6. Microsimulation and the Formulation of Policy:A Case Study of Targeting in the European Union

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1. Microsimulation and Policy Formation

In the past twenty years, there has been an enormous growth in the use of quantitative models, based on micro-data on households, for the analysis of public policy. These "microsimulation" models are widely used in government departments, by academic researchers, and by economists in the private sector. Calculations can be made of the impact on household incomes of changes in income tax, social security contributions, indirect taxes, social security benefits, housing benefits, and other policy variables. These calculations cast valuable light on a question in which everyone is interested - who gains and who loses from a policy variation? Although newspapers cling to the use of examples based on hypothetical families, it is generally recognised that these can be highly misleading in predicting the distribution of the effects of policy changes.

[1]The work described in this paper is a lineal descendant of research carried out as part of the Taxation, Incentives and Distribution of Income programme, which Michio welcomed to STICERD in 1980, and the Welfare State Programme, which he encouraged as part of the generous second donation by Suntory Limited.

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Microsimulation is in one sense arithmetic, but it is arithmetic informed by economic theory. Economic principles underlie the measurement of welfare: for example in allowing for indirect tax changes. Economic theory is essential in answering a second important question - how does a policy variation affect the incentives and disincentives faced by individuals? The household budget constraint has become highly complicated, with many different potential margins on which people may vary their behaviour. There is no single "marginal tax rate" faced by a household. It depends on the source of income and who is the recipient. A change in one variable may interact with others: for example, where occupational pensions are integrated with the basic state pension, a reduction in the latter can lead to an increase in the former. Microsimulation models are an essential tool in modelling the micro-economics of response to policy change.

The construction of microsimulation models began on mainframe computers, but received a great boost with the arrival of micro-computers in the 1980s. The policy usefulness of such models increased significantly with the possibility of carrying out analysis independently of computing services and on machines which could be brought to the meetings at which policies were being devised. Not least, it was politically important that the analysis could be carried out in total privacy, without any external knowledge of what policy reforms were being modelled. In STICERD, 1983 saw the construction of TAXMOD, the first user-friendly microsimulation program using the BBC Micro-computer. The model, constructed as part of the ESRC Programme on Taxation, Incentives and the Distribution of Income (TIDI), ran initially using data for several hundred households from the Family Expenditure Survey, but as computing speeds increased, the sample size was increased. At the same time, the model was developed in sophistication, with improved methods of grossing-up to the whole UK population, adjustments for income under-reporting, treatment of non-take-up of benefits, and validation against external sources (see Atkinson and Sutherland (1988)). TAXMOD was succeeded by POLIMOD, constructed by Holly Sutherland as part of the Welfare State Programme, and this model is now maintained by the Microsimulation Unit in Cambridge.

From national models, a natural step is to a model for the European Union. In

1996, a project began, under the title of EUROMOD, to construct such a model for the 15 members of the European Union, based on national household micro-data. EUROMOD is designed to estimate the revenue and distributional effects of national or EU-wide changes in social and fiscal policy (Sutherland (1997)). The present paper describes such a European microsimulation. The model employed is a prototype version of EUROMOD and runs on just five countries, but these countries cover approximately 70 per cent of the EU population and the prototype is sufficiently sophisticated to illustrate many of the important issues that are likely to arise in connection with social policy co-ordination in the EU. In Britain there is a remarkable unwillingness to consider policy issues in a European context; but, even where national governments remain ultimately responsible, it makes no sense for one country to determine policy without regard to the EU-wide picture. Since STICERD has from the outset encouraged European research collaboration, it is a highly appropriate example for the present paper.

The application of European microsimulation is illustrated in the paper by reference to a particular policy reform: the introduction of a common minimum pension guarantee across European Union member states. Details of the reform are given in Section 2, which then goes on to consider the problems which arise in its analysis. The aim of such a reform is to better "target" public spending on the elderly in poverty. However, the notion of targeting is more problematic than is commonly supposed since it depends crucially on the definition of the target population. In order to target, we need to agree on who is defined as "poor". Here we investigate the implications for a common European definition of poverty of different assumptions about exchange rates, purchasing power parities, and the choice of the welfare concept. Section 3 describes the microsimulation method used to calculate the revenue and distributional effects, and summarises the aggregate effects of the reform. The sensitivity of the distributional effects, and in particular the success of the reform in targeting European poverty, are explored in Section 4. Section 5 concludes.

2. Analysing European policy: A Common Pension Guarantee

The policy reform with which we are concerned is the introduction of a common minimum pension guarantee across European countries: a European Minimum Pension (EMP) for people aged 65 or over. The purpose of the policy is to guarantee a level of income to pensioners without relying on means-tested schemes which are associated with such difficulties as stigma and specifically, failure to claim (Atkinson and Sutherland (1998); Finch and Elam (1995)). If income from pension sources falls short of a specified level, then an EMP supplement is paid to meet the shortfall. It is different from means-tested schemes such as Income Support in the UK, in that the determination of benefit depends only on the pension income, not on other sources of income. Entitlement to the EMP is calculated by aggregating all sources of pension income. If this is less than the EMP guarantee level, then a payment is made equal to the difference. The pension guarantee would be provided, and financed, by national governments, in line with the principle of subsidiarity (see Atkinson (1998)). The role of the European Union is in setting the EMP guarantee level (which could be exceeded by member states).

The first issue which arises in assessing this European policy is the determination of the guarantee level in different member states. In principle, this guarantee could be related to per capita income in each member state. The minimum pension guarantee examined in the UK by Atkinson and Sutherland (1998) was 50% of mean equivalent disposable household income. Here however we consider a guarantee which is set at the same level in each country in terms of purchasing power parity exchange rates. The EMP is set at the equivalent of UK£75 per week in 1994. Using purchasing power parity exchange rates, this becomes in national currencies 774FF, 242DM, Ir£75 and It£179,237 per week respectively in France, Germany, Ireland and Italy. This is equivalent to 109 ecu in 1994. In this illustration the assessment of pension income takes place on a family unit basis so that the pensions of elderly couples are aggregated and compared with an EMP of twice the value of that for a single person.[2]

[2]For example, a couple with pension incomes of UK£100 and UK£20 per week would have their income topped up by UK£30. Note that although similar in many respects to the Minimum

The level of the payment is chosen so that it is generally in excess of the lowest existing minimum pension (including social assistance for pensioners) in each country. Any payment under the EMP is treated in the same way as other pension income by the rest of the national tax-benefit systems. Paradoxically, this can result in some pensioner households losing from the reform. This is because the EMP payment may be treated differently than the payments that it is designed to replace. For example, in France the EMP replaces the existing *Allocation aux Vieux Travailleurs Salariés* (AVTS) which is not included in income assessments for other means-tested benefits (such as housing benefits). EMP payments, like other pension income, will reduce entitlements to these benefits and the net effect may be to leave the household worse off. In general, entitlement to social assistance may provide a passport to other benefits, both in cash and in kind. In both Germany and the UK this is the case with support for housing costs in some circumstances. Just as with any other increase in pension income that results in the loss of these passported benefits, the final result may be a net reduction in income. An influential role for microsimulation models is that programming the rules of a reform proposal forces the analyst to consider its detailed implementation in a way that can be avoided when thinking in purely hypothetical terms. This leads in turn to questions being posed to the reformer. Would the EMP be accompanied by changes in the rules for other benefits? Here we take no account of such changes, but they would be important in the development of actual policy reforms.

The second major issue in a European analysis concerns the assumptions to be made in distributional analysis at a European level. The aim of the policy is to target poor pensioners, but how are they to be defined in a European context? It is well-known that national poverty estimates, and particularly cross-country comparisons of poverty, are sensitive to the choice of assumption and income concept used to rank households. Atkinson et al. (1998) showed how the apparently unambiguous poverty standard of 50% of average income could

Pension Guarantee (MPG) as proposed for the UK (Atkinson (1995) chapter 16; Atkinson and Sutherland (1998)) the two schemes are different in one important respect: under the MPG pension income is assessed on an individual basis. Thus the policy as implemented here implicitly assumes that pensioners who live together are expected to share their pension incomes.

be interpreted to yield quite different conclusions. One could start from one set of estimates where the poverty rate in France was more than twice that in the UK (in 1985) and end with another set of estimates where the poverty rates were indistinguishable (see also Atkinson (1998); Blackburn (1998)). When a common poverty line is drawn for Europe as a whole, the country composition of the part of the population that has been identified as poor is not only sensitive to the choices that are made at the technical level. It may also be a matter of sensitivity at the political level.

We explore the sensitivity of our simulation results to variations in two types of assumption about the equivalence of incomes of households in different circumstances. The first concerns the choice of equivalence scale used to account for differences in household size and composition, and the related issue of whether results should be weighted by household or by person. The first variant (a) simply ranks by household disposable income for each household in the sample, without adjustment for household size. The second option (b) is to use per capita income and to weight by the number of people in the household. This adjustment takes into account in the comparison of incomes differences in household size but implies that there are no economies of scale nor are there differences in need by age. Under these two variants, aggregate household income for each country is the same, and corresponds to national income measures used for accounting purposes. The third variant (c) uses the modified OECD scale (a value of 1 for the first adult, 0.3 for children aged under 14 and 0.5 for remaining people in the household) to equivalise household incomes, thus incorporating simple assumptions about economies of scale and the relative needs of adults and children.

The second type of assumption concerns the exchange rate that is used to convert incomes in different countries into a common currency. The options (a)-(c) described above use nominal exchange rates, but a final option (d) combines the assumptions of option (c) with the use of PPP-adjusted exchange rates to account for between-country differences in purchasing power. The ratios of PPP-adjusted to nominal exchange rates at the date in question were above 1 for France (1.08) and Germany (1.16), and below 1 for Ireland (0.87), Italy (0.86) and the UK (0.89). From these numbers, it is evident that the change in assumption is

potentially important. A switch to PPP-adjustment will raise the proportion of French and German households in the bottom quintile of the European income distribution, and lower the proportion from the other three countries.

3. The prototype European tax-benefit model (Eur5) and Aggregate results

The revenue and distributional effects of the introduction of the EMP are examined using a prototype model, Eur5, based on survey micro-data from five countries: France, West Germany, Ireland, Italy and the UK. The EUROMOD project is described in Sutherland (1997) and the prototype model for France, Italy and the UK is described in Bourguignon et al (1998).

The main output we are concerned with here is household disposable income. This is made up of elements of gross income (employment and self-employment earnings, investment and other capital income, occupational and public pensions, unemployment benefits and other non-means-tested benefits) taken from the survey data and updated to a common year (1994), combined with elements simulated by the model: social insurance contributions, income tax and other taxes on labour incomes and family benefits, including child benefits, housing benefits, out of work and in-work social assistance (see Bourguignon et al (1998) for more details).[3]

The model simulates the first round effects of changes in tax and social policy by calculating micro-level household incomes twice: once using the policy existing in 1994 and once after the reform, which is assumed to take place in that year. Entitlement to the EMP is calculated by aggregating all sources of pension income

[3]Data from the 1989 French *Enquête sur le Budget des Familles* have been made available by INSEE. Data from the *German Socio-Economic Panel* have been made available by Deutsches Institut für Wirtschaftsforschung. Data for Ireland from the 1987 *Survey on Income Distribution, Poverty and the Usage of State Services* have been made available by the Economic and Social Research Institute. Data from the 1994 Italian *Survey of Household Income and Wealth* have been made available by the Bank of Italy. Data from the 1991 UK *Family Expenditure Survey* are Crown Copyright. They have been made available by the Office for National Statistics (ONS) through the Data Archive and are used by permission. Neither the ONS nor the Data Archive bears any responsibility for the analysis or interpretation of the data reported here. The same disclaimer applies to INSEE, the DIW, the ESRI and the Bank of Italy for the French, German, Irish and Italian data respectively.

and comparing the total with the sum of EMP guarantees for the people aged at least 65 in the family.[4] Any EMP payment is split equally between beneficiaries and treated as pension income for tax and benefit assessment purposes.

The revenue cost of the scheme, standardised by country size, is shown in the first row of Table 1, for each country and for our 5-country illustration of the "European" population. The national per capita cost is greatest in Ireland and Italy and least in France and Germany. This difference in cost could be explained by differences in either of the following national factors:

- the proportion of pensioners in the population;
- the level of the EMP in relation to disposable income per capita;
- the coverage of national pensions and their relative generosity, compared with the EMP.

For convenience we refer to potential beneficiaries (people aged 65 or more) as "pensioners" and the households they live in as "pensioner households" even though they may not be in receipt of any pension income under existing policy. The second row of Table 1 shows that the main explanation for differences in cost cannot be found in the proportions of national populations who are aged 65 or more. The largest proportion is in Germany, with the lowest cost and the smallest proportion is in Ireland, with the highest cost. However, the EMP applies its eligibility assessment at the household (or family) level and so the grouping of pensioners within households is also important. The third row of Table 1 shows the proportion of households containing people aged 65 or more (across the Eur5 sample as a whole, this is 29%). The proportion follows the

[4] In fact, due to limitations in the Eur5 database, the assessment of entitlement to the EMP takes place over the whole household for France and Italy. This has the effect of averaging pension incomes over a potentially larger number of pensioners than the family-based assessment used in the other three countries. Thus we underestimate both the costs and benefits of the EMP in France and Italy to some extent. The households that are treated differently across countries are those with two pensioners who are not married to each other and those with three or more pensioners. The evidence that we have suggests there are few such cases. In Germany, Ireland and the UK they represent 0.2, 6.0 and 2.0 per cent respectively of all pensioner households. In France and Italy 0.2 and 0.6 per cent respectively of pensioner households contain three or more pensioners.

national pattern of the cost of the reform more closely, but the differences are not sufficiently large to explain the differences in revenue cost. This is illustrated in Figure 1, where the vertical axis shows the cost divided by the ratio of the proportion of households with population aged 65+ to the Eur5 average. The adjusted cost ranges from under 60 to over 100.

Even with incomes adjusted for between-country price differences, mean household disposable incomes vary considerably across countries. The fourth row of Table 1 shows that price-adjusted incomes are lowest in Ireland and Italy, and highest in Germany. France and UK have very similar income levels that are around the European mean. Since the EMP is the same in purchasing power, it represents a larger proportion of per capita income in Ireland and Italy and a smaller proportion in Germany. We should expect a downward-sloping relation between cost (adjusted for the differing relative proportions of households with people aged 65+) and disposable income, as shown in Figure 1.

The two countries which stand out from Figure 1 are France and the UK. On the basis of relative income levels, we would expect the EMP to cost much the same (when adjusted for differences in proportions of households with people aged 65+), whereas the cost in France is much lower. This suggests that further explanation for differences in cost must be found in the existing pension systems that the EMP is designed to supplement. The proportion of households containing people eligible for the EMP who in fact benefit from it, is shown in fifth row of Table 1. The European average is 38 per cent but the differential impact across countries is quite striking. In the UK, 58 per cent of pensioner households benefit, whereas the figure is just 29 per cent in France.

The proportion of beneficiaries from the EMP depends on two things: the relative *generosity* of existing pension payments compared with the EMP and the coverage of the existing pension systems. Where coverage is incomplete, we would expect some households to gain large amounts from this universal scheme. If coverage is more comprehensive but the pension system generally pays an income less than UK£75 per person, then we would expect large numbers of households gaining small amounts. (Clearly, in situations where several tiers of pension system exist, the picture can be considerably more complex.) The final row of

Table 1 shows the average percentage change in household income.[5] Comparing these figures for France and the UK we can see that the average proportional increase in income is 1.3 times as much in the UK as France. However, the proportion of pensioner households who benefit in the UK is twice as large as the proportion in France. This implies that in the UK there are large numbers of gainers but they gain less on average. In France pensions are typically more generous relative to the EMP, but some people aged 65 or more have quite low pension incomes.

Looking at the other countries, we may deduce that in Germany, as in France, pensions are typically more generous relative to the EMP, but some people have low pension incomes. The corresponding figures for Italy suggest that there would also be some large gains because of small existing pension incomes, and that a greater proportion of Italian than German pensioners would be in this position. Ireland has an even greater proportion of beneficiaries than the UK, but the increases in income are larger too, suggesting that the Irish system has problems with both coverage and adequacy, when measured against the standard of the EMP.[6]

We do not consider the financing of the EMP in this paper, but it is worth noting that the figures on average percentage change in household income shown in Table 1 can be interpreted as the increase in a uniform rate of VAT (on all household expenditures) that would be needed to finance the EMP in each country (assuming all disposable income is spent). The rate ranges from 1.7 per cent in Ireland to 0.6 per cent in Germany.

4. Targeting from a European Perspective

The purpose of the EMP is to target the increased expenditure, so as to ensure a minimum standard of living for Europe's elderly population. It is part of a broader anti-poverty strategy. Thus we need to evaluate not only the extent to

[5] Here, and throughout the paper, the losses borne by a few households are included in the calculations.

[6] One source of the apparent lack of coverage is the fact that social assistance pensions in Ireland are not payable until the age of 66: many people aged 65 and not in receipt of contributory pensions will stand to benefit substantially from the EMP.

which the household incomes of older people have increased relative to the rest of the population, but also their position in the distribution of income. Figure 2 shows the cumulative distribution of the benefit of the EMP across the European household income distribution, using the four alternative assumptions about the equivalence of incomes of households in different circumstances that were described in Section 2. This concentration curve follows the diagonal where the benefit is uniformly distributed, and lies above the diagonal where the benefit is concentrated more on lower income groups. Where one curve lies above another, this suggests that it is better "targeted".

The income measure that makes the reform seem most successful at targeting low income households is that which combines the use of PPP-adjusted incomes and the OECD equivalence scale (option (d)). The option that makes the reform seem least successful in this respect is the combination of nominal exchange rates and per capita household incomes weighted by household size (option (b)). This is not surprising since the effect of the per capita income ranking is to push large households to the bottom of the income distribution, and the effect of weighting by household size is to inflate the importance of large households. Older people tend to live in smaller households and under this income measure appear higher up the distribution and with less weight than under the other options.

Figure 2 demonstrates that there is some variation in the European distributional outcome according to the chosen assumption, although for the three options that assume some economies of scale within households ((a), (c) and (d)), it is broadly stable. However, it is not necessarily the case that the composition of the distribution is the same in each case. Under one assumption there may be a large number of low-income beneficiaries from country A benefiting by a small amount; under another assumption, there may be a small number of pensioners from country B who each gain a large amount.

We have seen that the factors underlying the aggregate effect of the reform are the proportion of pensioners in the population, the level of the EMP in relation to disposable income per capita, and the coverage of national pensions and their relative generosity, compared with the EMP. In addition, the European distributional effects underlying Figure 2 depend on the position of pensioner

households in the national income distributions. Each of these four factors is affected to some extent by the choice of assumptions that we make. In addition, it is clear that the manner of the targeting inherent in the EMP does not coincide exactly with any of the criteria used to place the potential beneficiary of the reform in the Eur5 income distribution.[7] If we had modelled the reform as a proportional change in the same income measure we use for ranking, then the sensitivity of the simulation results to assumptions could be predicted *a priori* and expressed as a set of transparent relationships. However, EUROMOD is being developed as a tool for the design and evaluation of actual policy instruments and practical policy proposals, which are necessarily complex and have rationales of their own. These points of difference may operate differently across countries and provide additional explanations for the sensitivity of Eur5 results to income equivalence assumptions.

In order to focus on the impact of the reform on European poverty, we concentrate on the impact on the bottom income quintile of the Eur5 distribution and on the composition of this quintile under the alternative assumptions. We recognise that this is an arbitrary choice of poverty line. It is chosen for reasons of simplicity. Other definitions of poverty might give other results, but we do not believe that our overall conclusions would be affected. Table 2 shows the proportion of the national benefit, and of the combined European benefit, that is received by households in the bottom quintile. If the benefit were uniformly distributed we would expect each entry to be 20 per cent. On the other hand, an entry of 100 would imply that the lowest quintile received all the benefit. Overall we notice that the impact of the EMP varies substantially across countries and that the variation is dependent to some extent on the income measure that is used to identify households in poverty. Using option (c), the share received by households in the bottom quintile varies by as much as between 62 per cent (UK)

[7] Among the differences between the criteria used for assessing entitlement for EMP and those used to rank households are: (i) the use of household disposable income as the relevant income concept for ranking, contrasted with household gross pension income (less tax and benefit withdrawal) which is used as the criterion in the assessment for entitlement to net EMP; (ii) there are no consumption economies of scale implicit in the EMP, which is not reduced for pensioners living together, whereas two of our income equivalence assumptions (c and d) assume some economies of scale, and assumption (a) implies that the number of EMP recipients within the household is irrelevant.

and 7 per cent (France), and for Germany the share varies by as much as from 18 per cent (option (b)) to 44 per cent (option (d)).

Underlying the results in Table 2 is the position of potential beneficiaries from the EMP in the distribution, and in particular the proportion of pensioner households who are identified as poor. This is shown in Table 3, where a figure of 20% would mean that pensioner households stand the same chance of being in the bottom quintile as a randomly drawn household. The final column of this table shows that even at the European level, the proportion of pensioner households who find themselves in the bottom quintile is strongly dependent on the ranking assumption. Pensioners are most heavily concentrated among the poor, in each country and at the European level, if unadjusted household income is used to rank households (option (a)). Using the *per capita* income measure (option (b)) greatly reduces the concentration of pensioners at the bottom, again in all countries, for reasons described above. The Eur5 proportion of pensioner households in poverty is reduced from 33 to 13 per cent, so that they become in effect "under-represented" among the poor. Using the OECD equivalence scale (option (c)) has a more mixed effect. The overall proportion of pensioner households in poverty becomes 25 per cent but, compared with unadjusted household income, the proportions fall dramatically in France (from 18 to 2 per cent), fall substantially in Germany (from 19 to 8 per cent), fall slightly in the UK (from 55 to 49 per cent), remain the same in Italy and rise in Ireland (from 50 to 56 per cent).

Adjustment of incomes to account for purchasing power differences (option (d)) has no effect on the distribution within countries, but does affect the country composition of the bottom quintile. It has the effect of replacing some households in the poorer countries in the bottom Eur5 quintile by households from the richer countries. Since the households moving in and out may or may not contain pensioners, the effect is again mixed. In aggregate the proportion of pensioner households in European poverty remains about the same but the proportions rise in France and Germany and fall in the remaining countries. The rise is particularly marked in France, suggesting that there is a concentration of pensioner households just above the quintile point under option (c). When French incomes

are adjusted downwards using PPP-related exchange rates, this large group of households shifts down, into the bottom quintile. This illustrates the general problem of using a single poverty line that takes no account of the distance of households above or below the line. Large groups near the "border" may make the results sensitive to small changes in assumption.

Returning to Table 2, the impact of the compositional changes shown in Table 3 is clear. In general, the larger the share of the pensioner population in the bottom quintile, the larger the share of the benefit received by this group. There are exceptions, however. In France and Germany, the effect of equivalising using the OECD scale greatly reduces the proportion of pensioner households in poverty (compare (a) and (c) in Table 3). We might expect the share of benefit received by the bottom quintile to fall too. However, in Germany this actually increases on using the equivalence scale (from 34 to 35 per cent) and falls only slightly in France (from 8 to 7 per cent). Thus the pensioner households who remain in the bottom quintile after adjustment by the equivalence scale contain a much higher proportion of beneficiaries who gain by large amounts than do those households that have been moved out of poverty by the equivalence scale. As this shows, the EMP may appear well targeted in terms of the overall distribution of income either because poor households are heavily concentrated in the bottom quintile or because the EMP is concentrated on the most needy pensioners.

Table 2 shows that adjustment of incomes by PPP-related exchange rates slightly increases the overall share of benefit received by the bottom quintile (to 45 per cent from 42 per cent using option (c)). The proportion of pensioner households in this group, shown in Table 3, is virtually unchanged. The combined effect is to improve the incidence of the policy on the households identified as poor. Furthermore, the country composition changes. There are increases in the numbers of French and German households in the bottom quintile, accompanied by a greater share of benefit within these countries falling on the poor. However, while the proportion of German households rises by a factor of 1.6 (from 8 to 13 per cent) with the PPP adjustment, the share of benefit rises by a factor of only 1.2 (from 35 to 44 per cent). This suggests that the German pensioner households who move into the group have relatively low entitlements to EMP,

compared with those already counted as poor. The same is true, to an even greater extent, for France. In Ireland, Italy and the UK the share of benefit received by poor households falls slightly less than the proportion of pensioner households counted as poor. This is consistent with the beneficiaries from these countries who are poor on nominal currency grounds having only slightly smaller entitlements than pensioner households who are counted as poor when incomes are PPP-adjusted.

An alternative way of evaluating the distributional effect of the reform is to examine the changes it brings about in the composition of the European poor. Table 4 shows the proportion of pensioner households in the lowest quintile after the reform. The samples have been re-ranked taking account of the changes in the income of pensioner households. Table 4 can be compared directly with Table 3. At the European level, under each of the four assumptions the proportions of pensioner households in the bottom quintile have been reduced. This is to be expected as the reform has increased the incomes of pensioner households in relation to households as a whole. However, if we were to judge the success or failure of the EMP by the proportion of pensioner households that are moved out of poverty, our conclusions would differ according to the income equivalence assumptions we had chosen. Reductions in the proportions of pensioner households who are counted as poor range from modest (33 to 31 per cent) under option (a) to substantial (from 13 to 8 per cent) under option (b). An intermediate case is option (d), where the reform reduces the proportion of pensioners in the bottom quintile from 24% to 20%: ie after the reform they are, in this respect, the same as the population as a whole.

If we wanted to make the case for an EMP on the grounds that it reduces the proportion of pensioner households in the bottom of the European income distribution, the most effective strategy would be to rank incomes on a per capita basis. This choice would not necessarily be predicted from the information in Table 2, which showed that this assumption resulted in the lowest share of the total benefit being received by this group. The explanation for this apparent paradox is that the pensioner households counted as poor when ranked by per capita income typically have extremely low incomes by any standards. The EMP

represents a significant increase in income to them and is sufficient to move many of them out of poverty, leaving behind mainly large, non-pensioner households.

At the European level, the EMP successfully reduces the number of pensioner households in the bottom income quintile using each of the assumptions, but this is not always the case within countries. The national effect depends on the distribution of pensioner households around the shifting quintile point. For example the proportions of French, and to a lesser extent German, pensioner households in the bottom quintile rise as a result of the EMP if unequivalised incomes are used on a nominal basis. The proportion of German pensioner households classified as poor also rises if PPP-adjusted incomes and the OECD equivalence scale are used for ranking. The impact on different countries is illustrated in the radar diagram in Figure 3.

One can compare Tables 3 and 4 from the perspective of a European analyst wishing to identify the countries that benefit most and least from the EMP. In terms of the percentage point reduction in pensioner households counted as poor, Ireland benefits more than any country *under all four income definitions*. France benefits least under all but the PPP-adjustment assumption, where Germany fares least well. We can also view the results in Tables 3 and 4 from the perspective of national analysts wishing to choose the assumptions that would lend greatest and least weight to arguments for the introduction of an EMP. Table 5 shows the rank order of the choices that is implied by the percentage point differences between corresponding cells of Tables 3 and 4. The choice of assumption that would be most favourable to the anti-poverty properties of the EMP is ranked as 1 on a national and European basis. The least favourable choice is ranked 4. On this basis there would be no consensus among either proponents or opponents of the EMP about the most effective way of identifying the impact of the reform on the poor. One value of the kind of analysis presented here is that it can make explicit the interests which lie behind apparently technical arguments.

5. Conclusion

If we were to consider the EMP as a practical policy proposal, we would need to take further the analysis presented here in several respects. Firstly, there are

losers from the reform and closer regard would need to be paid to the interaction of the EMP with existing national pension systems, and with national redistributive systems in general. Secondly, one might wish to explore variants of the EMP scheme, such as different treatments of the unit of assessment of pension income, in order to understand and improve its performance. The relative effectiveness across countries of the EMP is likely to be influenced by the (common) level at which it is set and the (common) social welfare criterion with which it is evaluated. Simulation of the effects of lower and higher levels would provide a fuller picture of the deficiencies of existing systems compared with the minimum standard provided by the EMP. It would be useful to show the impact of nationally-varying levels of the EMP. Finally, in practice the EMP would need to be financed. A model such as EUROMOD can be used to explore the combined distributional effects of an EMP and measures to finance it.

Our analysis has used the simulated introduction of the EMP as an illustration of the effect of a common European reform. It is clear that the imposition of this "harmonised" anti-poverty policy has a highly uneven effect across countries. This is true not only when a "harmonised" poverty line is used as was done here. It would still hold using reasonable country specific evaluation criteria. It is not the case that the use of a common instrument necessarily leads to the uniform achievement of a common objective. Moreover we have shown that it is not only differences in average income that affect the relative national impacts of the reform. Existing pension policies, as well as redistributive systems in general, have deficiencies of various kinds when compared with the particular standard set by the EMP. While one would not advocate introduction of an EMP on the basis of the evidence presented here, the information on its relative national effects could be used to design instruments that make up for these deficiencies.

The main purpose of this paper has, however, been to demonstrate the sensitivity of our conclusions about the effect of an anti-poverty reform to assumptions made in identifying poor households when the definition of poverty is common to all countries. One quite striking finding is that results at the European level may be fairly insensitive to changed assumptions, while country-level results are strongly affected. For example, the national proportions of pensioner households

identified as part of the European poor are highly sensitive to adjustments for differences in national purchasing power. But at an aggregate European level, the proportions are virtually unchanged (options (c) and (d) in Table 3). Results would have been different if distinct poverty limits had been used for the various countries. Both the standard that is set by a common "benchmark" policy such as the EMP, and the way in which we evaluate its effect on poverty, are sensitive to the assumptions made about the relative value of the incomes of households in different circumstances across Europe. The EUROMOD model is designed to provide European results, while also allowing us to focus on national issues. In the absence of consensus over choice of assumptions, our analysis has shown that it is all the more important in the design and analysis of European social policy to keep each of these perspectives firmly in view. We hope that we have demonstrated the worth of extending to a European scale the simulation modelling which has proved so valuable at a national level.

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	France	Germany	Ireland	Italy	UK	Total
Revenue Cost Per Capita (1994 PPP ECU Per Annum)	54.8	57.7	114.5	108.1	87.1	77.2
People Aged 65+ (Percentage)	12.8	17.9	11.9	14.8	15.4	15.2
Households with people aged 65+ (Percentage)	25.5	29.7	30.8	32.5	28.1	28.9
Disposable Income Per Capita (Eur5=100)	102.5	110.9	75.5	84.9	102.6	100.0
Pensioner households Gaining (Percentage)	29.1	20.5	66.4	44.4	57.6	37.5
Average Change in Household Income (Percentage)	0.7	0.6	1.7	1.5	0.9	0.9

Source: Eur5.

Table 6.1: Aggregate Impact of the EMP

Ranking of Households	France	Germany	Ireland	Italy	UK	Total
(a) Unequivalised	8.4	33.6	46.5	44.3	61.8	38.2
(b) Per Capita	6.3	17.9	43.3	50.0	36.4	29.9
(c)Equivalised by modified OECD Scale	6.7	35.4	54.3	57.0	62.4	42.4
(d) Modified OECD Scale with PPP	28.9	43.6	46.6	49.0	55.3	44.8

Source: Eur5.

Table 6.2: Share of Benefit in Household Income from a EMP Received by Lowest Eur5 Quintile (Percentage)

Ranking of Households	France	Germany	Ireland	Italy	UK	Total
(a) Unequivalised	18.1	18.8	49.7	40.4	55.2	32.9
(b) Per Capita[1]	3.7	3.8	34.7	26.5	12.7	12.9
(c)Equivalised by modified OECD Scale	1.8	8.2	55.8	39.3	48.6	24.5
(d) Modified OECD Scale with PPP	15.1	13.1	45.0	31.0	38.0	24.2

Source: Eur5.
1. The figures show the proportion of people in pensioner households who are in the lowest quintile of Eur5 people.

Table 6.3: Proportions of Pensioner Households in the Lowest Eur5 Quintile Before the Reform (Percentage)

Ranking of Households	France	Germany	Ireland	Italy	UK	Total
(a) Unequivalised	21.3	19.1	44.3	35.2	49.8	31.1
(b) Per Capita[1]	2.9	1.5	21.3	17.8	5.9	7.8
(c)Equivalised by modified OECD Scale	1.3	6.0	49.6	36.6	45.0	22.2
(d) Modified OECD Scale with PPP	10.6	14.2	35.0	24.4	28.9	19.7

Source: Eur5.
1. The figures show the proportion of people in pensioner households who are in the lowest quintile of Eur5 people.

Table 6.4: Proportions of Pensioner Households in the Lowest Eur5 Quintile After the Reform (Percentage)

Ranking of Households	France	Germany	Ireland	Italy	UK	Total
(a) Unequivalised	4	3	4	3	3	4
(b) Per Capita	2	1	2	1	2	1
(c)Equivalised by modified OECD Scale	3	2	3	4	4	3
(d) Modified OECD Scale with PPP	1	4	1	2	1	2

Source: Tables 3 and 4.

Table 6.5: The Rank Order of Income Equivalence Assumptions: Ranking According to the Percentage Point Reduction in Pensioner Households Counted as Poor

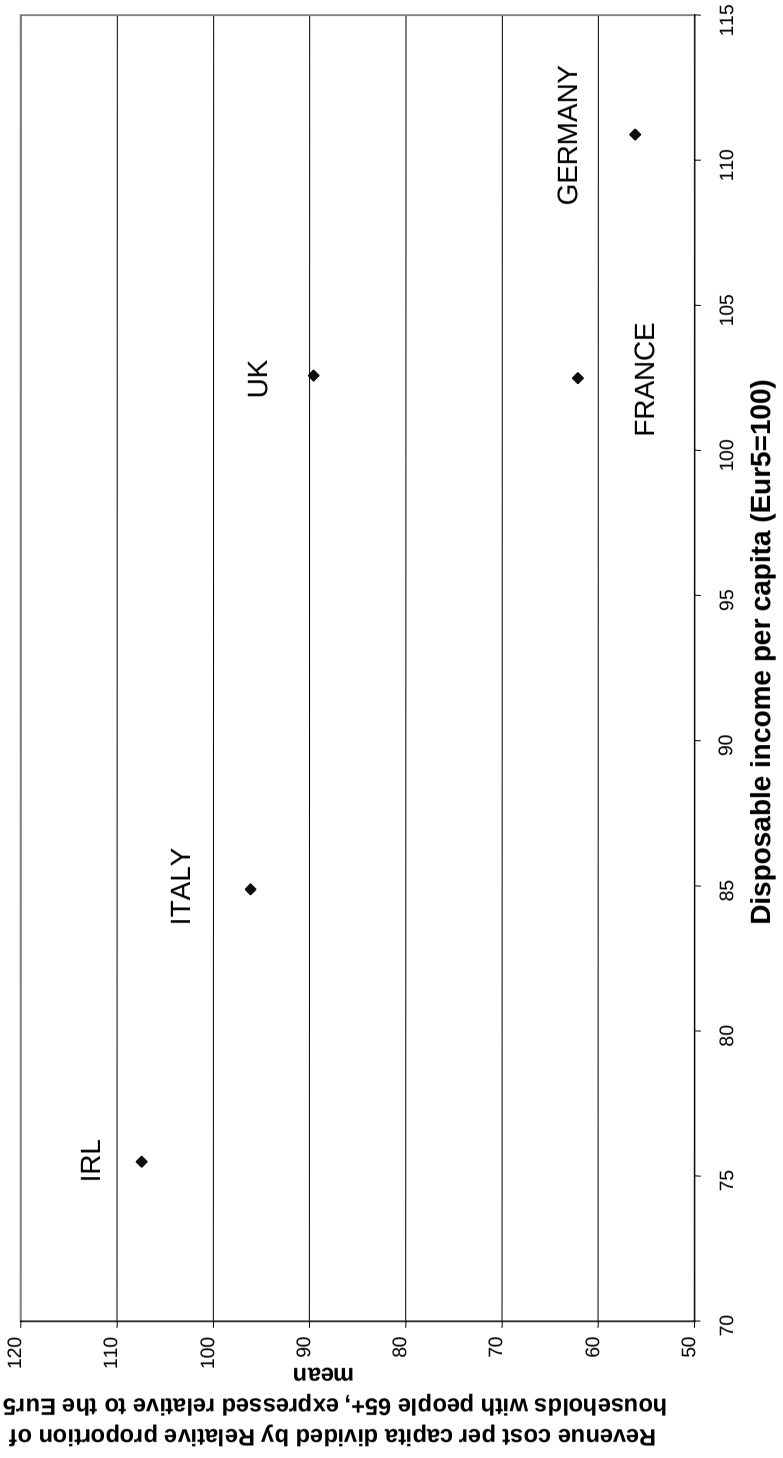

Figure 6.1: Adjusted Revenue Cost and Disposable Income Per Capita

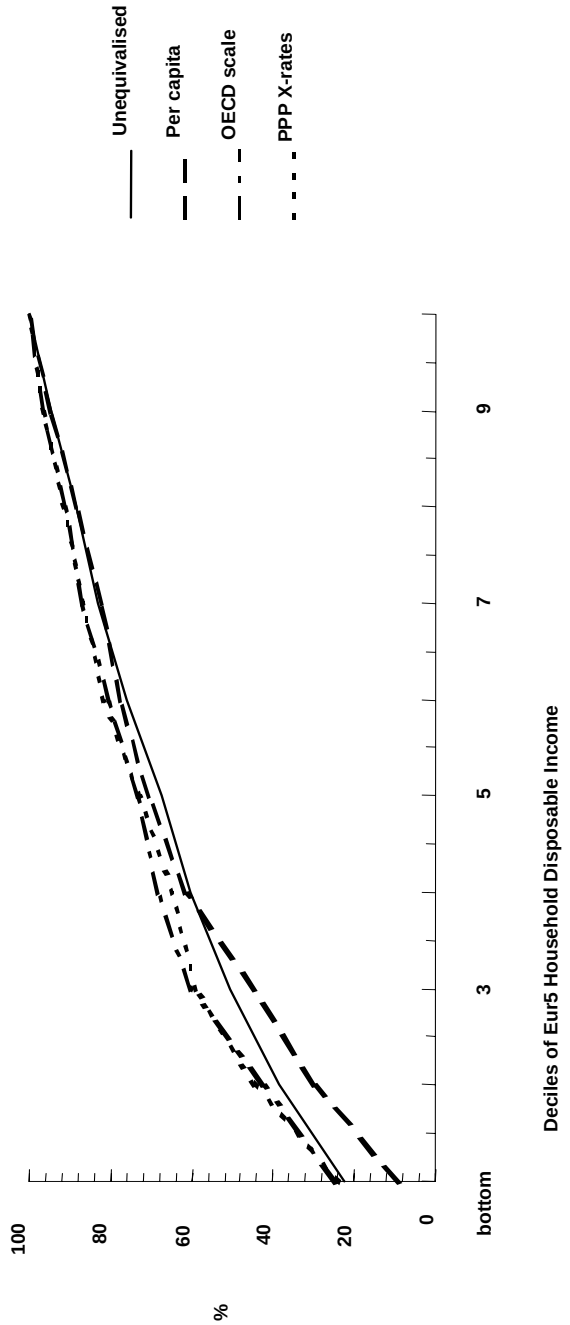

Figure 6.2: Cumulative Share of Benefit From an EMP Across the Eur5 Income Distribution: Ranking by Alternative Income Measures

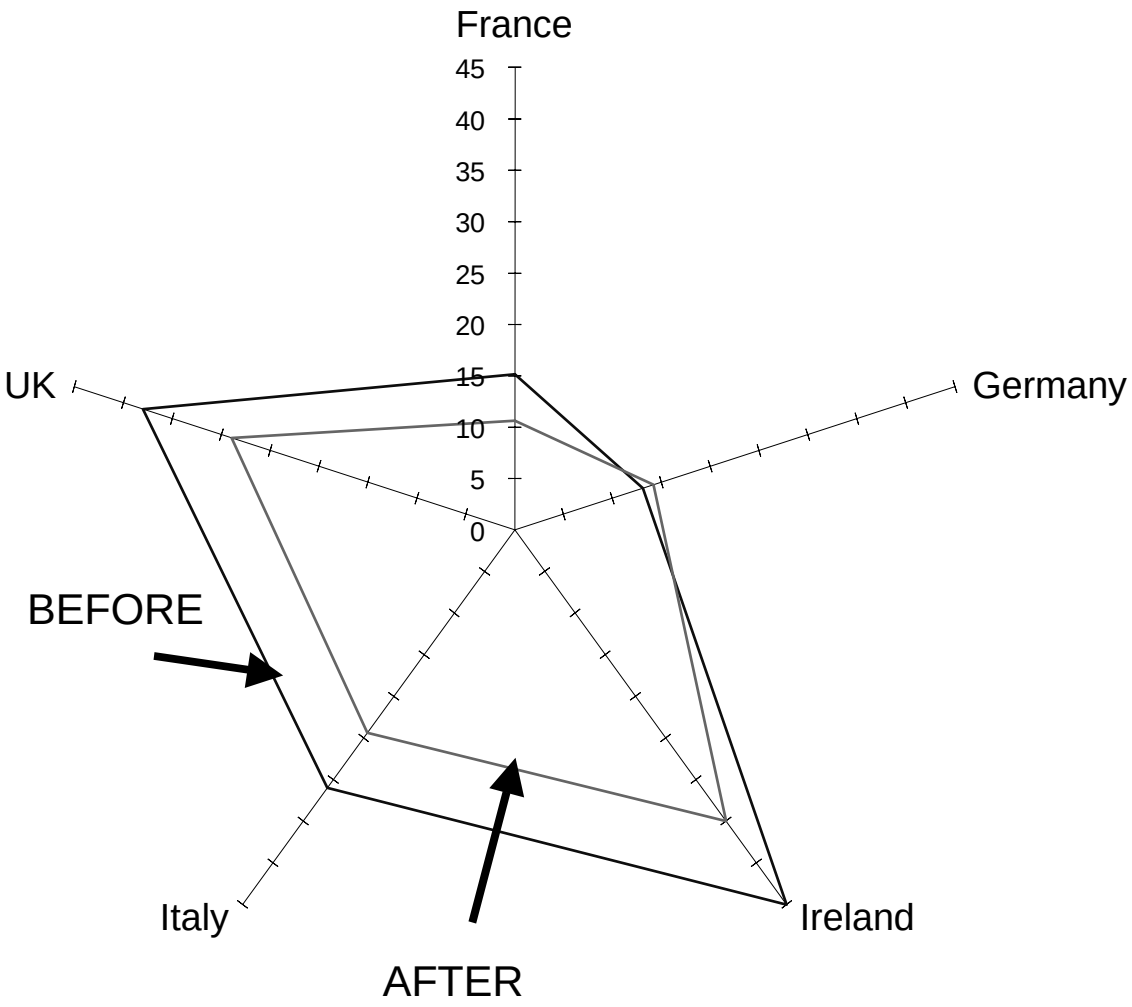

Figure 6.3: Effect of EMP on Pensioners in Eur5 Poverty (Option (d))