social transfers. This is consistent with the fact public pension systems have been maturing in most countries in the last decade.

84. Nevertheless, there are some exceptions. In Italy, the first and the third income quintile experienced larger growth in other social transfers relative to the growth of pensions. The Italian data did not allow for further disaggregation of the other social transfers.

85. The second to fourth income quintile groups in the United Kingdom also experienced rapid growth of non-pension transfers. Five percent came from the disability programme. The second and fourth quintiles gained more than 3% from unemployment benefits, which were paid to their unemployed adult children. Persons in the fourth quintile gained 4% from housing benefits. The growth of housing benefits also explains the growth of non-pension transfers in the first and second income quintiles in the Netherlands and Sweden.

5.4 How the evolution of the income package affects the allocation of net social transfers

86. Differences in growth rates of social transfers change the allocation pattern of net social transfers to each income quintile. This is not self-evident, because even if the growth rate of social transfers were exactly the same for each income quintile, the allocation pattern would be changed since the income level of each income quintile, on which the calculation of the growth rate is based, is different by definition.

87. Chart 5.3 depicts the share of net social transfers received by the retirement-age population by income quintile over the last decades. The total sum of net social transfers of the retirement-age population are set at 100%. If net social transfers were equally distributed, each quintile should get 20% of the net social transfers. If the bar is above the 20% level, the allocation of net social transfers is concentrated on that quintile. To show the over- and the under-representation of each quintile in the distribution, the x-axis crosses at the 20% level.

[Chart 5.3 Share of net social transfers by income quintile]

88. We can find three allocation patterns in the nine countries. Canada, the Netherlands and the United Kingdom can be characterised by a high and increasing allocation to the first quintile and low and decreasing allocation to the fifth quintile. All three countries have relied increasingly on private or occupational pensions over the past decades.

89. Germany, Italy, Japan and United States allocate less than 20% to the first income quintile. In these countries, net social transfers are concentrated on the third income quintile. Especially in Japan, the middle quintile gained more than 10% of net social transfers between mid 1980s and mid 1990s. This is a consequence of the income from work having shrunk by 35% in this quintile and the fact that net social transfers were used to compensate this reduction in the past decade.

90. The change in net social transfers in Finland and Sweden has been regressive. The highest income quintile gained more than the lower income quintiles during the last decade. In addition, decreasing income from work in higher income groups has been accompanied by increasing net social transfers as shown in Chart 4.2.

5.5 How the evolution of the income package affects income equality

91. The previous sections showed that, in many countries, capital income is playing a more important role in the retirement income package and income from work is playing a smaller role, while the net social transfers showed a more mixed picture. How do these factors affect income equality? Chart 5.4 shows the way each income component has contributed to income inequality over recent decades; the calculation method is based on SHORROCKS (1982).¹⁶

[Chart 5.4 Decomposition of income inequality by income component]

92. Chart 5.4 is to be read as follows. Total inequality is set at 100%. The four bars (for each observation time point) indicate the contribution of an income component to total income inequality. From the left, the first bar shows the contribution of income from work, the second bar capital income (including private pensions and occupational pensions), the third bar social transfers, and the fourth bar direct tax and social security contributions. Added together, the height of these bars is 100%. Where a bar extends above the 0% line, the income component is making a large contribution to income inequality. When a bar extends below that line, the income component is substantially reducing income inequality.

93. In interpreting the chart it is important to remember that the income is not necessarily the older person's own income, but can also be that person's share of income received by someone in the household. Particular care should be taken in cases where the three-generational households are common (Italy and Japan).

94. It is also possible to identify the contribution of the change of each income component to total inequality and the extent to which that component itself is equally distributed among its recipients. Such an investigation is important because any change in the contribution of each income component to total inequality (as shown in Chart 5.4) is the combined result of a change in its importance within the total income package and a change in the equality of its distribution among its recipients. Even if there were a positive change in the first instance, there might be a negative change in the second, or vice versa, and these could offset (or complement) one another. Thus, although the importance of a particular source of income might be declining, that source of income might be contributing more to income inequality than it did in the past.

16. Shorrocks proved that there exists only one decomposition rule, which satisfies six assumptions; (1) the contribution of each income component should be independent of how they are ordered; (2) the contribution of each income component should be independent of how individual observations are ranked; (3) the contribution of each income component should be independent of how many income types are considered; (4) the sum of the contributions of each income component should equal overall inequality; (5) the contribution of an income component to total inequality is zero, if all individuals receive the same amount of income from that component; (6) the contributions of two different income components whose distributions are simply one a permutation of the other are assigned different contributions to total inequality. This decomposition rule is;

$$s_k = \frac{S_k}{I} = \frac{Cov(Y_k, Y)}{Var(Y)} \quad \text{where } \sum^k S_k = I \quad \text{and} \quad \sum^k s_k = 1$$

where S_k is the absolute contribution of component k in terms of a chosen inequality index I , Y_k is the amount of component k and Y is total income. Therefore, s_k is the per cent contribution of component k (per cent contributions add up to 1 over all components). This decomposition rule can be applied to any inequality indexes.

95. Chart 5.5 provides a decomposition of the difference of income inequality in the mid-1980s and mid-1990s into the effect of a) a proportional change of each income component and b) a change of each income component inequality, based upon:

- calculating the difference of the Gini coefficient between mid-1980s and mid-1990s
- calculating the contribution of each income component to the difference in the Gini coefficient
- separating out the "change of the importance of the income" component and "inequality of the distribution of that income" component

96. Chart 5.5 is to be read as follows. The contribution of the "change of the importance of the income" component to the change of Gini coefficients is shown by the black bar, and the contribution of the "inequality of the distribution of that income" component is shown by the white bar. The sum of the black and the white bars is equal to the difference in Gini coefficients between the mid-1980s and mid-1990s. A positive value to either bar means that that component has increased income inequality and a negative value means it has decreased.

[Chart 5.5 Decomposition of change in Gini coefficients by income component and its share]

97. The Charts shows that in Canada, for example, the decrease in the contribution of employment income to total inequality shown in Chart 5.4 is mainly attributable to a decrease in the "inequality of the distribution of that income" component. In other words, it is mainly due to the fact that income from work became more equal across households rather than income from work becoming a less important source of income. Also, in Canada, both the increase in the importance of capital income, and the fact that capital income is unequally distributed, contributed to widening total inequality. The effects of changing shares and of component inequality are quite different in the various countries. In some cases they work to offset one another and in some cases they reinforce one another.

98. The highlights of Chart 5.4 and Chart 5.5 are:

- In Canada, the Netherlands, the United Kingdom, and the United States, capital income accounts for the largest part of income inequality. Especially in Canada and the United Kingdom, these contributions have been getting larger.
- In most countries, direct tax and social security contribution have played an important role in decreasing income inequality (this effect is not as important in Germany and Japan).
- In Finland, Germany, Italy, and Sweden, social transfers positively contribute to the income inequality – obviously so given the large earnings-related social transfer programmes in these countries
- In most countries, except in the United States, the contribution of income from work to income inequality has been decreasing.
- In Germany, and the United Kingdom, where the contribution of capital income is getting larger, the increased inequality was mainly caused by the growing importance of capital income, while the inequality in the distribution of capital income itself fell.

- Employment income is the main contributor to total inequality in Italy and Japan. In Japan, employment income is rather unequally distributed among those who receive it, which cancelled out the fact that it was becoming less important as component of the income package.

5.6 How changes in the household structure affect equality

99. The household structure, classified by work attachment and household size, has changed in the past decades (as was shown in Chart 2.4). The effect of the changing share of each household type itself could affect income inequality, even if the relative income level in each household type has not changed.

100. Using the MLD (Mean Log Deviation) decomposition method based on ZYBLOCK (1996), three effects of changing household structures on income equality¹⁷ can be identified. These effects are:

- *Within group effect*: the impact of changes of inequality within the population living in each household type
- *Structural effect*: the effect of changes in population shares
- *Between group effect*: the impact of "pure" changes in inequality between groups when the population structure is held constant.

101. Chart 5.6 shows the results of this decomposition. In the chart, the sum of the absolute value of each effect is set at 1.0. If the bar on the positive (0 to 1.0) side is longer than on the negative side (-1.0 to 0), the inequality measured by MLD has increased between the mid-1980s and the mid-1990s, and *vice versa*. Chart 5.6 suggests that the changes in the household structure have both positive and negative effects on income inequality.

[Chart 5.6 Impact of changing household structure on income inequality]

102. In most countries, the dominant effect on income inequality came from changes of within sub-group inequality. In Canada, Finland, Japan, and the United States, the value of this impact was negative, *i.e.* it reduced income inequality.

103. The effect of changes in population shares shows a relatively large positive value in the Netherlands and Japan. In these countries, changes in the shares of each household type had a substantial

17. ZYBLOCK (1996) proposed the decomposition method for examining the change of the MLD index over time. The decomposition rule is;

$$\Delta MLD = MLD^t - MLD^0$$

$$\Delta MLD = \underbrace{\sum_g \bar{w}_g \cdot \Delta MLD_g}_{Term A} + \underbrace{\sum_g \overline{MLD}_g \Delta w_g - \sum_g \overline{\ln\left(\frac{y_g}{\bar{y}}\right)} \Delta w_g}_{Term B} - \underbrace{\sum_g \bar{w}_g \cdot \left(\Delta \ln\left(\frac{y_g}{\bar{y}}\right) - \ln(\tilde{y}_g) \right)}_{Term C}$$

where w_g is the sub-group population relative to total population, MLD_g is MLD of each group, \bar{y} is the average income of total population, and y_g is the average income of each group. The bar above each variable means the average in two time periods, t and 0 . Term A, B and C correspond to the within, structural and between effect respectively. FÖRSTER and PELLIZARI (2000) utilised this method for the analysis of the effect of "work polarisation" on income inequality.

effect on income inequality. In Canada, Japan and the United Kingdom the between effect is relatively large and has reduced income inequality.

6. CONCLUDING REMARKS

6.1 Policy Implications

104. This paper confirmed the main conclusion of earlier work (e.g. Disney *et al.* 1998) that retirement income packages provided an adequate level in the mid-1990s and there was little difference between the selected nine countries when all the parts of the retirement income system were examined as a whole.

105. The average disposable income of older people has been rising. The retirement income package provides more than 70% of the mean disposable income of the working-age population. This observation applies not only to the average, but also to different income groups or different household types among the retirement-age population. The composition of the retirement income package has changed substantially during past decades. This change is much more dramatic than the change in relative incomes of older people. The common pattern is a decreasing share of income from work both for persons above the age of 65 and the population aged 51 to 64, which reflects the trend to early retirement.

106. The lower shares of work income have not necessarily been replaced with increasing social transfers in all nine countries. Increased capital income has substituted for lower work income in Canada, the Netherlands, the United Kingdom and the United States, reflecting the growth of occupational and private pensions. In these countries, there has been no change in the proportion of net social transfers in the last decade.

107. The results suggest that care is needed when introducing public pension reforms which reduce benefit levels or which promote private pension schemes to substitute for public pensions. Older people in the low-income groups still rely on social transfers, which account for more than 80% of their income. This share has been quite stable in past decades except in Japan, where income from work is important for all income groups. Public pension reforms may thus need to include special measures to ensure that low-income groups receive adequate support.

108. The consequences of the evolving retirement income package for income inequality are ambiguous. The growing share of capital income (mainly due to private pensions) has increased inequality during the last decades in most countries. In Germany and the United Kingdom, it was the increased share of capital income that resulted in increased inequality over the past decade; taken in isolation, capital income became more equally distributed across income groups. In Sweden and Italy, on the other hand, the main effect came from more inequality in the distribution of capital income. The contribution of work income to inequality has been declining for two decades as a result of earlier retirement and thus a reduced share of work income in the income package. However, in Japan, the effects of an increasingly unequal distribution of work income cancelled out the effects of a fall in the share of work income.

109. This evolution of the retirement income package thus has had ambiguous effects resulting from the combination of changing shares and changing component inequality on total income inequality. The

results show that the two effects can cancel each other out. The policy implications of decreased work income and increased private pensions are particularly important. Policies to reverse the trend towards early retirement or encourage the development of private pension schemes may produce new vulnerable groups and create new income inequalities among older people.

110. Changing household structures in terms of work attachment and living arrangements also affect income inequality. The number of households of single older people has increased due to early retirement and less co-habitation with children or other family members. Nevertheless, we found that the changing household structure had only a small impact on income inequality, except in Japan and in the Netherlands. In most countries, the change in income inequality in the last decade can be explained by the change of income inequality in each household type and the difference of income between each household type.

111. The analysis also showed that only taxes contributed to reduction of income inequality of the older population. As the earnings-related public pension systems matured during the last decade, social transfers contributed to, rather than reduced, income inequality in several countries.

6.2 Four points for future research

112. Several important areas should be given more attention and explored in future research.

113. First, the available data does not allow for the identification of the detailed components of capital income, particularly with respect to private pension schemes (occupational defined-benefit and defined-contribution plans, personal pensions, and all kinds of private transfers). Given that many countries are giving a more important role to private pensions in their overall retirement income systems, income surveys should be designed with more detailed categories. Second, we did not take into account neither benefits in kind, such as medical care services, nor tax deductions for the elderly. These items should be included in future research.

114. Third, it would be important to have longitudinal panel data, which would allow to trace the same individual before and after retirement. Based on such data, actual replacement rates of individuals could be established, as well as individual career histories. Fourth, more information is required about the wealth of older people. Wealth would be classified into four: savings, social security wealth, health capital, and human capital. Some information exists on savings and social security wealth but more data is necessary on health and human capital.

ANNEX 1: DATA SOURCES, LIMITATIONS AND ANALYTIC TOOLS

A.1 Data sources and definitions

115. The original sources of the data for each country, including the reference years that were reported, are shown in Chart A.1. Each country selected its original data source and made the necessary calculations to respond to the OECD questionnaire on distribution of household incomes, which was sent to countries in 1998. This questionnaire was the second wave of a series of such requests. The data gathered by the second wave are the basis of this paper.¹⁸ The main result of the second wave, which explored the driving factors in income distribution and low-income, was published as FÖRSTER and PELLIZZARI (2000).

Table A.1 National data sources and available years

Country	the original survey	Available years		
		Mid 1970's	Mid 1980's	Mid 1990's
Canada	Survey of Consumer Finances	1975	1985	1995
Finland	Finnish Income Distribution Survey	1976	1986	1995
Germany	Socio-Economic Panel	..	1984	1994
Italy	Survey of Household Income and Wealth	..	1984	1993
Japan ^{a)}	Comprehensive Survey of Living Condition of the People on Health and Welfare	..	1985	1995
Netherlands	Income survey and Income panel survey, based on tax files	1977	1985	1994
Sweden	Income Distribution Survey, based on tax records	1975	1983	1994
United Kingdom	Family Expenditure Survey	1975	1985	1995
United States	Current Population Survey	1974	1984	1995

Note: a) Special tabulation for the comparative study of retirement income policies in nine countries

Source: OECD questionnaire on distribution of households incomes (1999)

18. The second wave includes not only current data but also some revised old data and supplemented data for the years of economic recession. Some countries used different micro data sets for the second wave.

116. The data distinguish the following income sources:

1. Income from work, excluding employers' contributions to social security, and including sick pay paid by governments.
2. Capital incomes, including occupational pensions, property incomes and all kinds of private transfers.
3. Social security transfers, including accident and disability benefits, social retirement benefits (from public sources), unemployment benefits, maternity allowances, child and/or family allowances (from public sources), all income-tested and means-tested benefits. All kinds of in-kind benefits are excluded.
4. Direct taxes and social security contributions.

A.2 Data limitations

117. Policy analysis based on a cross-section of households is invariably difficult and subject to many limitations. Cross-sectional data cannot be used to examine what happens in particular households or to particular individuals over time. Interpretation of trends is affected by the general economic conditions that prevailed in the particular years that were chosen for comparative purposes. Potentially important information about assets, savings and consumption are typically not included. Income from the 'grey' economy is likely to be under-reported. There are also limitations relating to sample size etc. This study is subject to most of these limitations as well and the text emphasises areas where caution is needed in interpretation. Five limitations of our specific data set, however, deserve special mention.

118. One is that, in some countries, the data for taxes and social security contribution are based on simulations rather than on data provided directly by individuals at the time of the original data collection. It is still unclear whether this will affect the comparability of international comparisons.

119. A second limitation is in the Swedish data where "tax units" are used instead of households. For example, two adults plus one working older child living together would be counted as a single "household" in most countries but as two tax units in the Swedish data. It seems that the younger age population is affected more than the older age population. As a result, there is some possibility that the Swedish data underestimates average incomes compared with other countries.

120. A third possible limitation is the absence of sub-national breakdowns. Considering the diversity of consumer price indices among regional areas, this lack of geographic detail could limit understanding. A fourth limitation results from the exclusion of various benefits and tax concessions. The definition of social security transfers ignores benefits in kind such as residential care service, home-help services, medical care services, food stamps, etc. They also exclude indirect taxes and tax deductions because of difficulties of harmonising different definitions and estimations for each country. Employer contributions for social security and private pensions are also ignored. These exclusions are likely to cause some bias in interpreting the results, especially for of the lowest and highest income groups. The lowest income group usually receives more in-kind benefits, often associated with a means test. The highest income group has a higher probability of being covered by occupational or personal pension schemes and receiving employer

contributions for such schemes. A fifth limitation is the response error. Generally, interest income or self-employed income reported in surveys is lower than that reported in the adjusted national accounts.¹⁹

A.3 "Older individuals" versus "households headed by an older person"

121. Income analysis needs to take both individuals and households into account. For example:

- If only a household base were used (*i.e.*, households headed by an older person), then the existence of some older people in households headed by younger people would be hidden – such as older people living with their children as subordinate persons.
- In some countries, the numbers of household members have been decreasing over the past decades. Analysis based only on a household unit would ignore these changes.
- Analysis based only on the individual level ignores the fact that some sources of income are shared among household members and that households have economies of scale. A household of six people does not need twice the income of a household of three people.

122. Often age-related analysis is based on the income position of "households headed by a older person", usually defined as a household whose head is in receipt of pension or is over the "official" retirement age of 65. This approach has many advantages. However it is gradually becoming less relevant. It is based on the notion of a household that consists of an older breadwinner, with a younger spouse either with no income or whose income plays a supplementary role. A sharp break in the situation of the household is implicitly assumed to occur when the breadwinner retires and replaces work income with pension income.

123. This model is becoming eroded. Income from sources other than pensions now play a substantial role among middle- and upper-income groups. Assuming a sharp break between work and retirement is no longer seen as helpful in policy terms. And two earners in a family are becoming the norm, with concepts such as "head of household" becoming less useful. Accordingly, most of the analysis in this report is based on the concept of "adjusted individualised household income".

124. Household and individual data can be reconciled by using two devices: equivalence scales and assumptions about the distribution of income in households. There are differences in household sizes among covered countries, shown in Table A.2.²⁰ Even in the same country, the household size has changed. Especially in Japan and the Netherlands, households have been shrinking over the past decade; the use of equivalence scales ensures comparability between different time periods.

19. See Atkinson *et al.* (1995), Table 3.7 for the estimation of the difference between the estimation based on micro data sets and the adjusted national accounts.

20. The household size shown in the Annex is based on demographic information in income data, which are used for the OECD questionnaire on distribution of household incomes. Therefore, the number is not necessarily identical with Census data in each country.

Table A.2 Household size, mid-1980s and mid-1990s, and change

	Average number of household members		Change (percent)
	Entire population		
	Mid 1980s	Mid 1990s	
Canada	2.7	2.6	-5.2
Finland	2.4	2.2	-8.6
Germany	2.6	2.5	-4.6
Italy	3.1	3.0	-3.9
Japan	3.4	2.9	-14.9
Netherlands	2.6	2.3	-11.1
Sweden	1.8	1.8	-1.4
United Kingdom	2.6	2.4	-6.0
United States	2.7	2.7	-1.4

Note : Since the numbers are obtained by income survey data, the numbers could be different from the National Census data.

Source : Calculations from the OECD questionnaire on distribution of household incomes (1999).

125. The first assumption relates to the equivalence scale. This is the technique that is used to adjust for the fact that there are economies of scale in households. The equivalence scale to adjust for family size is the square root of household size in our analysis. This means that if there are four members of a household and they earn 200 units income, the value of the income for each member is not 50 ($= 200 / 4$) units of income. Rather, we divide by the total income by 2 (that is, $4^{0.5}$) and the value of income for each household member is 100 ($= 200 / 4^{0.5}$). This is a commonly used approach, but it is arbitrary. Other methods (for example, using a different weight for children) would give different results, but the basic cross-country comparisons in this paper would not change significantly.²¹

126. The second assumption is that all income, including all social security transfers, would be equally shared among all members of the household. For example, suppose there is a household, which consists of four members. The household head earns 200 units income and there is no other income for the household. The assumption means that each member of the household receives 50 ($= 200 / 4$) units of income equally without consideration of economies of scale. This means that if there were a household consisting of a 67-year old in receipt of a pensions and a 50-year old spouse in receipt of work income, the data for the 50-year old would include pension income as well as work income.

127. Once again, this assumption is arbitrary. For an example, if the household head has strong bargaining power and he or she wants to allocate their income selectively to their child's education, then

21. See Atkinson *et al.* (1995) pp.18-21 for a useful summary of different kinds of equivalence scale and for the explanation why they applied the square-root equivalence scale (the elasticity of 0.5) for their analysis. OECD (2001) pp.80-81 also shows there is no major difference related to the poverty rate between the modified OECD equivalence scale, which gives different weights by age, and the square-root equivalence scale. See also the annex in Yamada and Casey (2002) for sensitivity analysis of different equivalence scales for Gini coefficients and the low- and high-income rates. This sensitivity analysis is available for the working- and the retirement-age population separately. The Gini coefficients of the working-age population take the lowest value, when the square root of household size is employed as the equivalence scale. This is not the case for the retirement-age population. However, in summary, there is no qualitative difference for the selection of equivalence scale in terms of ranking by two age groups.

other household members will receive less than 50 units of income. Or work income and pensions may not necessarily be shared equally by household members. However, it is unlikely that this arbitrariness would greatly affect the basic conclusions that are drawn from the cross-country comparisons found in this report.

A.4 An examination for with and without the assumption of economies of scale

128. To understand an assumption of economies of scale Table A.3 is useful. The table shows disposable income of three different household types with the total average using two values of elasticity: elasticity for the case there is "no economies of scale (per capita household income)" and the case there are "economies of scale". Those two household types are a majority of people living in the household headed by the age 65 and over. Disposable income of the population aged 18 to 64 is set at 100%. The numbers in parentheses indicate rank.

Table A.3 **The Comparison of with and without economies of scale**
Mean disposable income as a percentage of mean disposable income of the population aged 18 to 64

	the population aged 65 and over in the households headed by the person aged 65 and over				the total population aged 65 and over	
	single adult, not working		two or more adults, no worker			
	Without the assumption for the economies of scale: elasticity = 1.0					
Canada	113	(1)	100	(3)	110	(2)
Finland	92	(1)	91	(3)	92	(2)
Germany	108	(1)	92	(3)	101	(2)
Italy	98	(1)	86	(3)	96	(2)
Japan	78	(2)	77	(3)	88	(1)
Netherlands	111	(1)	90	(3)	100	(2)
Sweden	94	(2)	89	(3)	96	(1)
United Kingdom	92	(1)	78	(3)	87	(2)
United States	93	(2)	86	(3)	101	(1)
	With the assumption for the economies of scale: elasticity = 0.5					
Canada	69	(3)	89	(2)	92	(1)
Finland	61	(3)	83	(1)	76	(2)
Germany	70	(3)	85	(1)	81	(2)
Italy	54	(3)	71	(2)	79	(1)
Japan	44	(3)	64	(2)	83	(1)
Netherlands	71	(3)	82	(1)	80	(2)
Sweden	68	(3)	91	(1)	85	(2)
United Kingdom	58	(3)	70	(2)	70	(1)
United States	58	(3)	77	(2)	84	(1)

Sources: Calculations from the OECD questionnaire on distribution of household incomes (1999)

129. It seems that non-working single households are relatively well off in the top table. For example, non-working single households in Germany receive incomes that are 16 (= 108 - 92)% higher than two or more member households with no worker. Compared with the population aged 65 and over total, they receive 7 (= 108 - 101)% more. But, once we apply "economies of scale" for calculation, this relative economic position is changed. Taking an example from Germany again, the bottom panel indicates that the income of people in non-working single households become 15 (= 85 - 70)% less than that of two or more member households with no worker, and 11 (= 81 - 70)% less than the population aged 65 and over total.

ANNEX 2: TABLES

Table 2.1 Disposable income of older age groups ^{a)}

	Canada			Finland			Germany			Italy			Japan			Netherlands			Sweden			United Kingdom			United States		
	mid 70s	med 80s	mid 90s	med 70s	mid 80s	mid 90s	mid 70s	mid 80s	med 90s	mid 70s	med 80s	mid 90s	med 70s	mid 80s	mid 90s	mid 70s	med 80s	med 90s	mid 70s	med 80s	mid 90s	med 70s	mid 80s	mid 90s	mid 70s	mid 80s	med 90s
	Age 65-74 to...																										
All Ages	55	91	98	74	81	85	..	85	93	..	82	86	..	91	89	92	93	90	77	87	95	73	74	80	90	99	98
18-25	63	89	99	69	83	97	..	86	97	..	77	82	..	85	86	84	89	93	93	117	160	62	65	72	87	100	106
26-40	49	88	98	67	78	84	..	83	93	..	77	81	..	95	90	93	91	86	70	83	96	73	70	75	86	95	97
41-50	51	78	87	68	70	76	..	75	78	..	78	78	..	85	82	86	85	79	65	74	80	62	60	65	77	84	84
51-65	69	82	87	80	78	79	..	78	84	..	76	79	..	82	80	81	83	81	71	76	76	67	70	74	76	82	80
	Age 75+ to...																										
All Ages	49	84	94	70	74	78	..	81	78	..	78	82	..	92	87	93	84	79	60	68	78	71	72	74	78	84	82
18-25	56	83	95	66	76	89	..	82	81	..	73	79	..	86	84	84	80	82	72	92	130	60	64	67	75	86	88
26-40	44	82	94	64	72	77	..	79	78	..	73	78	..	96	88	93	82	76	54	65	78	70	69	70	75	81	80
41-50	46	72	83	65	64	69	..	72	65	..	74	75	..	86	80	86	77	69	50	58	65	59	58	60	67	72	69
51-65	62	76	83	76	72	72	..	74	71	..	72	75	..	83	78	82	75	71	55	60	62	65	69	69	66	70	66

.. Data not available.

a) Disposable income of people age 65-74 (or people age 75 and over) divided by disposable income of x-y years old.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

Table 2.2 **Disposable income of the population aged 65 and over by income decile** ^{a)}

	Low income group					High income group				
	↔									
	Decile									
	1	2	3	4	5	6	7	8	9	10
Canada	148	107	94	87	85	86	86	86	87	96
Finland	101	83	78	75	73	72	72	72	73	75
Germany	102	90	84	82	80	79	78	79	81	79
Italy	128	92	86	81	78	76	76	77	77	75
Japan	72	73	75	77	77	78	81	84	87	94
Netherlands	83	77	74	72	74	77	80	82	80	82
Sweden	89	84	81	80	79	79	79	83	79	83
United Kingdom	76	69	66	64	64	65	67	72	67	72
United States	80	78	77	78	78	81	83	94	83	94

Note: a) Disposable income of the retirement-age population in decile x divided by the disposable income of the working-age population in decile x.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

Table 2.3 **Ratio of disposable income of older people in “retired” households** ^{a)}
to disposable income of people aged 18 to 64

	Older people in the "retired" households					
	single adult, not working			two or more adults, no worker		
	mid 70s	mid 80s	mid 90s	mid 70s	mid 80s	mid 90s
	Canada	33	61	69	40	77
Finland	53	60	61	66	79	83
Germany	..	69	70	..	78	85
Italy	..	49	54	..	66	71
Japan	..	38	44	..	58	64
Netherlands	80	75	71	82	83	82
Sweden	56	65	68	66	79	91
United Kingdom	51	53	58	60	64	70
United States	51	61	58	66	80	77

Note: a) The “retired” household means the households with no one in the labour market headed by a person aged 65 and over.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999)

Table 3.1 Overall trends in income distribution: summary results
mid-1970s to mid-1980s, and mid-1980s to mid-1990s

	Relative change ^{a)} of the Gini coefficients				Relative size ^{b)} of the Gini coefficients (working < (>) retirement age population)		
	mid 1970's to 1980's		mid 1980's to 1990's		mid 1970's	mid 1980's	mid 1990's
	the working age population	the retirement age population	the working age population	the retirement age population			
Canada	0	---	0	--	<<<	<	>>
Finland	--	---	+++	-	<<<	<	>>
Germany			++	-		<	>>
Italy			+++	+		>	>>
Japan			+	0		<<<	<<<
Netherlands	++	0	++	+	0	>	>>
Sweden	-	---	+++	++	<<	>	>>>
United Kingdom	+++	0	++	++	<<	>>	>>
United States	++	0	0	0	<<<	<<	<

Note: blank; no data available

- a) +++ (- - -) more than 12 per cent increase in the Gini coefficients (decrease in the Gini coefficients)
 ++ (- -) 7 to 12 per cent increase in the Gini coefficients (decrease in the Gini coefficients)
 + (-) 2 to 7 per cent increase in the Gini coefficients (decrease in the Gini coefficients)
 0 -2 to +2 per cent change in the Gini coefficients
- b) <<< (>>>) at least 12 per cent larger (smaller) than the Gini coefficients of younger age population
 << (>>) 7 to 12 per cent larger (smaller) than the Gini coefficients of younger age population
 < (>) 2 to 7 per cent larger (smaller) than the Gini coefficients of younger age population
 0 -2 to 2 per cent difference

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

Table 5.1 Real income growth, retirement age, by income quintile
Percentages, mid-80s to mid-90s

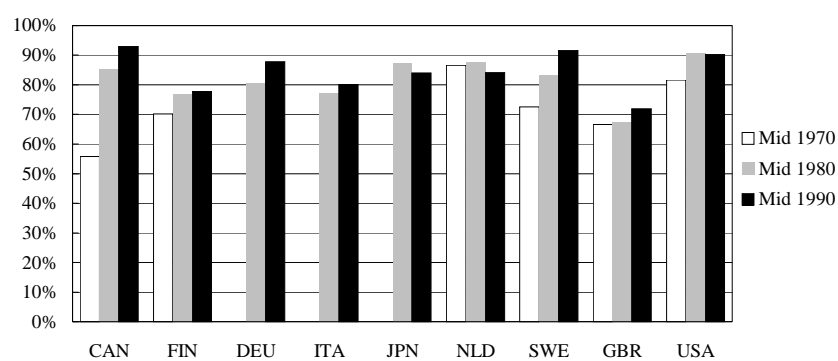
	Total population	Retirement-age population				
		Q1	Q2	Q3	Q4	Q5
Canada	-1	19	11	12	7	2
Finland	11	14	15	14	10	10
Germany	19	24	26	25	26	19
Italy	7	10	10	6	9	17
Japan	21	29	20	12	14	18
Netherlands	19	11	13	13	14	15
Sweden	16	18	20	23	29	38
United Kingdom	21	14	24	32	33	30
United States	7	3	7	4	2	5

Note: Shaded cells indicate higher income growth than that of total population.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

ANNEX 3: CHARTS

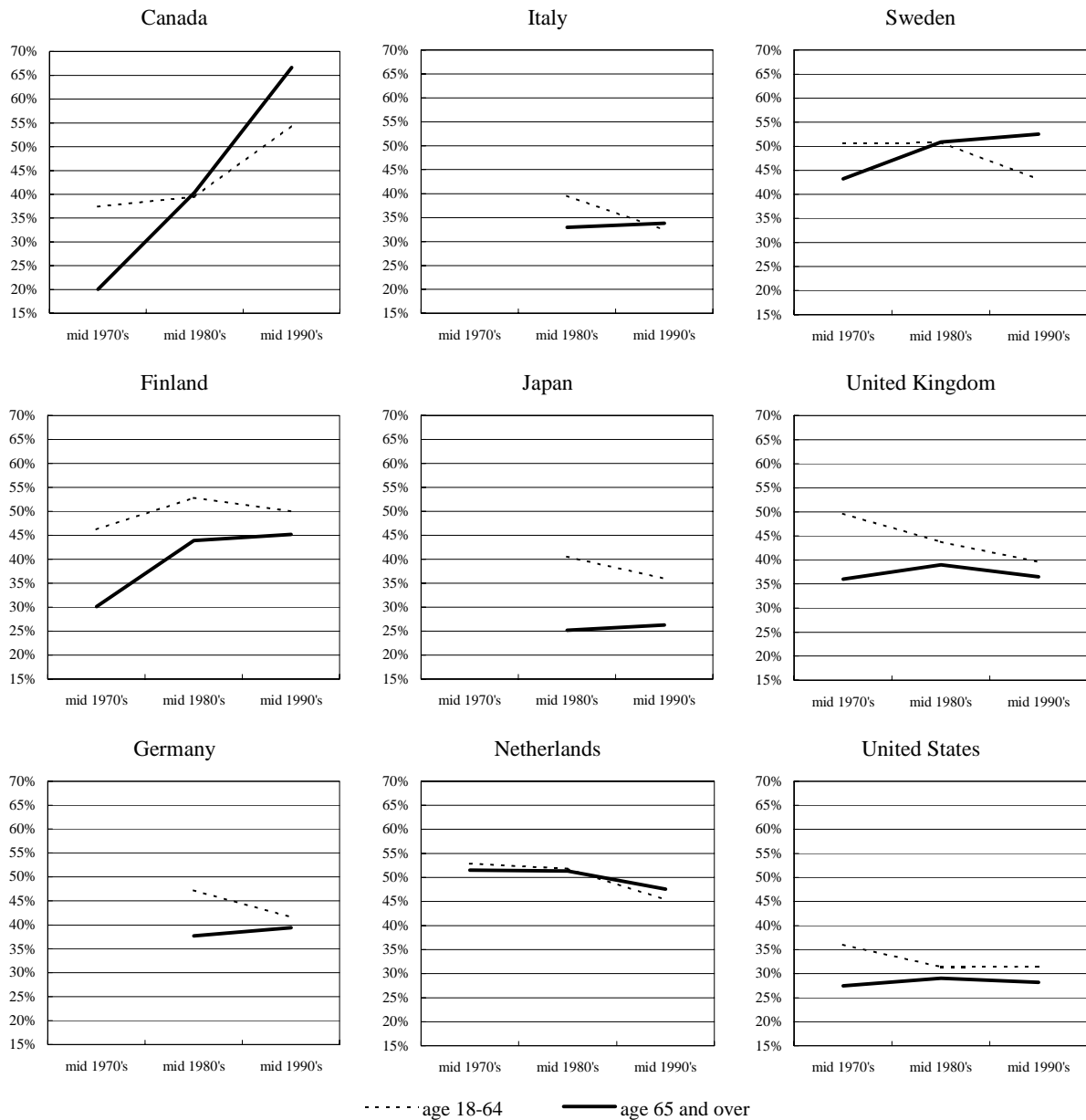
Chart 2.1 **Ratio of disposable incomes of people aged 65 to 74 to those of people aged 18 to 64**
Mid-1970s, mid-1980s and mid-1990s



Source: Calculations from the OECD questionnaire on distribution of household incomes (1999)

Chart 2.2 Mean disposable income of the lowest income quintile

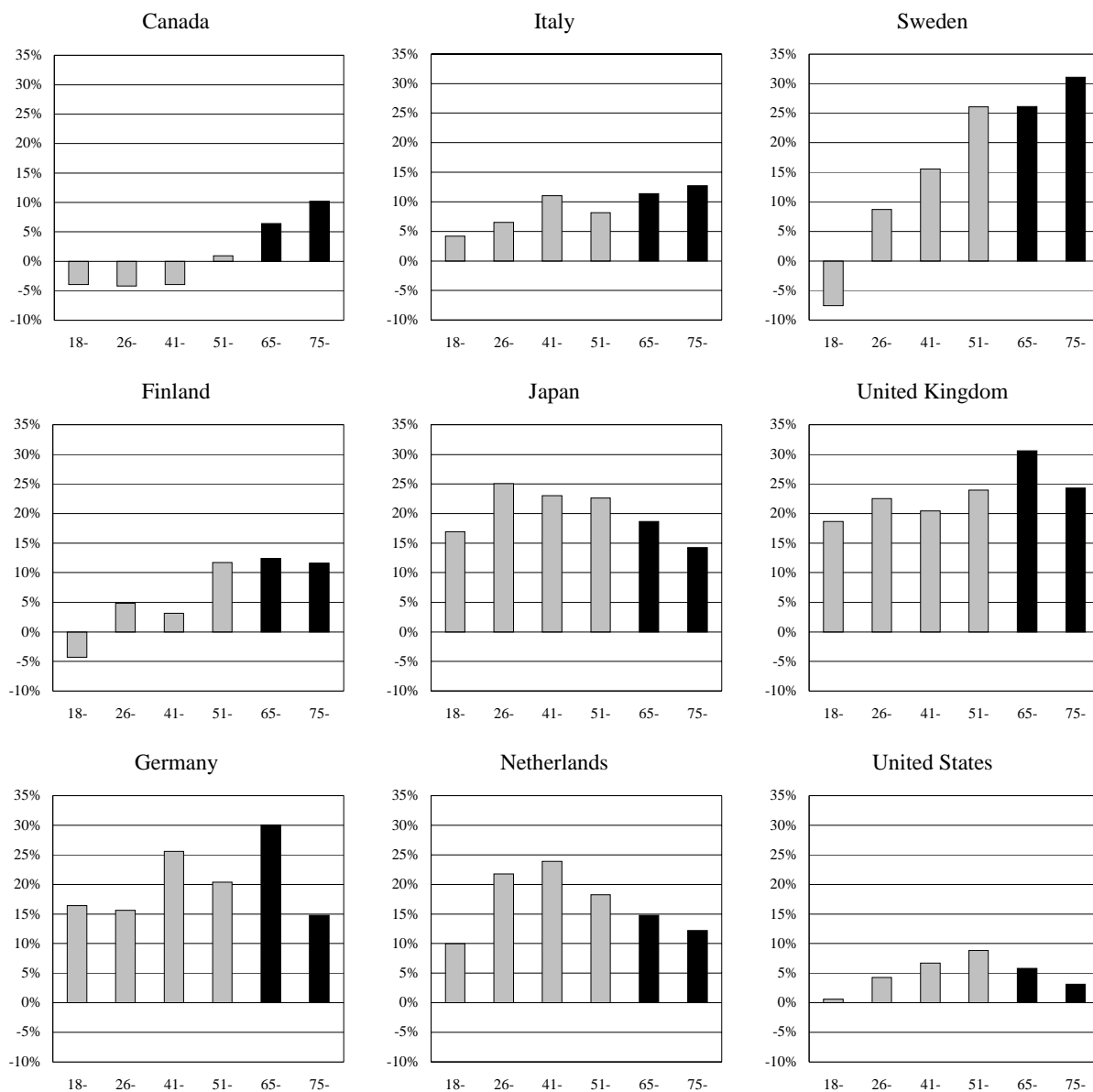
as a percentage of mean disposable income of people aged 18 to 64
mid-1970s, mid-1980s and mid-1990s



Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

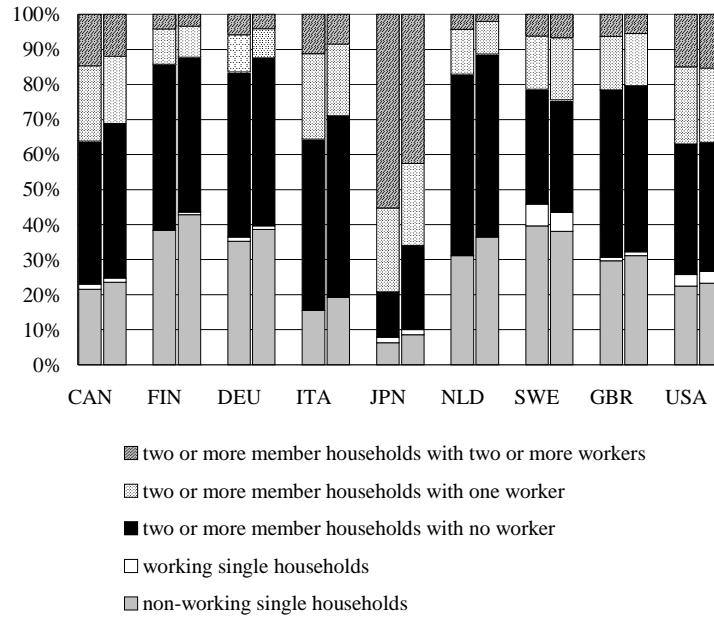
Chart 2.3 Real income growth rates by age group

mid-1980s and mid-1990s



Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

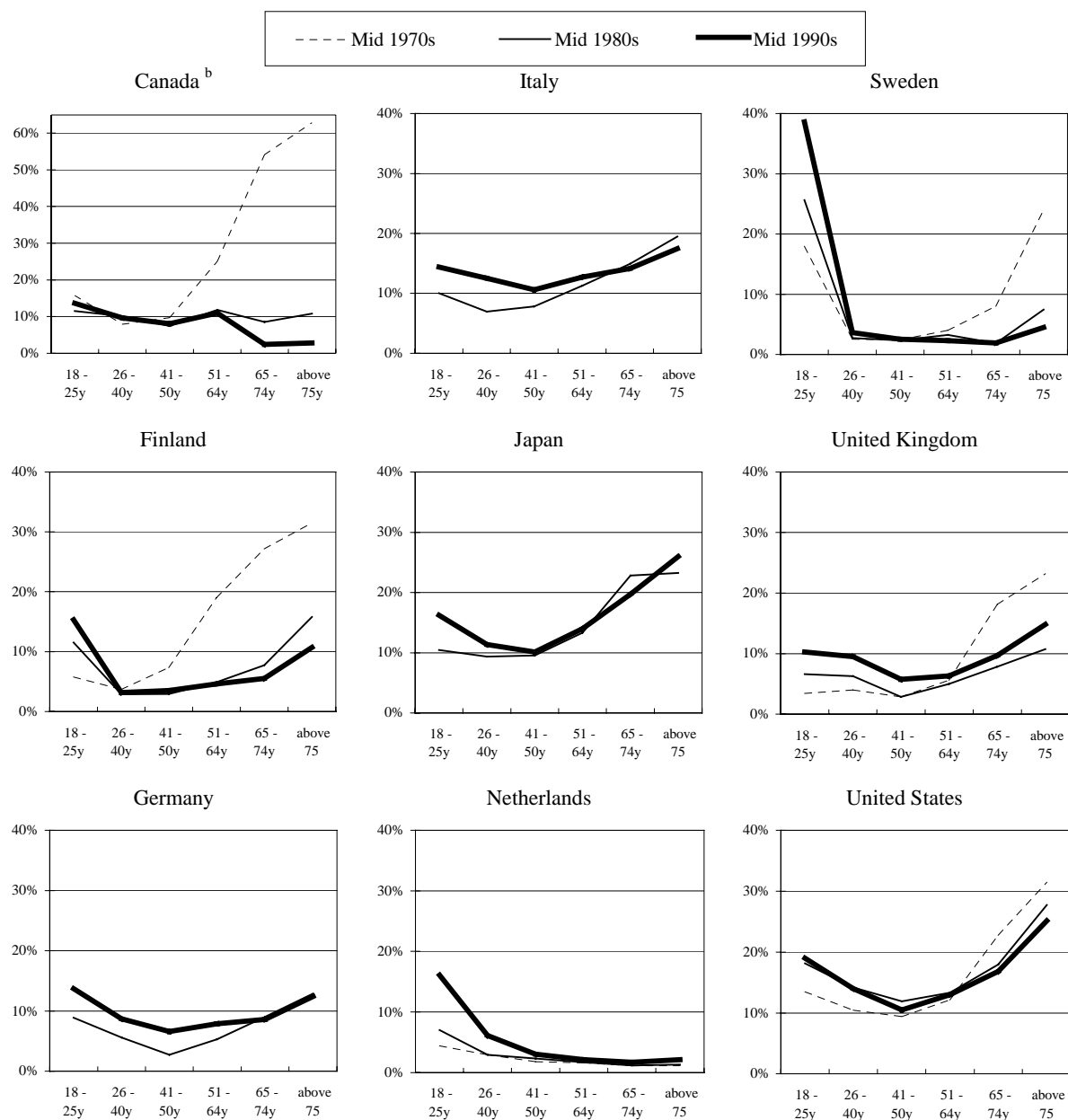
Chart 2.4 **Changing household^{a)} structure, by household size and work attachment**
mid-1980s to mid-1990s



Note: a) The population aged 65 and over living in the household headed by the person aged 65 and over.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

Chart 2.5 Percentage of population that is below the low income cut-off line^{a)}
by age group

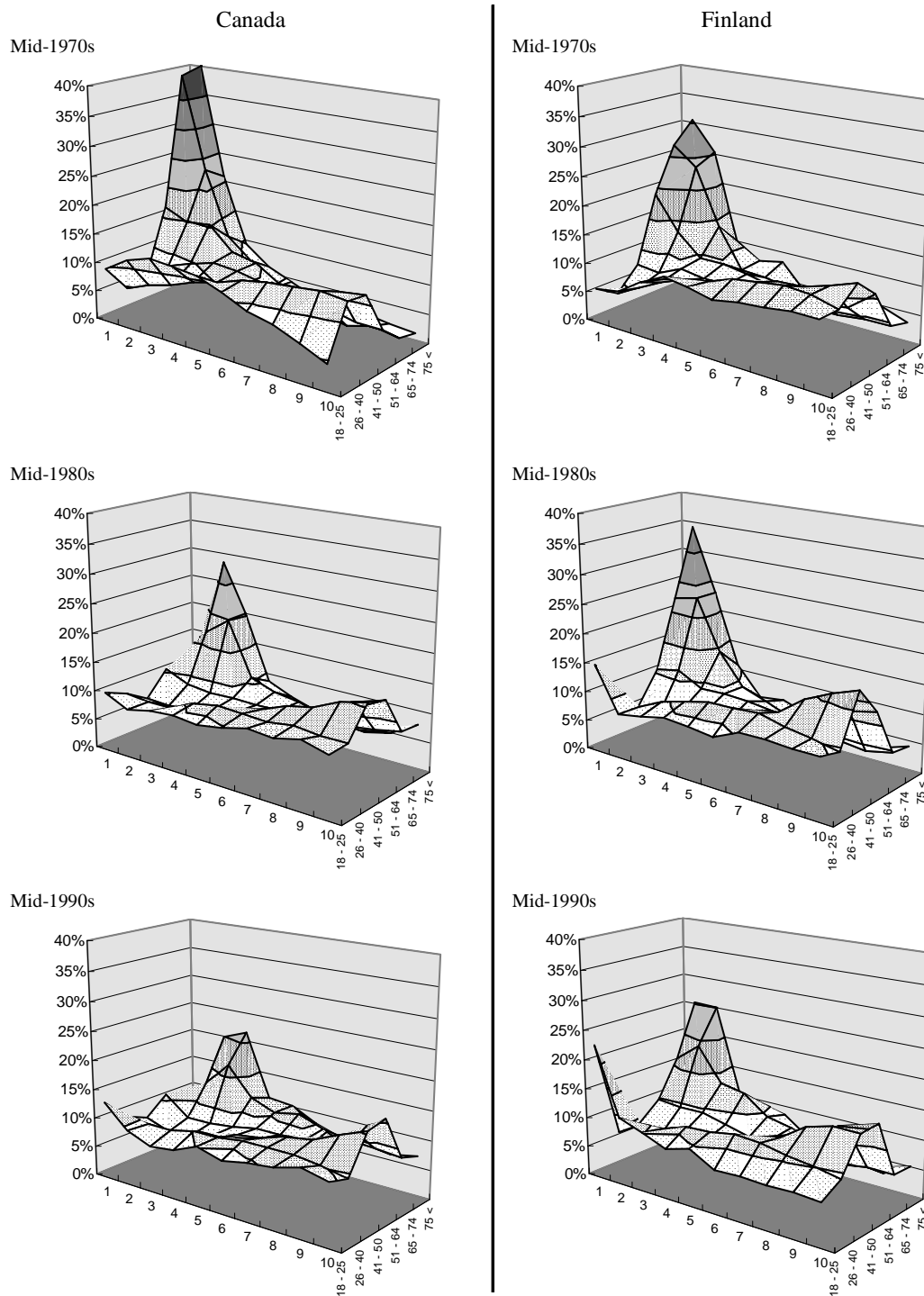


a) Low income cut-off line means 50% of median disposable income of the entire population.

b) Measure of vertical axis is different for Canada.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

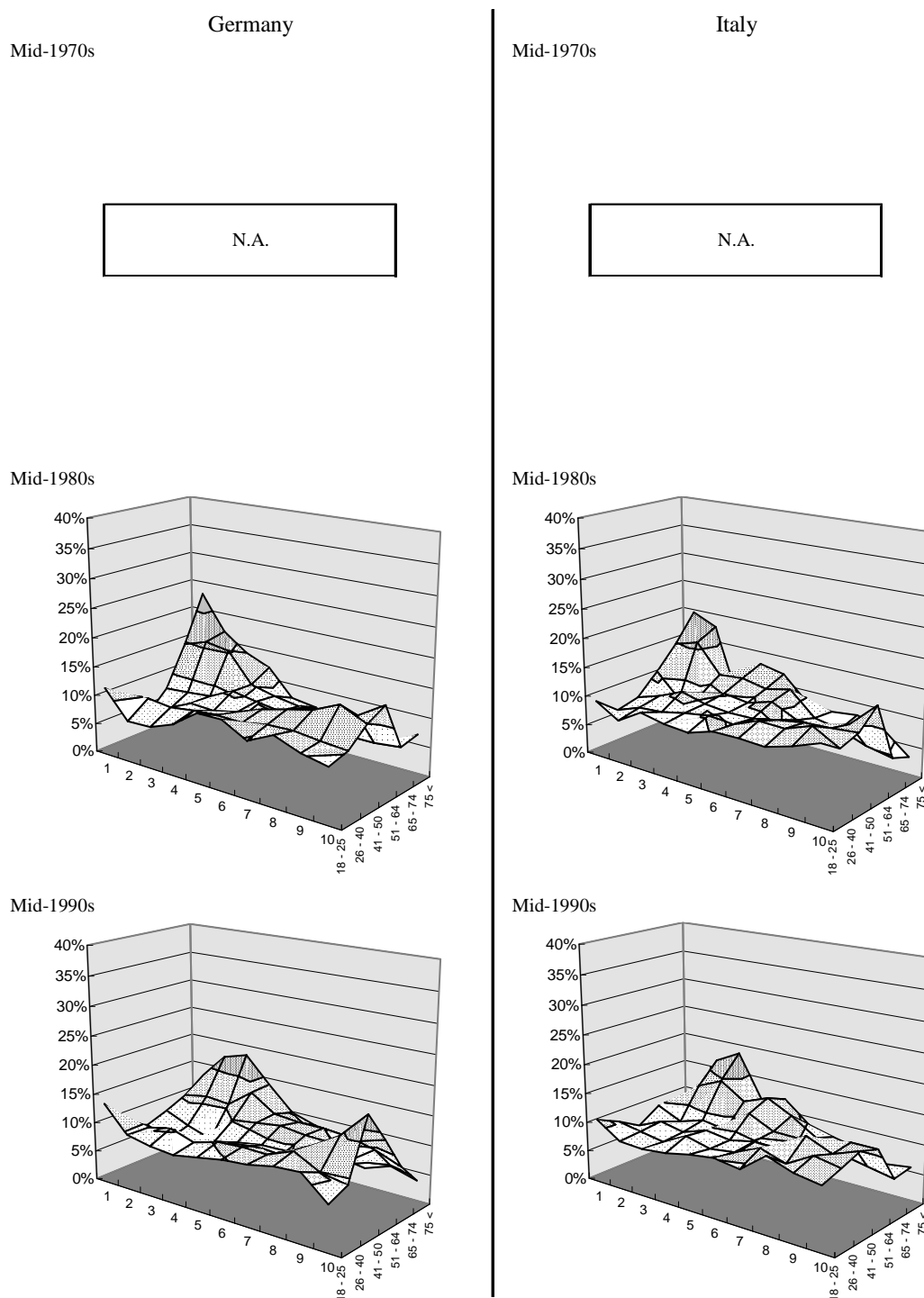
Chart 3.1 Population of income deciles as a percentage of each age category^{a)}



Note: a) The charts depict the relative risk of being in each income decile by age group.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999)

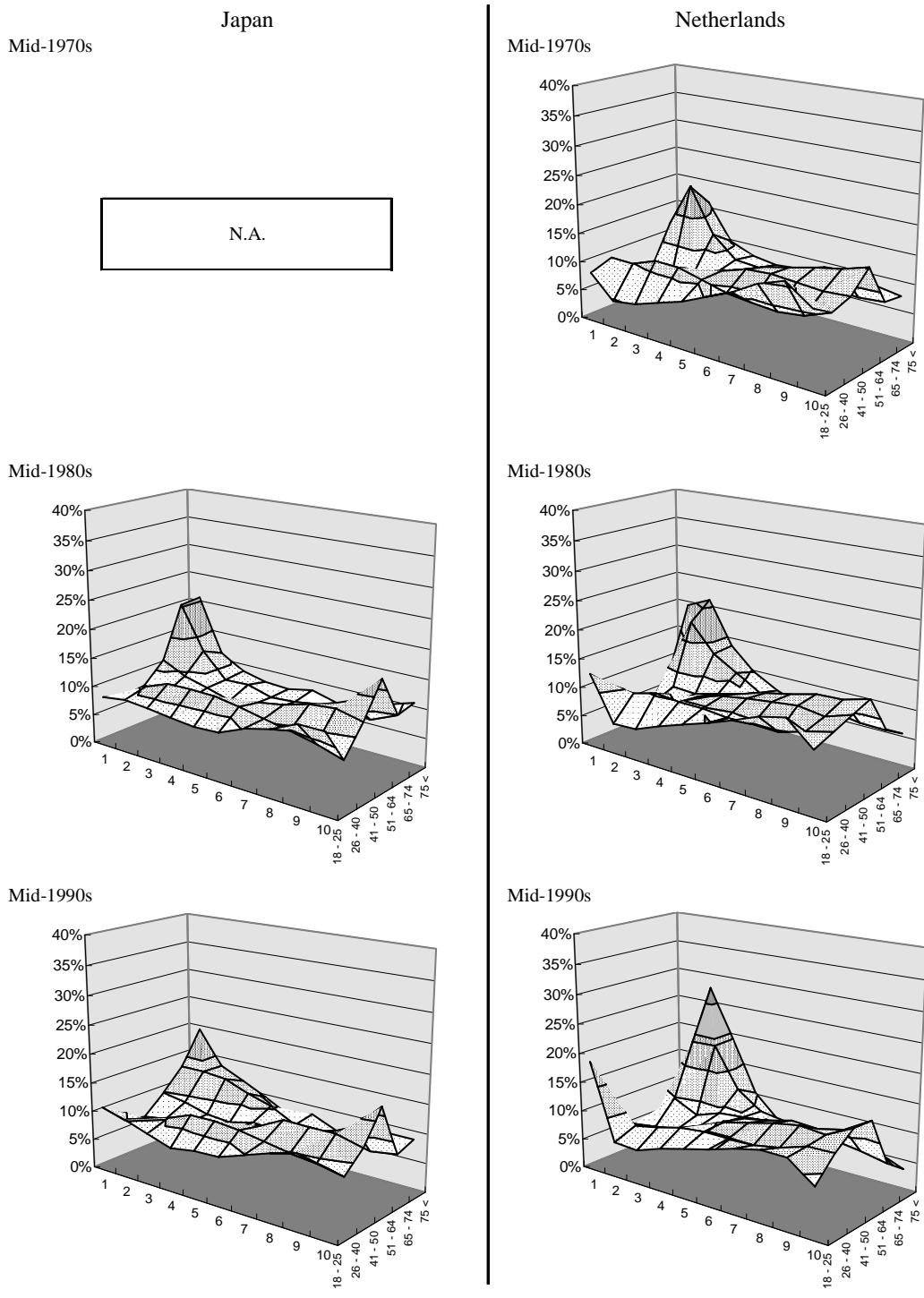
Chart 3.1 Population of income deciles as a percentage of each age category^{a)} (cont.)



Note: a) The charts depict the relative risk of being in each income decile by age group.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999)

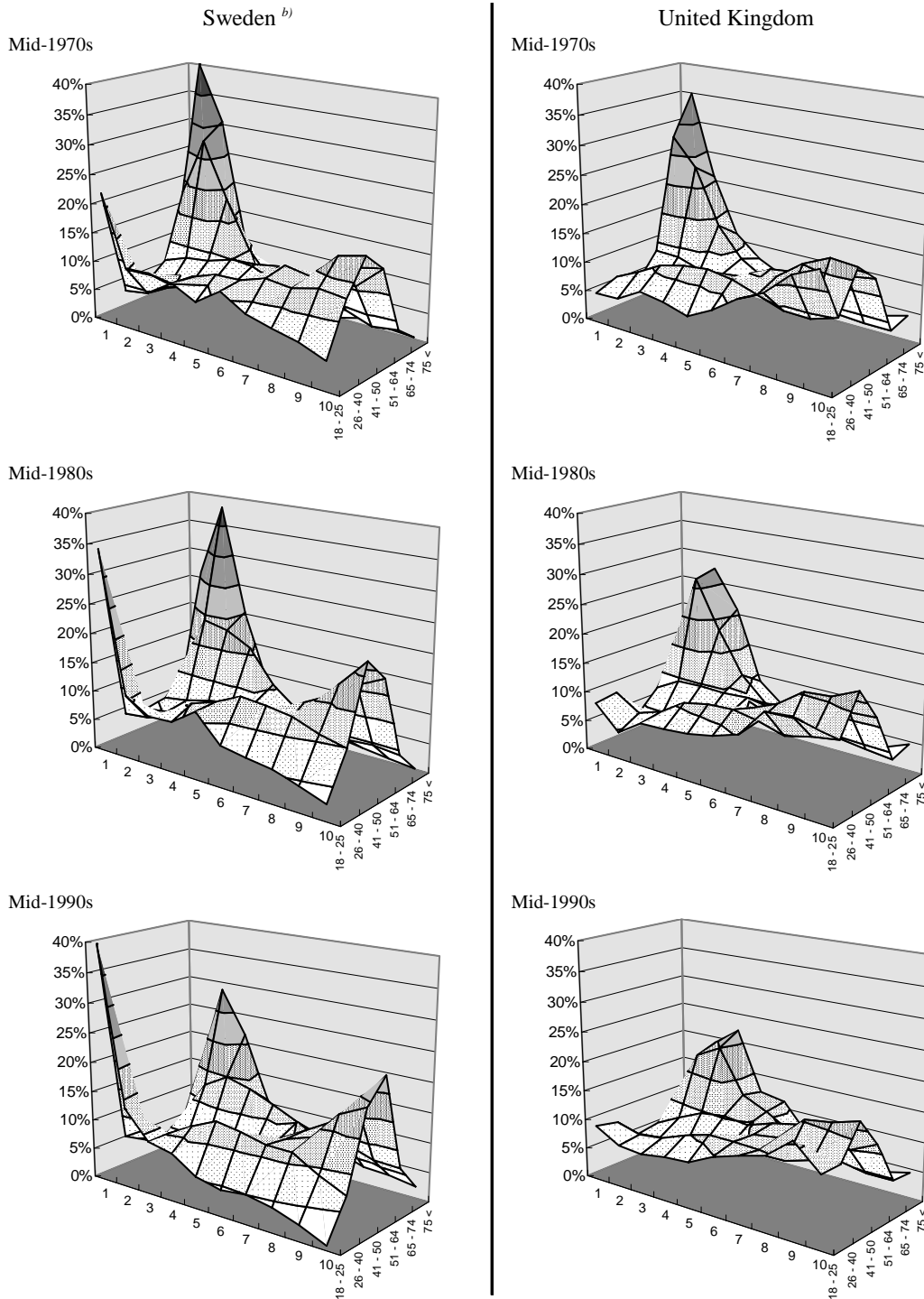
Chart 3.1 Population of income deciles as a percentage of each age category^{a)} (cont.)



Note: a) The charts depict the relative risk of being in each income decile by age group.

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999)

Chart 3.1 Population of income deciles as a percentage of each age category^{a)} (cont.)

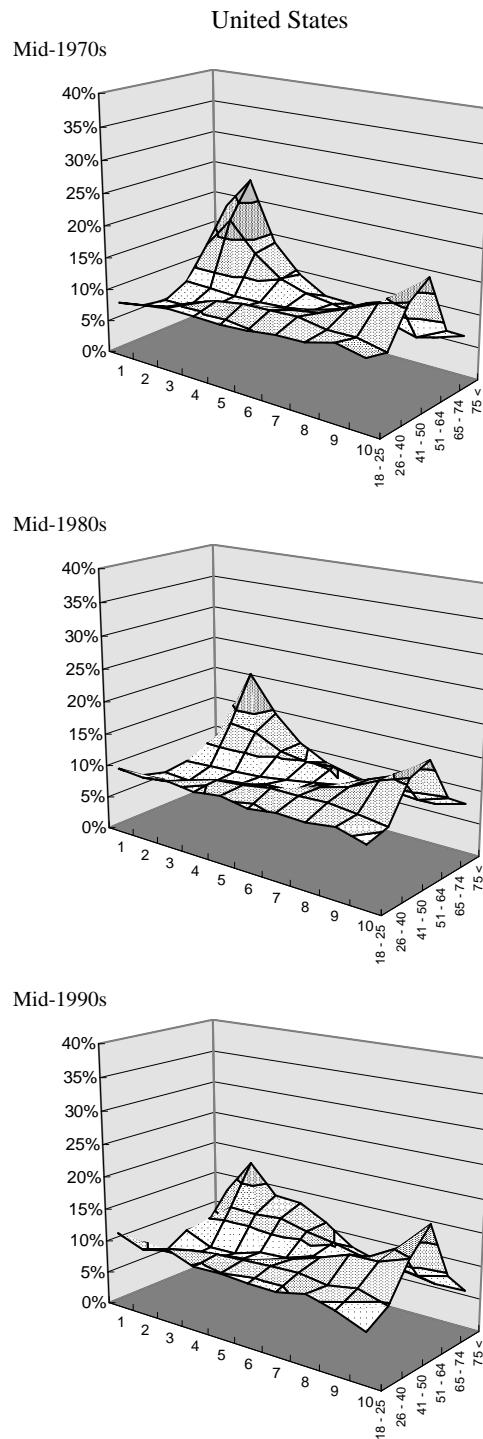


Note: a) The charts depict the relative risk of being in each income decile by age group.

b) The Swedish definition of household in the survey is based on "Tax Units". Therefore, the data, especially for the younger age group, are less comparable with other countries.

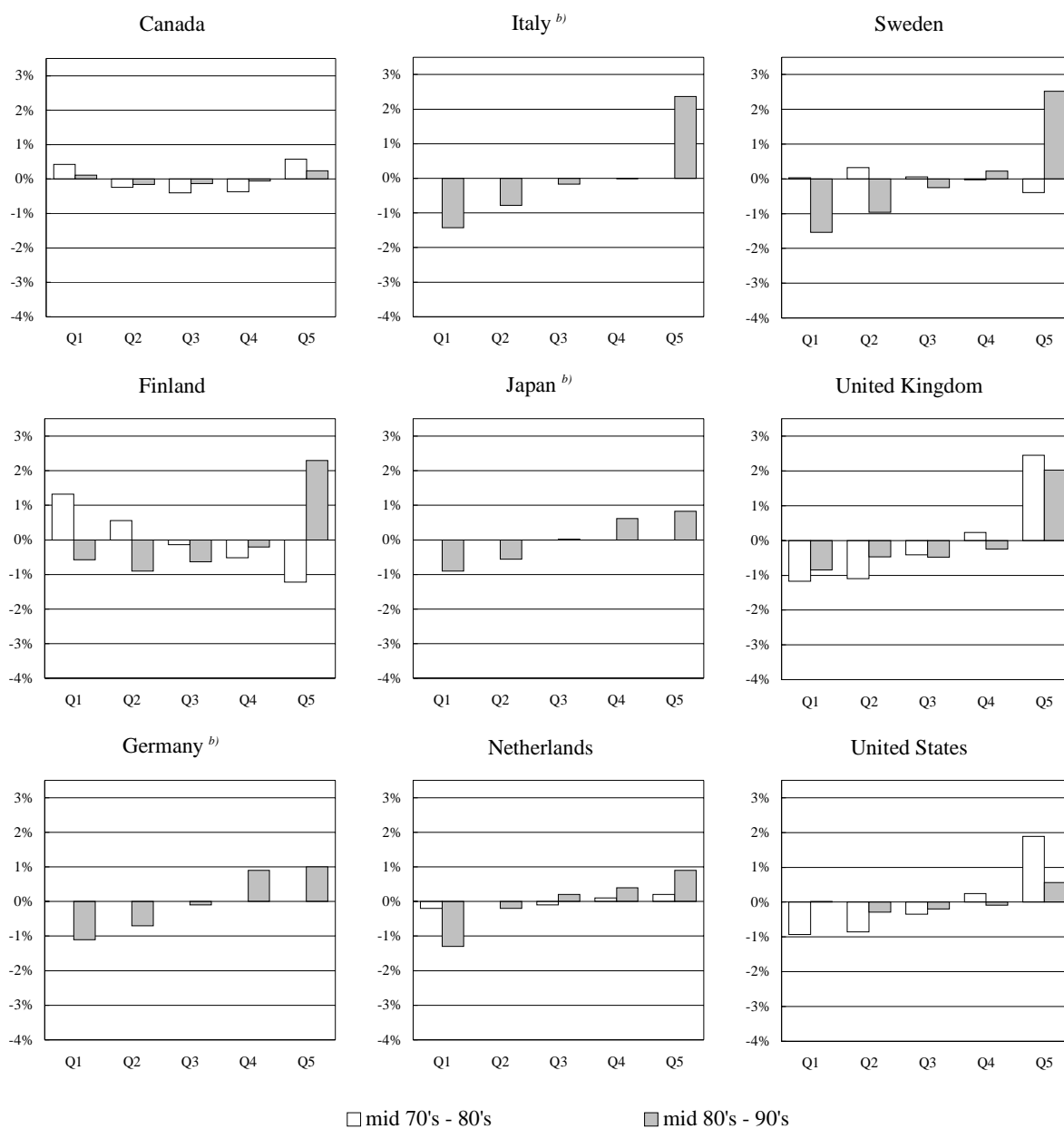
Source: Calculations from the OECD questionnaire on distribution of household incomes (1999)

Chart 3.1 Population of income deciles as a percentage of each age category ^{a)} (cont.)



Note: a) The charts depict the relative risk of being in each income decile by age group.
 Source: Calculations from the OECD questionnaire on distribution of household incomes (1999)

Chart 3.2 **Gains and losses of the share of disposable income by income quintile^{a)}**
 population aged 18 to 64, mid 1970s-80s and mid 1980s-90s

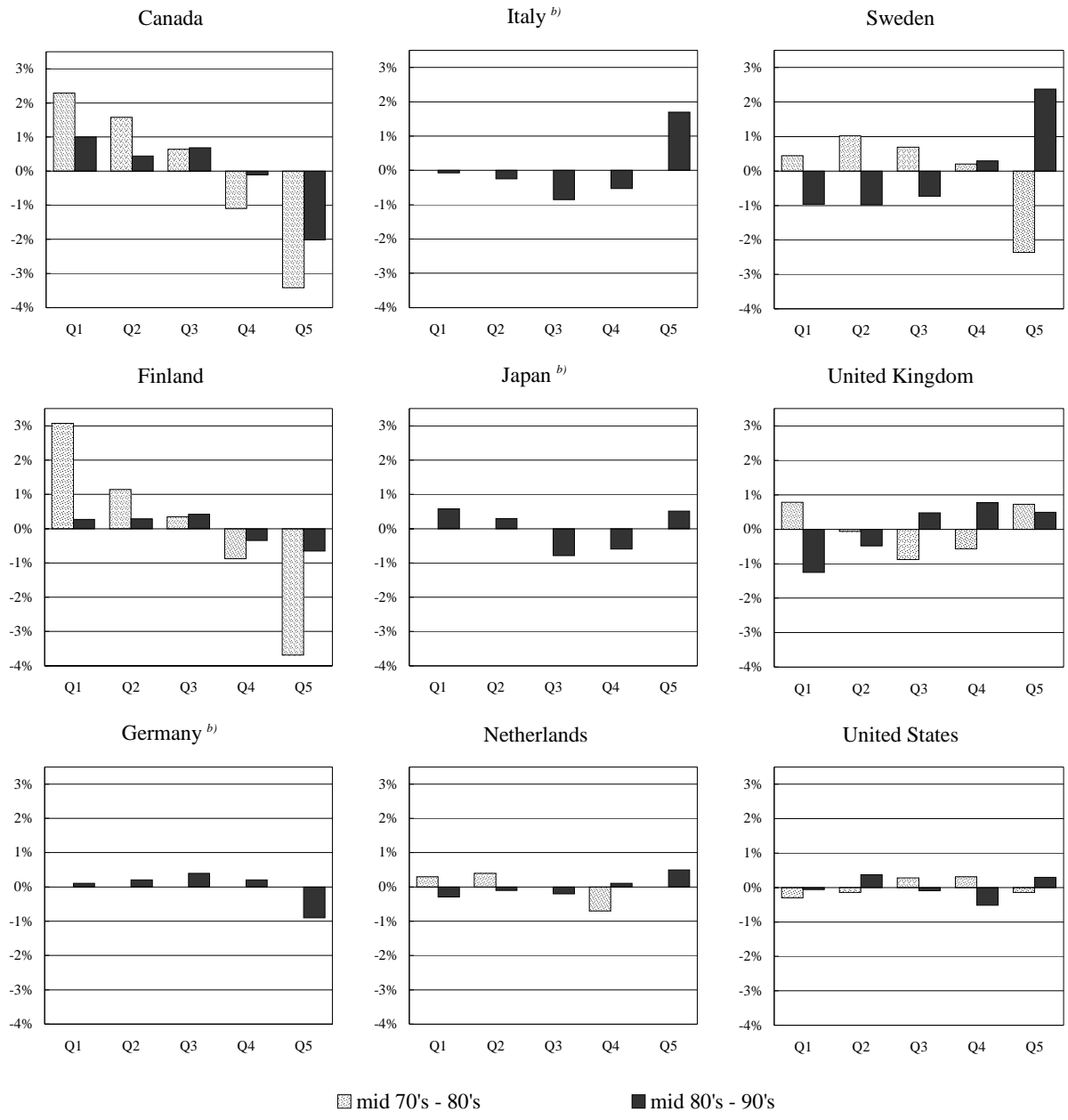


Note : a) The sum of the gains and losses in the same period is equal to nil.

b) The data for mid 1970s are not available in Germany, Italy and Japan.

Source : Calculations from the OECD questionnaire on distribution of household incomes (1999).

Chart 3.2 Gains and losses of the share of disposable income by quintile^{a)} (cont.)
 population aged 65 and over, mid 1970s-80s and mid 1980s-90s

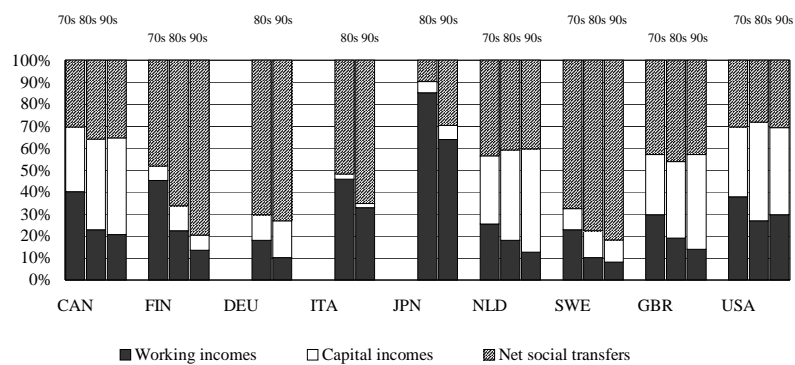


Note : a) The sum of the gains and losses in the same period is equal to nil.

b) The data for mid 1970s are not available in Germany, Italy and Japan.

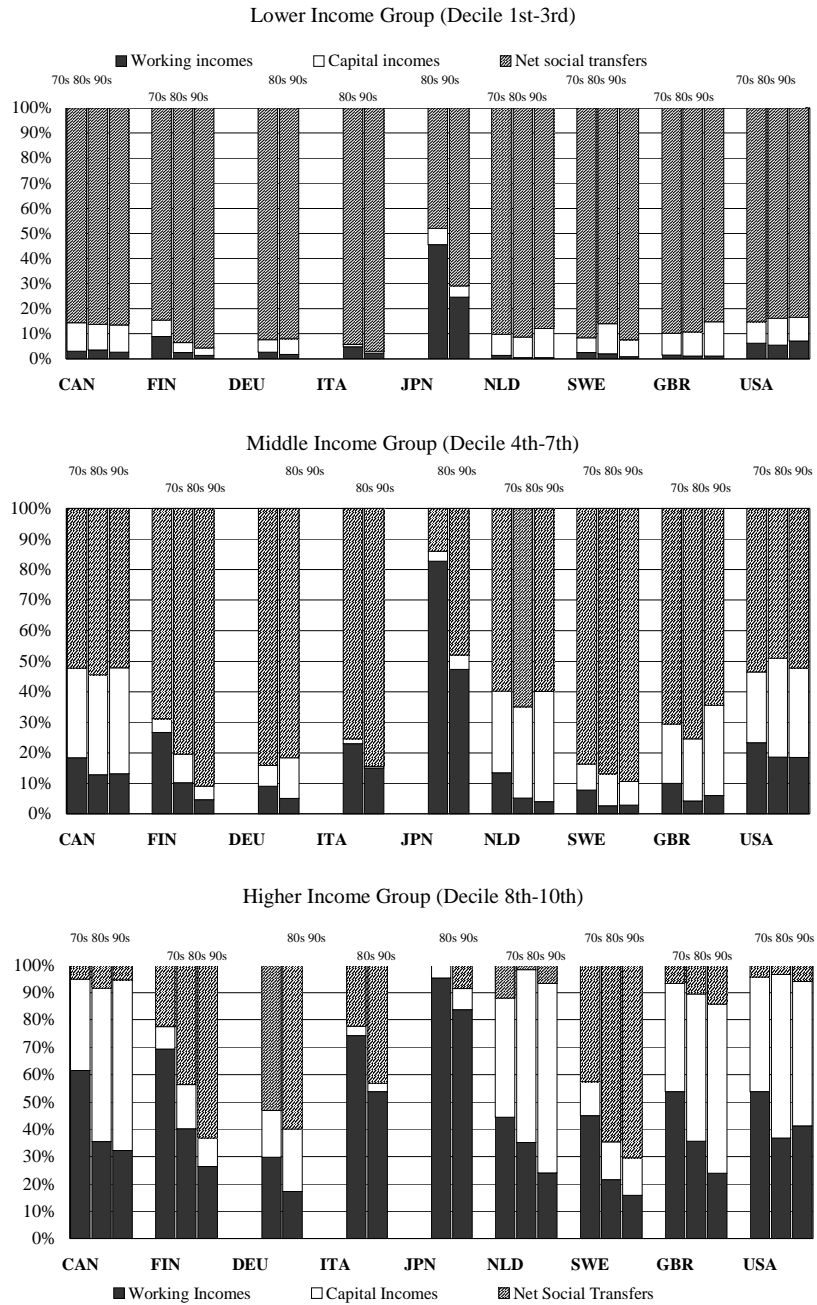
Source : Calculations from the OECD questionnaire on distribution of household incomes (1999).

Chart 4.1 Disposable income by source of income
age 65 and over



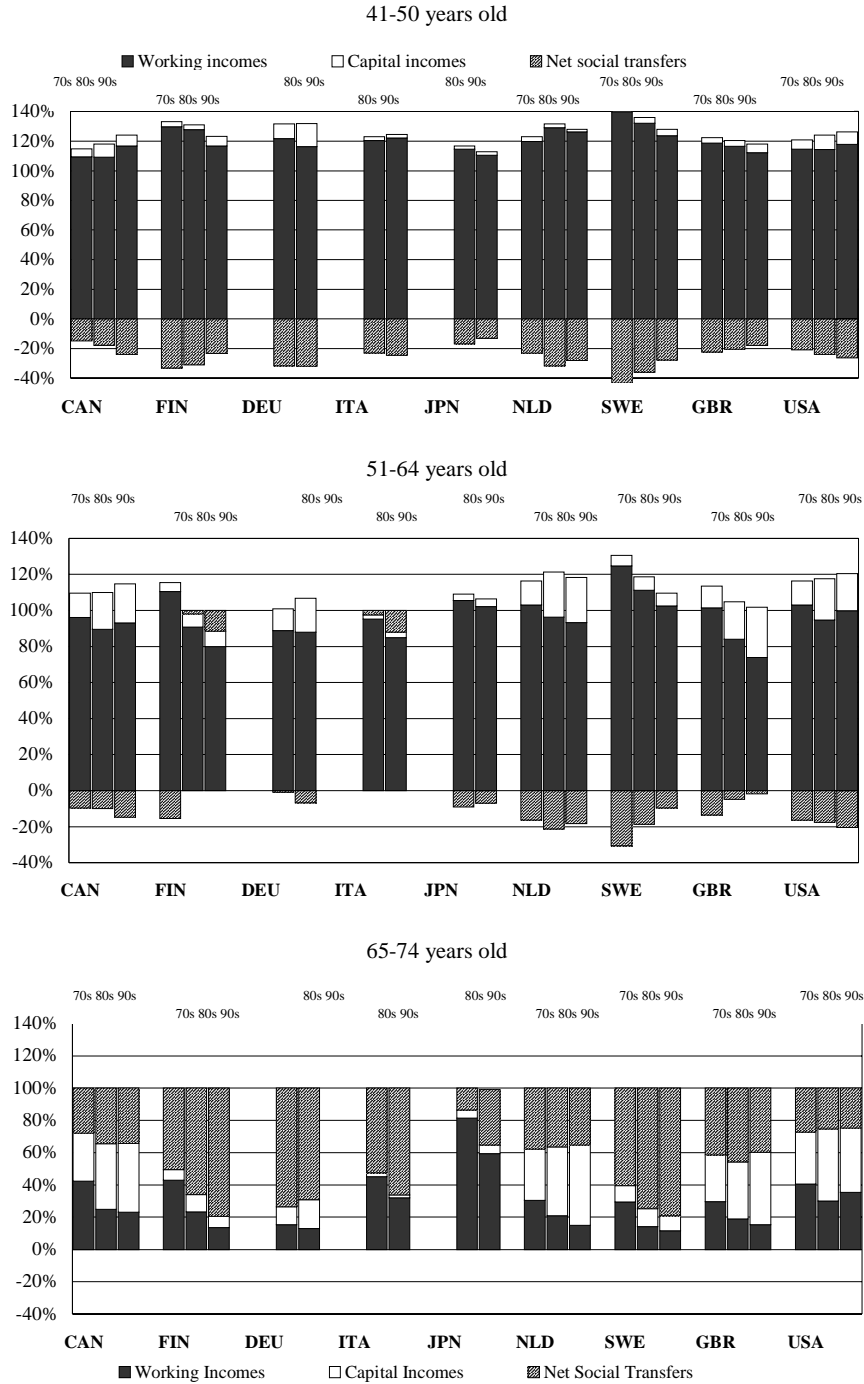
Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

**Chart 4.2 Trends in income sources, by income group
age 65 and over**



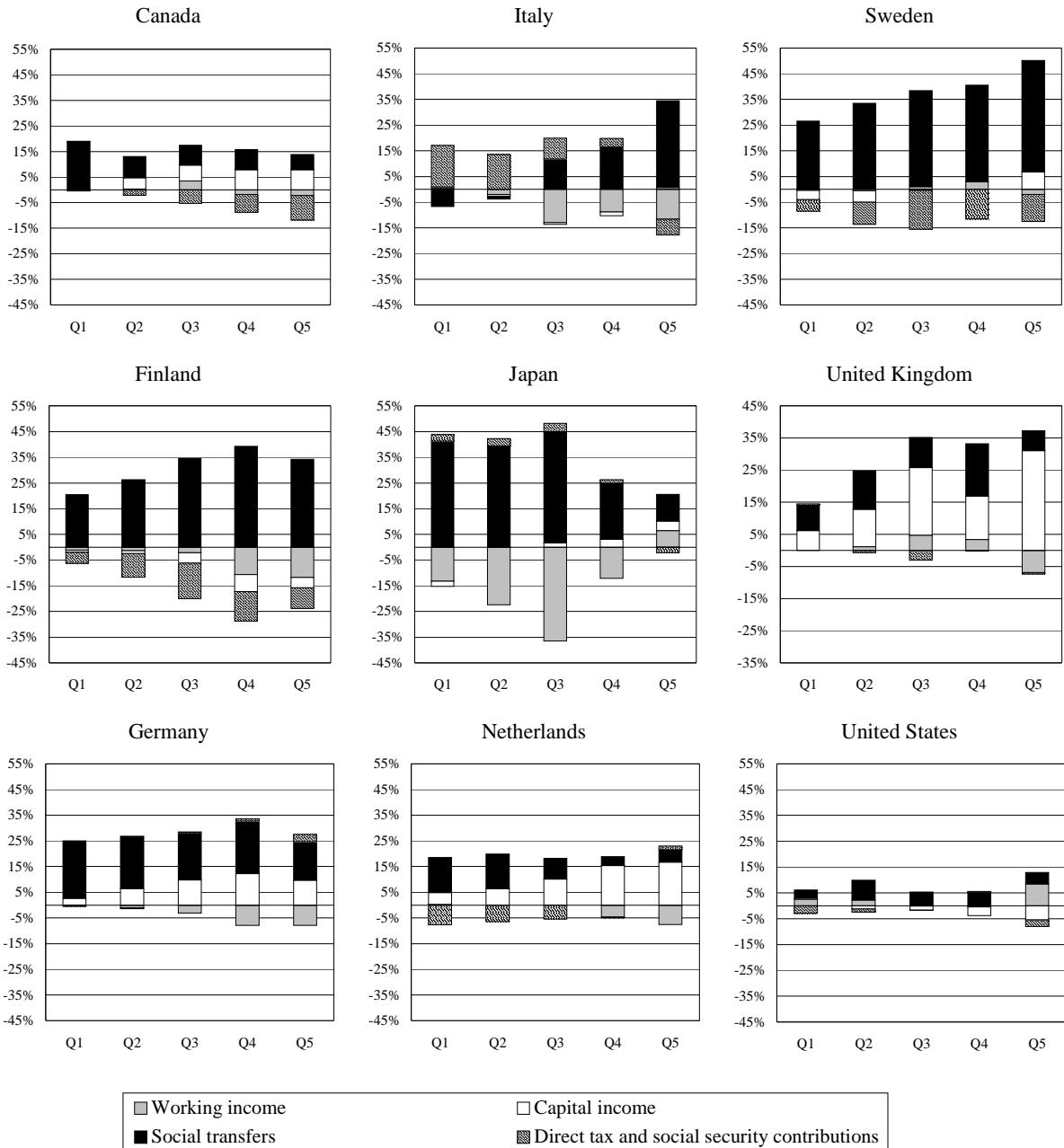
Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

Chart 4.3 Trends in the percentage of disposable income by age group
mid 1970's, mid-1980s and mid-1990s



Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

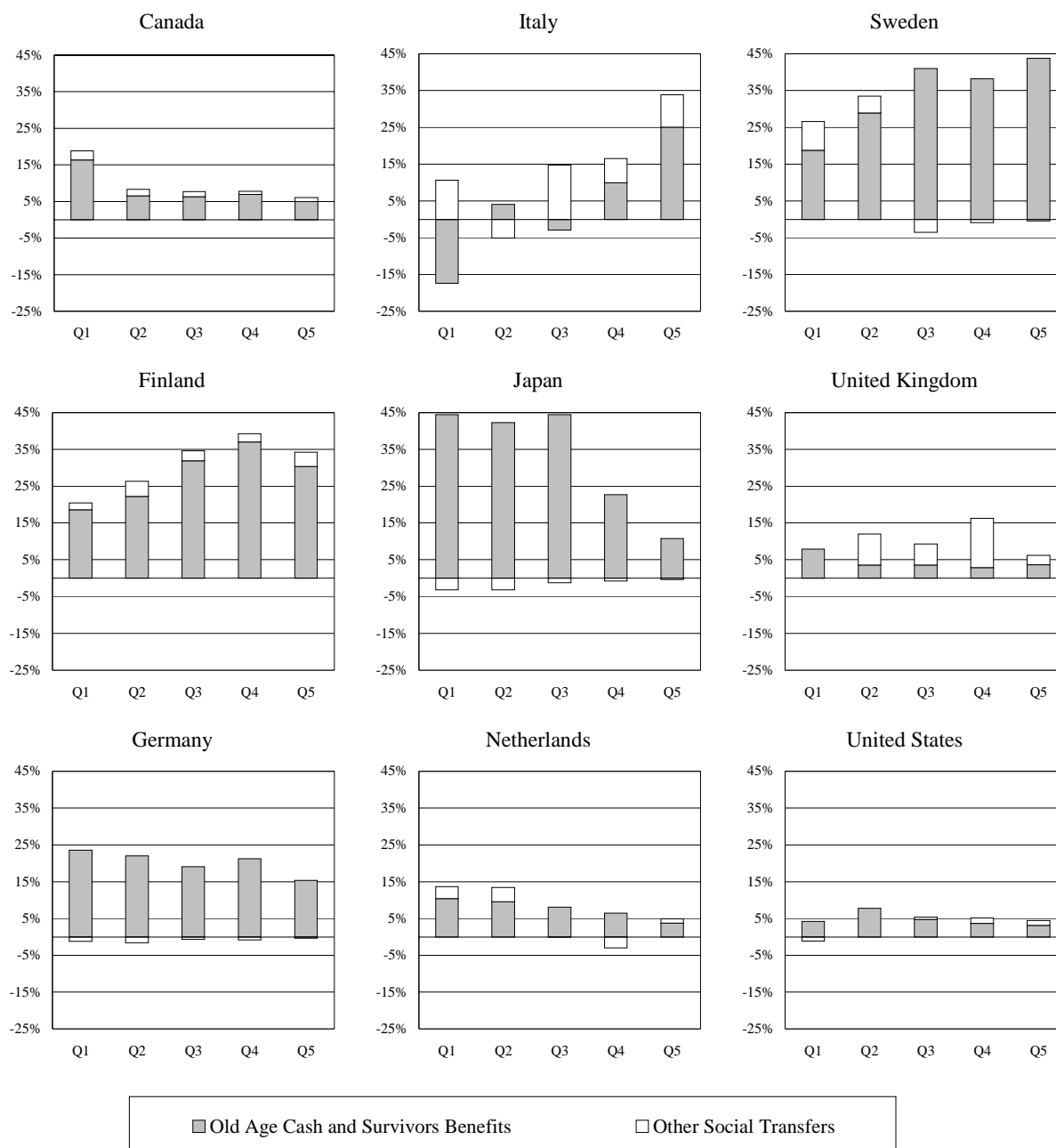
Chart 5.1 Real income growth rates, by income component and income quintile
the population aged 65 and over, mid-1980s and mid-1990s



Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

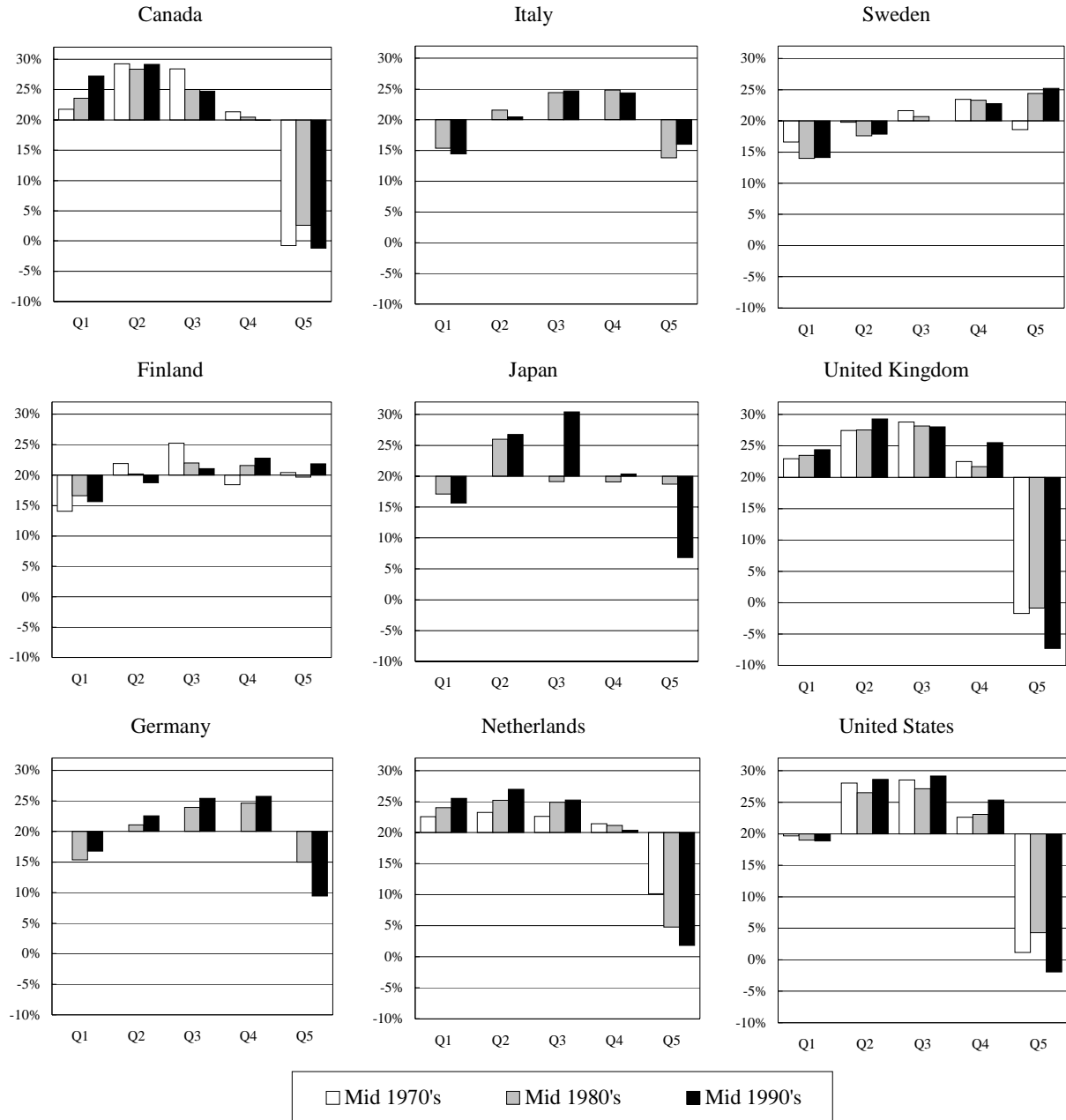
Chart 5.2 Details of real social transfer growth rates by program and income quintile

mid-1980s and mid-1990s



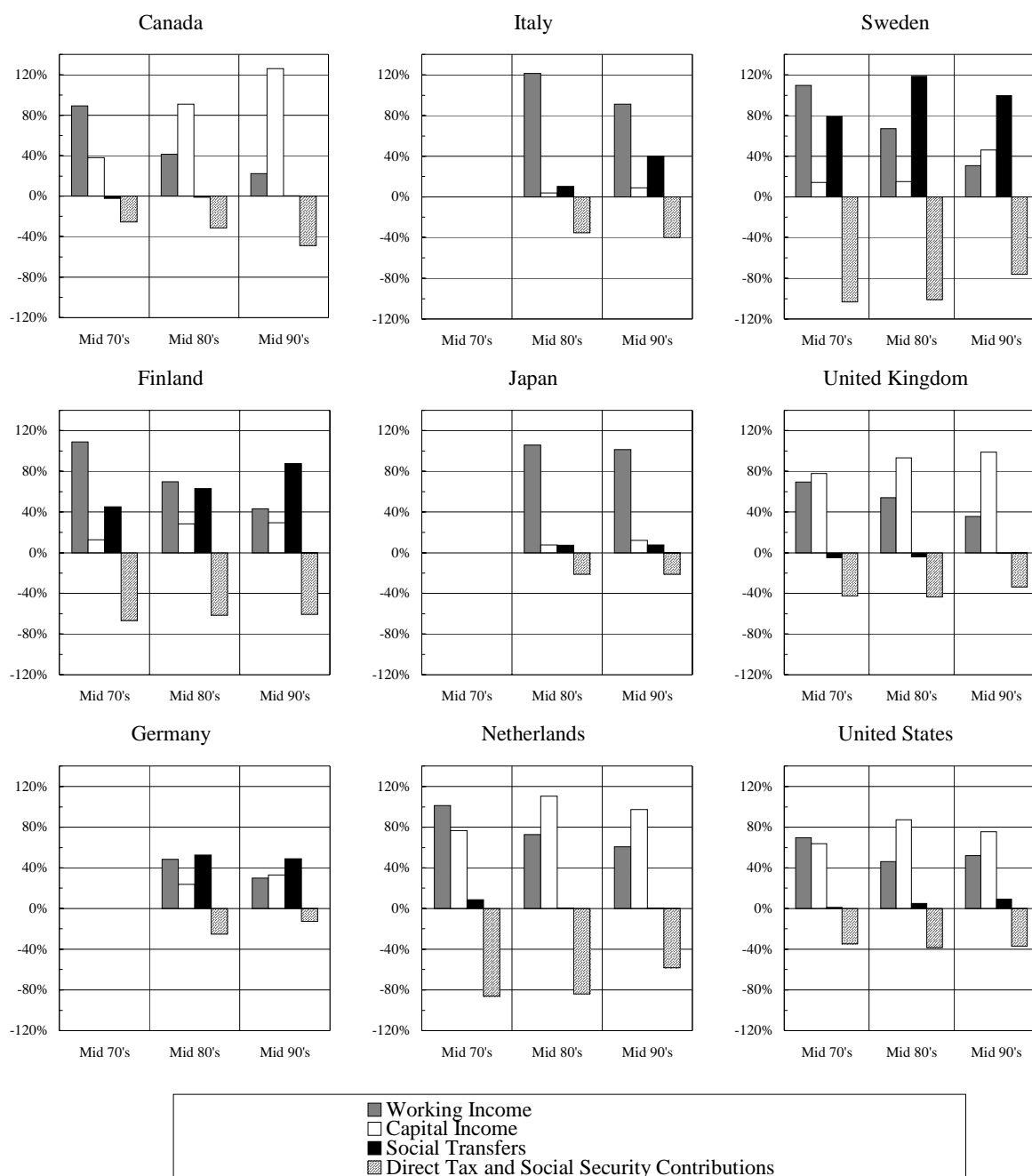
Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

Chart 5.3 Share of net social transfers by income quintile
 population aged 65 and over, mid 1970s, mid-1980s and mid-1990s



Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

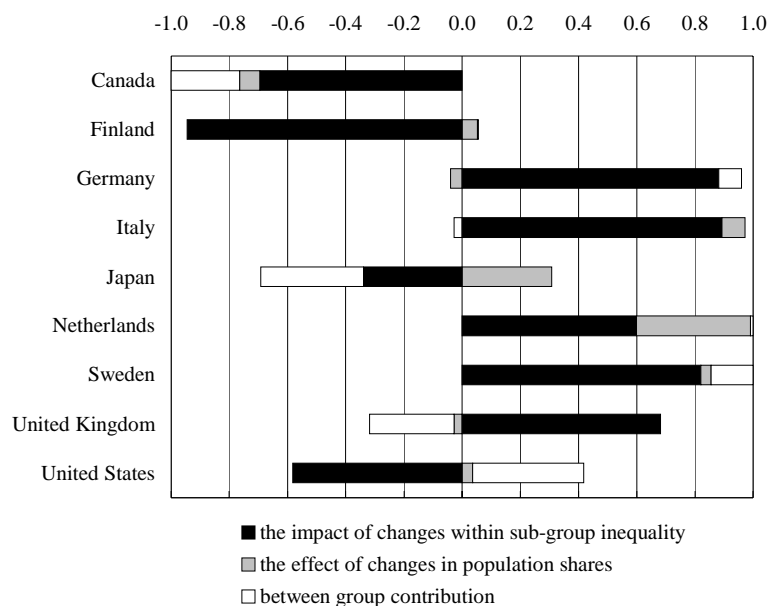
Chart 5.4 Decomposition of income inequality by income component^{a)}
 population aged 65 and over, mid 1970s, mid-1980s and mid-1990s



Note: a) The decomposition method is based on SHORROCKS (1982).

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

Chart 5.6 Impact of changing household structure on income inequality^a
 decomposition by working attachment and the household size ^{b)}, mid 1980s to mid 1990s
 (the sum of the each absolute effect = 1)



Note: a) The sample is restricted to older people living in households headed by a person aged 65 and over. This restriction will remove numerous older people living in households headed by their adult children, especially in Italy and Japan.

b) Decomposition method is based on ZYBLOCK (1996).

Source: Calculations from the OECD questionnaire on distribution of household incomes (1999).

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