ANNEX I.3

Progressivity of Pension Benefit Formulae

The charts in Figure 5.1 of Chapter 5 show how the pattern of pension entitlements varies with earnings for different countries. This illustrates the very different philosophies of different pension systems, particularly in their relative emphasis on the insurance and redistributive roles of pension systems. The allocation of countries to six groups (Figures 5.1A to 5.1F) depends on the strength of the link between pre-retirement earnings and post-retirement pension entitlements. It is based on a single summary indicator, the calculation methodology and results of which are presented here.

Consider two benchmark regimes. The first is termed a "pure basic" scheme. It pays the same flat-rate amount to all pensioners regardless both of their earnings history and their other sources of income. Such a scheme is sometimes also called a "demogrant" or a "citizen's pension". The relative pension value is independent of earnings (as illustrated in Figure 5.1A for the flat-rate systems of Ireland and New Zealand) and the replacement rate declines with earnings.

At the other end of the spectrum of benefit design is a "pure insurance" scheme. This aims to pay the same replacement rate to all workers when they retire. The pension value obviously increases with earnings in a straight line, which is why these plans are often called "linear". Defined-contribution plans typically conform to this pure-insurance model because the contribution rate is usually a constant proportion of earnings for all workers (the only exception is Mexico). Many earnings-related schemes (of the defined-benefit, points and notional-accounts varieties) are also linear: they offer the same accrual rate to most workers regardless of earnings, years of service or age.

These two benchmarks – pure-insurance and pure-basic schemes – underpin an "index of progressivity" constructed for cross-country comparison of pension benefit formulae. The index is designed so that a pure basic scheme would score 100% and a pure insurance scheme, zero. The former is maximally progressive; the latter is not progressive since the replacement rate is constant.

The calculation is based on the Gini coefficient, which is a measure of inequality and is widely used in studies of income distribution. The higher the Gini coefficient, the more unequal a distribution. Formally, the index of progressivity is calculated as 100 minus the ratio of the Gini coefficient of pension entitlements divided by the Gini coefficient of earnings (expressed as percentages). In each case, the Gini coefficients are calculated using the earnings distribution as the weight. Table I.3.1 shows the calculation both with national data (where available) and with the OECD average for the earnings distribution (see Figure 7.1 in Chapter 7).

Table I.3.1. **Indicators of the progressivity of pension benefit formulae**

Gini coefficient for pension entitlements and progressivity index for OECD average and national earnings distributions

	Earnings distribution			
	OECD average		National	
	Gini	Index	Gini	Index
Australia	6.8	74.8	6.8	78.9
Austria	21.5	20.7		
Belgium	9.5	64.8		
Canada	3.7	86.5		
Czech Republic	7.8	71.1	7.5	76.8
Denmark	2.3	91.7		
Finland	25.3	6.7	22.6	29.9
France	14.6	46.4		
Germany	20.9	22.9	19.8	38.8
Greece	26.0	4.3		
Hungary	25.6	5.6		
Iceland	10.6	60.8		
Ireland	0.0	100.0	0.0	100
Italy	26.1	4.0	22.5	30.4
Japan	14.2	47.8	13.9	56.8
Korea	11.7	56.9	12.9	60
Luxembourg	22.5	17.2		
Mexico	23.4	13.7		
Netherlands	25.6	5.7	24.4	24.4
New Zealand	0.0	100.0	0.0	100
Norway	14.8	45.3	11.8	63.5
Poland	25.7	5.2	27.2	15.6
Portugal	18.7	31.1		
Slovak Republic	26.3	3.2		
Spain	23.6	13.0	26.7	17.3
Sweden	21.3	21.6	18.1	44
Switzerland	15.2	44.1		
Turkey	20.5	24.4		
United Kingdom	8.3	69.6	9.3	67.1
United States	16.1	40.6	19.4	40
OECD average	**16.4**	**39.5**	**15.2**	**52.7**

Source: OECD pension models.

The first column of Table I.3.1 shows the results for the Gini coefficient of gross pension benefits. The second column shows the index of progressivity of the benefit formula. In the flat-rate cases – Ireland and New Zealand – the index is, as explained above, 100. Other countries with highly progressive pension systems are Australia, Canada, the Czech Republic, Denmark and the United Kingdom where the index is above two thirds. These countries all have targeted or basic pensions that play a major role in retirement-income provision.

At the other end of the scale, Finland, Hungary, Italy, the Netherlands, Poland and the Slovak Republic have almost entirely proportional systems with very limited progressivity. The index is less than 10 in all these cases. This group includes two of the countries with notional accounts, which were deliberately designed to have a close link between contributions and benefits. Other countries lie between these two groups.

Note that these calculations are only based on the outcomes of the mandatory parts of the pension systems. In practice, countries that have a voluntary element for higher earners – for example the United Kingdom – will also have more extensive private occupational and personal pension provision. Taking these into account makes the overall distribution of pensioners' incomes wider than that based only on the mandatory pensions.

Bibliography

Aldrich, J. (1982), "The Earnings Replacement Rate of Old-age Benefits in Twelve Countries: 1969-1980", *Social Security Bulletin*, Vol. 45, No. 11, pp. 3-11.

Blanchard, O.J. (1993), "The Vanishing Equity Premium", in R. O'Brien (ed.), *Finance and the International Economy 7*, Oxford University Press.

Bodie, Z. (1995), "On the Risk of Stocks in the Long Run", *Financial Analysts' Journal*, May-June, pp. 18-22.

Casey, B., H. Oxley, E.R. Whitehouse, P. Antolín, R. Duval and W. Leibfritz (2003), "Policies for an Ageing Society: Recent Measures and Areas for Further Reform", Economics Department Working Paper No. 369, OECD, Paris.

Cichon, M. (1999), "Notional Defined-contribution Schemes: Old Wine in new Bottles?", *International Social Security Review*, Vol. 52, No. 4, pp. 87-105.

Constantinides, G., J. Donaldson and R. Mehra (1998), "'Junior Can't Borrow' A New Perspective on the Equity Premium Puzzle", Working Paper No. 6617, National Bureau of Economic Research, Cambridge.

Dang, T.T., P. Antolín and H. Oxley (2001), "Fiscal Implications of Ageing: Projections of Age-related Spending", Working Paper No. 305, Economics Department, OECD, Paris.

Diamond, P.A. (1997), "Insulation of Pensions from Political Risk", in S. Valdés-Prieto (ed.), *The Economics of Pensions: Principles, Policies and International Experience*, Cambridge University Press.

Disney, R.F. (1999), "Notional Accounts as a Pension Reform Strategy: an Evaluation", Pension Reform Primer Series, Social Protection Discussion Paper No. 9928, World Bank, Washington, D.C.

Disney, R.F. and P.G. Johnson (eds.) (2001), *Pension Systems and Retirement Incomes Across OECD Countries*, Edward Elgar, Aldershot.

Disney, R.F. and Whitehouse, E.R. (1994), "Choice of Private Pension and Pension Benefits in Britain", Working Paper No. 94/2, Institute for Fiscal Studies, London.

Disney, R.F. and E.R. Whitehouse (1996), "What are Pension Plan Entitlements Worth in Britain?", *Economica*, Vol. 63, pp. 213-238.

Disney, R.F. and E.R. Whitehouse (1999), "Pension Plans and Retirement Incentives", Pension Reform Primer Series, Social Protection Discussion Paper No. 9924, World Bank, Washington, D.C.

Disney, R.F. and E.R. Whitehouse (2001), *Cross-Country Comparisons of Pensioners' Incomes*, Report Series No. 142, Department for Work and Pensions, London.

Eurostat (1993), *Old Age Replacement Ratios*, Vol. 1, *Relation between Pensions and Income from Employment at the Moment of Retirement*, Statistical Office of the European Communities, Luxembourg.

Finkelstein, A. and J. Poterba (2002), "Selection Effects in the United Kingdom Individual Annuities Market", *Economic Journal*, Vol. 112, No. 476, pp. 28-50.

Finkelstein, A. and J. Poterba (2004), "Adverse Selection in Insurance Markets: Policyholder Evidence from the UK Annuity Market", *Journal of Political Economy*, Vol. 112, No. 1, pp. 183-208.

Förster, M.F. and M. Mira d'Ercole (2005), "Income Distribution and Poverty in OECD Countries in the Second Half of the 1990s", Social, Employment and Migration Working Paper, No. 22, OECD, Paris.

Hernanz, V., F. Malherbert and M. Pellizzari (2004), "Take-up of Welfare Benefits in OECD Countries: a Review of the Evidence", Social, Employment and Migration Working Paper No. 17, OECD, Paris.

Ippolito, R. (1991), "Encouraging Long Tenure: Wage Tilt or Pensions", *Industrial and Labor Relations Review*, Vol. 44, No. 3.

PENSIONS AT A GLANCE – ISBN 92-64-01871-9 – © OECD 2005

Jagannathan, R. and N. Kocherlakota (1996), "Why Should Older People Invest Less in Stocks than Younger People?", *Federal Reserve Bank of Minneapolis Quarterly Review*, Vol. 20, No. 3, Summer.

Johnson, P.G. (1998), *Older Getting Wiser*, Institute of Chartered Accountants in Australia.

Keenay, G. and E.R. Whitehouse (2002a), "Taxing Pensioners", in *Taxing Wages*, OECD, Paris.

Keenay, G. and E.R. Whitehouse (2002b), "The Role of the Personal Tax System in Old-age Support: a Survey of 15 Countries", Discussion Paper No. 02/07, Centre for Pensions and Superannuation, University of New South Wales, Sydney.

Keenay, G. and E.R. Whitehouse (2003a), "Financial Resources and Retirement in Nine OECD Countries: the Role of the Tax System", Social, Employment and Migration Working Paper No. 8, OECD, Paris.

Keenay, G. and E.R. Whitehouse (2003b), "The Role of the Personal Tax System in Old-age Support: a Survey of 15 Countries", *Fiscal Studies*, Vol. 24, No. 1, pp. 1-21.

Lazear, E. (1981), "Agency, Earnings Profiles, Productivity and Hours Restrictions", *American Economic Review*, Vol. 71, pp. 606-620.

Lazear, E. (1985), "Incentive Effects of Pensions", in D. Wise (ed.), *Pensions, Labor and Individual Choice*, University of Chicago Press for National Bureau of Economic Research.

McHale, J. (1999), "The Risk of Social Security Benefit Rule Changes: Some International Evidence", Working Paper No. 7031, National Bureau of Economic Research, Cambridge, Mass.

Mehra, R. and E.C. Prescott (1985), "The Equity Premium: a puzzle", *Journal of Monetary Economics*, Vol. 15, pp. 145-161.

Mitchell, O.S. and E.L. Dykes (2000), "New Trends in Pension Benefit and Retirement Provisions", Working Paper No. 2000-1, Pension Research Council, Wharton School, University of Pennsylvania, Philadelphia.

OECD (1995), *Private Pensions in OECD Countries: Canada*, Social Policy Studies No. 15, Paris.

OECD (2001), *Ageing and Income. Financial Resources and Retirement in Nine OECD Countries*, Paris.

OECD (2003), *Taxing Wages*, Paris.

OECD (2004), *OECD Classification and Glossary of Private Pensions*, Paris.

OECD (2005), *Taxing Wages*, Paris.

Palacios, R.J. and E.R. Whitehouse (2000), "Guarantees: Counting the Cost of Guaranteeing Defined Contribution Pensions", Pension Reform Primer briefing note, World Bank, Washington, D.C.

Palacios, R.J. and E.R. Whitehouse (2005), "Civil-service Pension Schemes Around the World", Pension Reform Primer series, Social Protection Discussion Paper, World Bank, Washington, D.C., forthcoming.

Pennachi, G.G. (1998), "Government Guarantees on Funded Pension Returns", Pension Reform Primer series, Social Protection Discussion Paper No. 9806, World Bank.

Turner, J.A. and D.M. Rajnes (2000), "Limiting Worker Financial Risk Through Risk Sharing: Minimum Rate of Return Guarantees for Mandatory Defined Contribution Plans", International Labour Organisation, Geneva.

United Kingdom, Department of Work and Pensions (2003), "Income Related Benefits Estimates of Take-up – 2000-2001", London.

United Kingdom, Government Actuary's Department (2003), *Occupational Pension Schemes in 2000: Eleventh Survey by the Government Actuary*.

United States, Department of Labor (1999), *Private Pension Plan Bulletin: Abstract of 1996 Form 5 500 Annual Reports*, Pension and Welfare Benefits Administration, Washington, D.C.

Viscusi, W.K. (1985), "The Structure of Uncertainty and the Use of Pensions as a Mobility-reduction Device", in D. Wise (ed.), *Pensions, Labor and Individual Choice*, University of Chicago Press for National Bureau of Economic Research.

Vordring, H. and Goudswaard, K. (1997), "Indexation of Public Pension Benefits on a Legal Basis: Some Experiences in European Countries", *International Social Security Review*, Vol. 50, No. 3, pp. 31-44.

Weaver, R.K. (1988), *Automatic Government: The Politics of Indexation*, Brookings Institution, Washington, D.C.

Whiteford, P. (1995), "The Use of Replacement Rates in International Comparisons of Benefit Systems", *International Social Security Review*, Vol. 48, No. 2.

Whitehouse, E.R. (1998), "Pension Reform in Britain", Pension Reform primer series, Social Protection Discussion Paper No. 9810, World Bank, Washington, D.C.

Whitehouse, E.R. (2000), "Administrative Charges for Funded Pensions: Measurement Concepts, International Comparison and Assessment", *Journal of Applied Social Science Studies*, Vol. 120, No. 3, pp. 311-361.

Whitehouse, E.R. (2001), "Administrative Charges for Funded Pensions: Comparison and Assessment of 13 Countries", in *Private Pension Systems: Administrative Costs and Reforms, Private Pensions Series*, Vol. 3, OECD, Paris.

Whitehouse, E.R. (2002), "Pension Systems in 15 Countries Compared: the Value of Entitlements", Discussion Paper No. 02/04, Centre for Pensions and Superannuation, University of New South Wales, Sydney.

Whitehouse, E.R. (2005a), "Pension Policy Around the World: Vol. 1, High-income OECD Countries", Social Protection Discussion Paper, World Bank, Washington, D.C.

Whitehouse, E.R. (2005b), "Pension Policy Around the World: Vol. 2, Eastern Europe and Central Asia", Social Protection Discussion Paper, World Bank, Washington, D.C.

Whitehouse, E.R. (2005c), "Pension Policy Around the World: Vol. 3, Latin American and Caribbean", Social Protection Discussion Paper, World Bank, Washington, D.C.

Whitehouse, E.R. and R.J. Palacios (2005), "Pension Policy Around the World: Vol. 5, South Asian Civil-service Schemes", Social Protection Discussion Paper, World Bank, Washington, D.C.

Whitehouse, E.R. and D. Robalino (2005), "Pension Policy Around the World: Vol. 4, Middle East and North Africa", Social Protection Discussion Paper, World Bank, Washington, D.C.

World Bank (1994), *Averting the Old-Age Crisis: Policies to Protect the Old and Promote Growth*, Oxford University Press.

PENSIONS AT A GLANCE – ISBN 92-64-01871-9 – © OECD 2005

Table of Contents

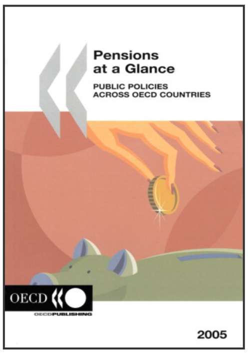
Part II

Country Studies

List of Box

List of Tables

List of Figures



OECD Pensions at a Glance 2005

Public Policies across OECD Countries

Please cite this chapter as:

OECD (2006), “Annex I.3. Progressivity of Pension Benefit Formulae”, in *OECD Pensions at a Glance 2005: Public Policies across OECD Countries*, OECD Publishing, Paris.

DOI: https://doi.org/10.1787/pension_glance-2005-12-en