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INCOME INEQUALITY OVER THE LATER-LIFE COURSE: A COMPARATIVE ANALYSIS OF SEVEN OECD COUNTRIES

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Income Inequality over the Later-life Course: A Comparative Analysis of Seven OECD Countries

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Abstract

This paper examines income inequality over stages of the later-life course (age 45 and older) and systems that can be used to mitigate this inequality. Two hypotheses are tested:

- Levels of income inequality decline during old age because public benefits are more equally distributed than work income;

- Because of the progressive nature of government benefits, countries with stronger public income security programs are better able to reduce income inequalities during old age.

The analysis is performed by comparing age groups within seven OECD countries (Canada, Germany, the Netherlands, Norway, Sweden, the United Kingdom, and the United States) using Luxembourg Income Study data. Both hypotheses are supported. Several conclusions are drawn from the findings.

Keywords: retirement; income dynamics; comparative analysis; public pensions

JEL Classification: J26, H55

Résumé

Cet article étudie les inégalités de revenu au cours des dernières étapes du cycle de vie (45 ans et plus) ainsi que les systèmes mis en place pour les contrôler. Deux hypothèses sont testées :

- L'amplitude des inégalités de revenu diminue avec l'âge parce que les revenus de transferts sont plus également répartis que les revenus du travail
- En raison du caractère progressif des prestations publiques, les pays dotés de systèmes de protection sociale plus généreux sont mieux à même de lutter contre les inégalités de revenu aux âges élevés.

L'analyse est fondée sur les données du Luxembourg Income Study et compare différents groupes d'âge dans sept pays de l'OCDE (Canada, Allemagne, Pays Bas, Norvège, Suède, Royaume-Uni, Etats-Unis). Les deux hypothèses sont validées par les données. Plusieurs conclusions sont tirées à la lumière de nos résultats.

Introduction

In many academic articles on Social Security, the topic of interest is the balance between "adequacy and equity". In a very real sense, these are competing goals. The more strongly we tie benefits to contributions (resulting in individual equity) the less distribution of wealth is available to the system which makes the achievement of "adequacy" goals more difficult. Papers on this topic in the actuarial literature include: Brown and Ip (2000), Know and Cornish (1997), and Brown and Prus (2004).

Such discussions are grounded in older, more foundational debates around the optimal distribution of wealth. One interesting philosophical paradigm is that first presented by Rawls (1971). Rawls postulates that society is rational and logical if it targets wealth distribution systems (such as Social Security) consistent with a "Maximin" model.

Rawls creates the logical arguments needed for the Maximin Rule by asking his readers to imagine a group of people without a set government (i.e., a blank page) who then set about to design an optimal system of government or, more correctly, to determine what basic principles should govern any society. Rawls argues that a person who does not know where they will end up in life (i.e., they could end up being anyone) will want to pick a society that offers the **least bad** alternative for its most unfortunate citizens. That is, society should be designed to maximize the position of the minimum person. Inequalities in society are alright, but only if they actually help out the least fortunate persons and everyone has an equal opportunity to attain the positions or offices that are rewarded with more than a minimum distribution.

In their 2004 paper, Brown and Prus used Luxembourg Income Study (LIS) data to look at income inequality in the retirement income security systems of ten developed countries, juxtaposed with the proportion of retirement income security provided by government-sponsored systems. As one might expect, that paper shows (see Figure 1) that there is a strong negative correlation between the level of government sponsored income (ratio of government transfers to total income) and income inequality (Gini ratio, where the higher the Gini ratio the more inequality there is in income distribution) in old age.

(Figure 1 about here)

From this Figure, one can conclude that Canada, Denmark and Sweden are reaching what could be viewed as optimal outcomes. What varies is the mix of government sponsorship (and control) of retirement income security and income inequality. If Swedes are politically happy with a system in which the government provides 70 percent of post-retirement income, then that system also provides a very high level of income security as evidenced by the Gini ratio (0.194). On the other hand, Canada provides only 46 percent of their seniors' income which results in a higher Gini ratio (0.256). Nonetheless, it may well be that Canadians are happy with that mix.

What can be said, however, is that the other seven nations analyzed could be doing a "better" job with their total retirement income security systems. For example, the Netherlands could clearly achieve more income equality (a lower Gini ratio) without increasing government control of the retirement income security system. Similar comments can be made about the other nations who are not on the "optimal" frontier.

Other research has arrived at similar conclusions (e.g., Regie des rentes du Quebec, 2004; OECD, 2000; 2001). The 2001 OECD study bases its conclusions on two criteria which are referred to as fundamental objectives of retirement income policies: preventing unacceptable declines in income when people retire and guarding against very low incomes among older people (*ibid*, p21). Table 1, reproduced from this study, shows that general replacements rates are very high, which seems to indicate that most systems are preventing unacceptable declines in income when people retire. Many authors have indicated that the types of replacement ratios cited above mean no dislocation in one's standard of living at retirement (e.g., Palmer, 2001). These data also show that some countries like Canada clearly have government systems that are highly focused on poverty control in old age (i.e., guard against very low incomes), while such targeting of income benefits is not so clear in countries like Japan and the United Kingdom.

(Table 1 about here)

Research on age and income distribution, however, most often focuses on a given age group (e.g., 65 and older) or compares aggregate age groups (e.g., less than 65 and 65 and older). The current paper presents a unique perspective to this literature by examining income inequality across several older age groups in an international framework. While claims of causality cannot be made from these data, the study does provide insights into how different retirement income systems shape the distribution of income during later life. Two hypotheses are derived, and tested here, from the discussion above.

The first hypothesis states that levels of income inequality decline from middle to old ages. This is because public benefits are more equally distributed than income generated from the labor market. A progressive public pension system, which becomes a key source of income for people as they enter old age, reduces the overall level of income inequality in old ages relative to middle ages. The second, and related, hypothesis states that because of the progressive nature of government benefits, countries with stronger public retirement income security programs are better able to reduce income inequalities from middle to old ages.

Methods

Data Data from the LIS are used in this study. LIS data are a compilation of income survey data files from 30 countries that have been made comparable by rearranging and reclassifying income measures (Smeeding, 1991). The LIS aggregates (or disaggregates) country-specific income elements into internationally consistent income categories such as government transfer benefits. More information on LIS data and variable definitions and measurements is found at http://www.lisproject.org.

Our analysis focuses on OECD nations using the most recent wave of LIS data (data from around 2000). Though the LIS has been designed to make cross-national comparisons possible, some differences between LIS datasets make it difficult to compare all OECD countries for the current study. For example, gross income data in the Belgium dataset are not available, and Finland includes government-funded pension data in the occupational pension category. Only those OECD countries that have complete and comparable income data are used in this analysis. These countries are: Canada, Germany, the Netherlands, Norway, Sweden, the United Kingdom, and the United States.

The aim of this paper is to examine changes in levels of income inequality over the later part of traditional working ages to traditional retirement ages. LIS data are cross-sectional, and do not allow for proper cohort analysis. The analysis is performed across the following age groups: 45-54, 55-59, 60-64, 65-74, and 75+.

Two issues about the analysis of these data are noted. First, while the current study provides original insight into the relationship between age and income inequality, it is not possible with cross-sectional data to completely disentangle age from cohort effects. Second, there is a larger mix of retirees and workers at ages 55 to 64 compared to other ages. This makes it difficult to distinguish between the influence of public pension policies versus fluctuations in labour force status per se on changes in levels of income inequality during old age. To lessen this problem more narrow age groupings (i.e., 55-59 and 60-64), which are more homogeneous groups in terms of labour force status than the combined 55-64 group, are used in the analysis.

Measuring Income This study uses total annual money income of older-headed (45+) households as the income measure. Annual money income is total income received from all household members from all sources, both private sources -- earnings, investments (namely interest on bank accounts and bonds, dividend income, capital gains, rent income), and occupational pensions/annuities -- and public sources (what we call government transfers, namely social security retirement benefits and means-tested old-age benefits).

Total household income is divided by a household “factor” using an equivalence elasticity of 0.5 (i.e., household size raised to the power of 0.5) to adjust for household size. This approach offers an intermediate statistic between using no adjustment and using per capita income, and is commonly used in OECD and LIS income distribution studies. We also assign the household's equivalent income to each member of the household to get back to the individual level of analysis. Hence, weighted adjusted household income is the income measure, which we simply refer to as “household income."

Measuring Income Inequality Income is measured here at the relative level (a household’s share of total income), which permits direct international comparisons of within-country income distributions. Relative income inequality therefore refers to the share of the income pie allocated to different households at different points in the income distribution.

Income quintiles and the Gini ratio are used to measure the level of relative

income inequality within this distribution. In an income quintile distribution, the first quintile (Q1) is comprised of households with the lowest 20% of weighted adjusted household incomes, the second quintile (Q2) is made-up of households with the next lowest 20% of weighted adjusted household incomes..... and the fifth quintile (Q5) represents those with the highest 20% of weighted adjusted household incomes.

The Gini ratio provides a more summary (single number) measure of relative inequality within a distribution, and ranges from zero (perfect equality) to one (perfect inequality). The formula for the weighted (i.e., assigning the household's adjusted income to each member of the household) Gini ratio (G^w), as provided by Crystal and Waehrer (1996), is:

$$G^w = 1 + \frac{1}{\sum_{i=1}^{k} w_i} - \frac{2\sum_{i=1}^{k}\sum_{j=1}^{w_i}\left(j + \sum_{h=1}^{i-1} w_j\right)n_i}{\sum_{i=1}^{k} w_i \sum_{i=1}^{k} w_i n_i}$$

In this formula let $i = 1,...., k$ index individual observations in the data, where the data are ranked by income and k is the number of observations. The income and household weight of the ith observation are denoted by n_i and w_i respectively.

Results

Income Inequality and the Later-life Course Our first hypothesis states that levels of income inequality decline from traditional working to retirement ages. Table 2 shows inequality rates in the distribution of disposable (after tax) household income by age.

Norway and Sweden generally have the most equal and the United States the most unequal distributions of income at any stage of the later life course. Looking at patterns in the trajectory of income inequality rates across the later life course, one of the most significant changes is observed in Sweden -- the Gini coefficient increases by 27 percent between ages 45-54 and 55-59, then decreases by 15 percent from ages 55-59 to 60-64 and a further 5.3 and 13 percent from ages 60-64 to 65-74 and 65-74 to 75+ respectively. Along with Sweden, Norway and Canada are best able to reduce income inequalities during old age, although starting at ages 65-74 rather than 60-64 -- income inequality levels decline by about 20 percent from ages 60-64 to 65-74. The old age welfare systems in the Netherlands (13 percent), the United Kingdom (12 percent), and Germany (11.4 percent) also produce large declines in income inequality levels. These patterns generally continue from ages 65-74 to 75+, most noticeably for Norway and the United Kingdom. By contrast, income inequality levels change only slightly as households enter old age in the United States.

(Table 2 about here)

Table 3 sheds light on these findings by showing the percentage of total disposable household income owned by each income quintile. Sweden and Norway's decline in income inequality in old age is the result of greater transference of income

from the top quintile (Q5) to all other quintiles (Q1 to Q4) -- they acquire a greater share of total income at the expense of the top quintile. By contrast, in Canada, the Netherlands, and the United Kingdom, the decline in income inequality from ages 60-64 to 65-74 stems from the change in income shares from primarily the top quintile to only the lowest quintiles, especially the bottom quintile -- that is, income inequality is reduced through targeted measures aimed at increasing the income position of the poorest citizens. It is interesting to note that only in the United States do both the bottom and top quintiles experience improvement (albeit a moderate one) in relative income position from ages 60-64 to 65-74.

(Table 3 about here)

Distributional Implications of Public Pension Policies Our second hypothesis offers an explanation of income inequality trajectories as observed in Table 2. It states that countries with stronger public income security programs are better able to reduce income inequalities over traditional working to retirement ages. Tables 4 and 5 provide the data to test this hypothesis.

Table 4 displays the percent of total gross (before tax) household income from public (government transfers) and private (earnings, investments, and occupational pensions) sources. Households in the United States receive the smallest percentage of income from government sources -- this figure ranges from a low of 3.2 percent at ages 45-54 to 42.7 percent at ages 75+. Sweden generally has the highest reliance on public transfers. These are also the countries with the highest and lowest Gini coefficients respectively. Overall, cross-national differences in income inequality are significantly accounted for by differences in the percentage of government transfers in the composition of household income at all stages of the later life course -- the r^2 coefficient for the relationship between the "Gini ratio" as reported in Table 2 and the "percentage of income from government transfers" as reported in Table 4, after controlling for age, is 0.51.

(Table 4 about here)

Table 5 expands these findings to show that there is generally a heavier reliance on government benefits for all income quintiles in countries with the lowest rates of income inequality. Public sources in Sweden make up 92.6 and 39.5 percent of the income of the bottom and top quintiles respectively at ages 65-74; the comparable figures in the United States are only 81.8 and 14.7 percent. In Canada, which has a moderate level of income inequality, these figures fall between the Swedish and U.S. numbers -- 88.7 and 17.7 percent of income is received from government transfers by Q1 and Q5.

(Table 5 about here)

Conclusion

Both hypotheses are supported by the data. However, one has to be careful in how strong a set of conclusions one draws from these data. As stated by the OECD 2001 (p35) study described earlier:

> *This discussion illustrates the care that needs to be taken in interpreting measures of outcome, particularly income distribution measures. Measures that show increased inequality, or even reduced levels of economic well-being, do not necessarily indicate a policy problem. They may, in some cases, simply be the consequences of achieving a more important objective, such as more independent living arrangements or a more balanced system with a larger role for private pensions and earnings.*

Yet we believe that the data allow us to form the following conclusions:

- There is a negative correlation between the level of retirement income provided by government-sponsored systems and post-retirement income inequality;

- Some countries come closer to achieving an optimal outcome of these two variables than others;

- Income replacement ratios at retirement are surprisingly high which indicates that in general there is not a large dislocation in one's standard of living at retirement;

- Several countries use pension and social security systems that are heavily targeted to the poor, with the goal of alleviating poverty in retirement;

- Levels of income inequality decline over working to retirement ages. This is because public benefits are more progressively distributed than income from the labor market;

- Income redistribution in Sweden and Norway is from the richest quintile to all other quintiles. Income redistribution in Canada, the Netherlands, and the United Kingdom is mainly a shift from the richest quintile to the poorest quintile -- thus the systems in these countries could be said to be highly focused on the alleviation of poverty;

- Public pension policies play a pivotal role in reducing income inequalities in old age.

At the same time, readers are advised to consider other factors that may have an impact on these conclusions. These factors include:

· Living expenses (especially health care costs) for different age groups will vary from country to country;

· Different levels of home ownership make income equality comparisons less meaningful;

· Differences in workforce participation (especially by women) have an impact on both incomes and expenditures.

The authors of this paper sincerely hope that there are lessons to be learned from this analysis especially in a period of time when many pension and social security systems are being reformed.

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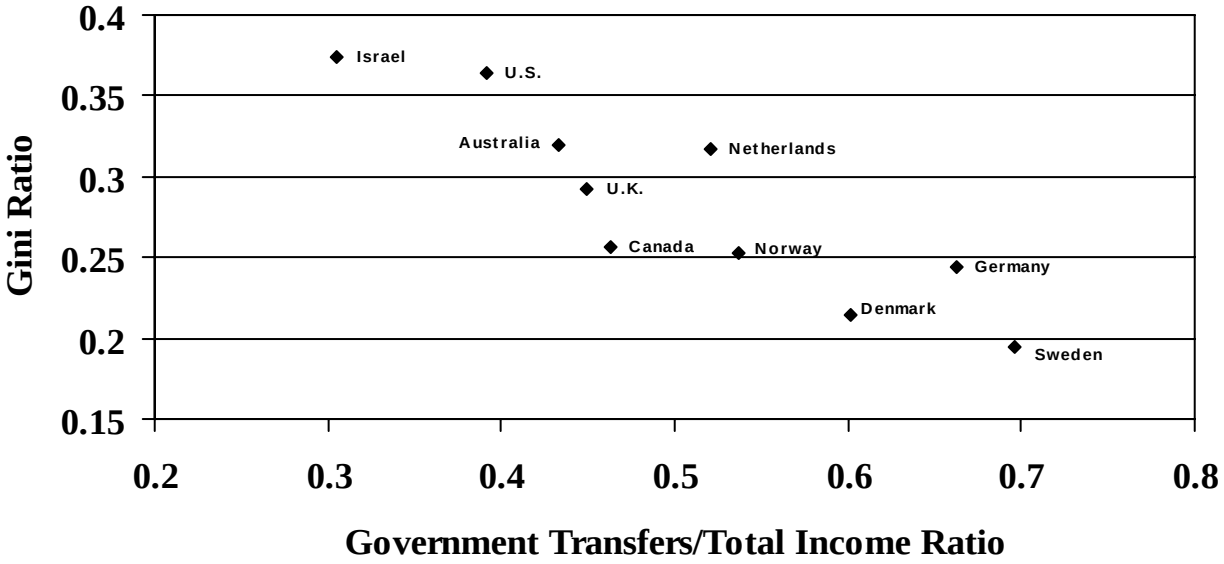
Figures/Tables

Figure 1: Percentage of Household Income from Government Transfers by Gini Coefficient, for Selected Countries, Household Heads Aged 65+.



Source: Brown and Prus, 2004, p35.

Table 1: Disposable Income of the Population aged 65 and over by Income Decile compared with the Population aged 18 to 64 in the same Income Decile, in Percentages, mid-1990s

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

Source: OECD, 2001, p24.

Table 2: Gini Coefficients of Disposable Household Income for selected OECD Countries, by Age of Household Head [a]

	Age				
	45-54	**55-59**	**60-64**	**65-74**	**75+**
Canada	.301	.325(+ 8.0%)	.327(+ 0.6%)	.266(-18.7%)	.259(- 2.6%)
Germany	.239	.271(+13.4)	.289(+ 6.6)	.256(-11.4)	.254(- 0.7)
Netherlands	.261	.266(+ 1.9)	.277(+ 4.1)	.241(-13.0)	.238(- 1.2)
Norway	.255	.277(+ 8.6)	.284(+ 2.5)	.224(-21.1)	.209(- 6.7)
Sweden	.226	.287(+27.0)	.244(-15.0)	.231(- 5.3)	.201(-13.0)
U.K.	.339	.361(+ 6.5)	.342(- 5.3)	.301(-12.0)	.286(- 5.0)
U.S.	.351	.383(+ 9.1)	.384(+ 0.3)	.375(- 2.3)	.370(- 1.4)

a. Percentage changes in Gini coefficients between subsequent age groups are in brackets.

Table 3: Percentage Share of Total Disposable Household Income by Income Quintile Rank for selected OECD Countries, by Age of Household Head [a]

	Canada	Germany	Netherlands	Norway	Sweden	U.K.	U.S.
			45-54				
Q1	7.7%	9.9%	8.0%	10.2%	10.4%	6.8%	6.2%
Q2	13.5	15.1	15.0	15.1	15.3	12.6	12.4
Q3	18.0	18.3	19.1	17.8	18.7	17.1	17.2
Q4	23.0	22.7	23.5	20.9	22.4	22.6	22.5
Q5	37.8	34.0	34.4	36.1	33.2	40.9	41.7
			55-59				
Q1	6.6	8.7	8.5	9.1	9.3	5.3	5.2
Q2	12.9	13.8	13.9	14.7	14.1	12.4	11.4
Q3	17.9	18.1	18.2	17.8	17.3	17.1	16.8
Q4	23.1	23.2	22.7	21.1	21.0	23.5	22.7
Q5	39.4	36.2	36.7	37.8	38.3	41.6	43.8
			60-64				
Q1	5.6	8.2	6.8	9.3	9.3	6.7	5.1
Q2	13.3	13.8	13.2	14.1	15.2	12.3	11.4
Q3	18.0	17.9	18.2	17.5	18.9	16.9	16.4
Q4	24.0	23.0	23.3	20.8	22.8	23.0	23.3
Q5	38.8	37.2	38.6	38.4	33.9	41.2	43.8
			65-74				
Q1	9.8	9.6	10.2	11.0	10.8	8.8	6.0
Q2	13.7	14.5	14.7	14.9	14.7	13.2	11.3
Q3	17.4	17.8	17.8	18.3	18.0	16.7	16.2
Q4	22.6	22.5	22.7	22.3	22.4	22.3	22.5
Q5	36.5	35.5	34.7	33.5	34.0	39.1	44.1
			75+				
Q1	10.7	9.7	11.2	12.3	12.4	9.2	6.6
Q2	13.8	14.4	14.1	15.1	15.7	13.5	11.2
Q3	16.9	18.1	16.7	17.7	17.8	17.2	16.0
Q4	21.6	22.6	22.3	21.8	21.4	22.2	22.2
Q5	37.0	35.2	35.7	33.2	32.7	37.9	44.0

a. May not total exactly to 100% due to rounding.

Table 4: Percent of Total Gross Household Income by Source for selected OECD Countries, by Age of Household Head [a]

	Canada	Germany	Netherlands	Norway	Sweden	U.K.	U.S.
			45-54				
Earnings [b]	89.0%	89.1%	89.3%	82.7%	84.0%	88.1%	90.5%
Investments [c]	5.0	3.5	1.7	9.0	3.4	3.4	5.2
Pensions [d]	1.1	0.4	0.2	0.6	0.4	1.9	1.2
Gov.Tranfers [e]	4.9	7.0	8.8	7.7	12.2	6.6	3.2
			55-59				
Earnings	80.1	83.5	75.6	79.1	73.4	76.8	84.4
Investments	6.6	4.4	4.0	10.0	10.9	6.0	7.4
Pensions	7.4	1.5	5.1	1.5	2.3	7.9	4.2
Gov.Tranfers	5.8	10.6	15.2	9.4	13.3	9.3	3.9
			60-64				
Earnings	58.2	60.8	35.1	64.4	56.1	55.5	72.2
Investments	9.1	6.5	6.7	10.5	6.6	8.6	8.2
Pensions	19.7	4.9	32.2	6.1	10.6	18.5	9.7
Gov.Tranfers	13.0	27.8	26.0	19.1	26.7	17.7	9.9
			65-74				
Earnings	20.1	17.5	5.3	28.2	14.9	18.9	39.2
Investments	11.8	7.5	6.2	7.7	8.9	12.5	15.1
Pensions	28.6	13.1	40.5	14.7	14.5	24.3	15.3
Gov.Tranfers	39.5	62.0	48.0	49.4	61.8	44.3	30.3
			75+				
Earnings	6.0	5.7	7.4	7.7	2.9	10.6	21.8
Investments	17.1	9.0	5.6	9.7	8.3	11.9	18.9
Pensions	28.8	16.1	33.3	15.2	11.8	19.7	16.6
Gov.Tranfers	48.1	69.3	53.7	67.4	76.9	57.7	42.7

a. May not total exactly to 100% due to rounding.
b. Includes self-employment income.
c. Includes other income from private sources.
d. Private (occupational) pension income.
e. Government transfers (e.g., social security retirement benefits and means-tested old-age benefits).

Table 5: Percent of Total Gross Household Income from Government Transfers by Income Quintile Rank for selected OECD Countries, by Age of Household Head

	Canada	Germany	Netherlands	Norway	Sweden	U.K.	U.S.
			45-54				
Q1	29.4%	30.4%	36.3%	31.0%	43.9%	53.3%	20.1%
Q2	9.0	10.3	15.4	11.6	17.5	11.6	6.1
Q3	4.6	7.2	9.2	7.2	13.1	4.7	3.2
Q4	2.9	4.6	5.5	4.5	8.6	2.9	2.6
Q5	1.1	2.1	3.3	2.2	3.6	1.0	0.9
			55-59				
Q1	37.2	51.4	44.8	43.3	46.3	60.0	32.6
Q2	12.0	21.4	30.4	17.7	26.1	22.3	7.5
Q3	5.9	10.6	15.8	7.8	14.5	7.9	4.2
Q4	3.5	5.6	13.0	5.5	8.7	4.6	3.2
Q5	1.1	2.6	5.3	2.1	3.9	1.2	0.7
			60-64				
Q1	60.1	86.9	72.3	69.2	71.1	73.0	52.9
Q2	25.1	67.5	40.3	37.0	43.9	50.1	23.6
Q3	15.7	39.6	38.5	24.5	29.3	19.0	13.0
Q4	10.9	19.4	15.2	12.7	22.2	12.1	8.5
Q5	3.8	6.6	16.5	3.9	10.5	3.6	2.9
			65-74				
Q1	88.7	91.2	88.0	87.7	92.6	87.4	81.8
Q2	73.5	89.8	77.6	76.7	83.4	79.1	62.3
Q3	49.4	82.5	61.4	61.5	75.7	64.4	44.5
Q4	34.0	64.4	39.0	46.0	60.4	40.0	29.7
Q5	17.7	33.4	27.7	24.8	39.5	19.1	14.7
			75+				
Q1	91.2	93.8	94.7	93.4	94.9	91.2	85.6
Q2	81.4	90.0	87.7	87.6	89.4	85.3	80.8
Q3	65.6	85.3	76.4	80.6	86.3	79.7	65.7
Q4	46.0	73.5	43.0	69.8	82.2	64.1	44.9
Q5	22.6	44.6	28.8	44.0	58.4	28.4	21.3

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