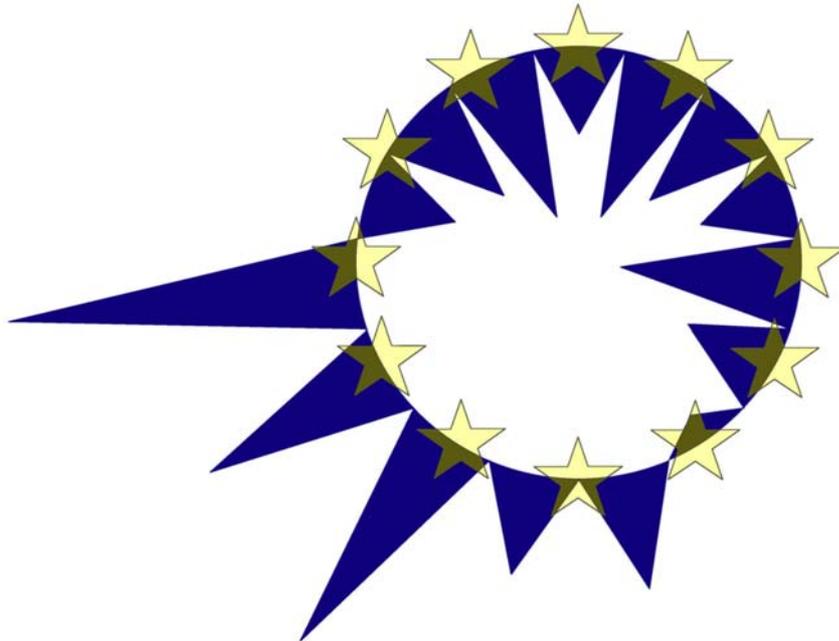# EUROMOD

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ASSESSING THE IMPACT OF TAX/TRANSFER POLICY CHANGES ON POVERTY: METHODOLOGICAL ISSUES AND SOME EUROPEAN EVIDENCE

Tim Callan and John Walsh

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Assessing the Impact of
Tax/Transfer Policy Changes on Poverty:
Methodological Issues and Some European Evidence

Tim Callan and John Walsh

Economic and Social Research Institute

Abstract

A method of systematically assessing the "first-round" impact of tax and transfer policy changes on the income distribution and the incidence of relative income poverty is proposed. It involves the construction of a "distributionally neutral" policy, which can be approximated by a policy which indexes tax allowances, credits and bands and welfare payment rates in line with a broad measure of income growth. The impact of actual policy changes in five EU countries over the 1998 to 2001 period is then measured against this benchmark, using the EUROMOD tax-benefit model.

Address for correspondence:

Tim Callan
ESRI
4 Burlington Road
Dublin 4
IRELAND
email: tim.callan@esri.ie

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1. Introduction[1]

A view that poverty must be conceptualised and measured relative to the particular society is common in Europe, and has been formally endorsed at EU level on a number of occasions. [2] Recent developments have built on the decision of the European Council meeting at Laeken in 2001, which endorsed a portfolio of 18 statistical indicators to monitor progress in the fight against poverty and social exclusion. Prominent among these "Laeken indicators"[3] are a number of measures of relative income poverty (see Atkinson *et al.*, 2002) and some measures of income distribution.[4] The incidence of relative income poverty can be monitored using cross-sectional income surveys.[5] But in addition to monitoring outcomes in this way, we need to analyse and understand the impact of past policy decisions and gauge the likely impact of alternative policy choices faced today. If analysis is to assist policy makers, then it must be possible to assess how past policy choices have affected relative income poverty, and how current policy choices may influence poverty in the future. Analysis using tax-benefit models is essential for both the backward looking assessment of

[2] See, for example, the definition of poverty adopted by the European Union (1984), which identified poverty with the situation of people whose "resources (material, social and cultural) are so limited as to exclude them from the minimum acceptable way of life in the countries in which they live".
[3] The Council met at Laeken in December 2001.
[4] The relative income poverty measures are relabelled as identifying those "at risk" of poverty; it is accepted in this context that not all of those below the income cut-off are in poverty, but the "at risk of poverty" measure is accepted as a useful one in monitoring social exclusion.
[5] The new EU-SILC (Statistics on Income and Living Conditions) will provide a base for monitoring of the indicators in EU countries. In practice, the use of such surveys means that one obtains a picture of relative poverty with a significant time lag. For example, the Joint Report on Social Inclusion (European Commission, 2004) relies on data gathered some three years earlier.

policy impact and for exploration of the likely impact of future policy in order to inform policy choices.

The central question examined in this paper is how to assess the impact of tax and transfer policy changes across the income distribution. For example, how should we measure the impact of tax and transfer policy changes implemented in an annual Budget? One natural approach is to ask what would have happened if Budget day changes in income tax, social security contributions and social benefits had simply not taken place. This counterfactual is of particular relevance for certain purposes – for example, keeping track of changes in government expenditures and tax revenues. It will be argued, however, that this is a flawed benchmark against which to assess the *distributional* impact of policies actually implemented. Instead, a "distributionally neutral" benchmark is proposed, which can be approximated by indexation of tax and welfare parameters in line with growth in wages. This provides a more accurate picture of the impact of policy changes on the income distribution and on measures of relative income poverty. The EUROMOD model is used to apply this method in assessing the "cash" or "first-round" impact of policy changes over the 1998 to 2001 period in five European countries.

The choice of a framework for the assessment of the distributional or poverty impact of budgetary changes in tax and welfare policy is examined in Section 2. Issues arising in the application of the analysis to five European countries using EUROMOD are described in Section 3, which goes on to set out the results of the analysis. The main findings are drawn together in Section 4.

2. Measuring the distributive impact of policy changes

In this section we consider three alternative benchmarks against which the distributive impact of changes in income tax and social security or welfare policies may be assessed. Most studies in this area use one of these benchmarks:

(a) *No nominal change:* No change in the nominal value of tax and welfare policy parameters – policy is "frozen" in nominal terms.

(b) *Price indexation:* Tax and welfare parameters are "price indexed" in line with consumer price inflation.

(c) *Wage indexation:* Tax and welfare parameters are "wage indexed" in line with growth in nominal wages. As will be shown, this leads to a "distributionally neutral" benchmark, in contrast to both (a) and (b).

In this section, we first outline briefly some of the key features of each benchmark. We then construct a simple economic backdrop, using SWITCH, the Irish tax-benefit model,[6] which serves to highlight the key differences between the three benchmarks. Based on this analysis, we argue that the wage indexation benchmark is to be preferred in identifying the distributional impacts of past or proposed future policy changes.

(a) No nominal change in tax and welfare parameters

Under this benchmark, tax and welfare rates would remain fixed in nominal terms. (This is in line with the conventions governing the "opening budget" in some countries). What would happen if such a budget were implemented? On the income tax side, there would be no change in rates, allowances or bands. Under a progressive income tax system, this would involve a rise in the tax take as a proportion of income or "fiscal drag". The amount of fiscal drag would depend *inter alia* on the rate of growth of nominal incomes. On the welfare side, constant nominal payments in the face of price inflation would lead to a fall in real incomes for those depending on welfare payments.

(b)Price indexation of tax and welfare parameters

Under this benchmark, welfare payment rates, tax bands and other "money" parameters in the tax and benefit system would be indexed in line with price inflation. Thus, the real value of welfare payments would be held constant. If real wages were growing, then welfare payments would be lower in relation to average wages. On the tax side, growth in real wages when tax bands were indexed in line with prices would mean that some "fiscal drag" would still occur, raising the average tax rate. (See Immervoll *et al.* 2005 for an analysis of the impact of growth in earned incomes on average disposable income and relative income, when tax and benefit parameters do not keep pace with real earnings growth).

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[6] SWITCH is a static tax-benefit model, like the Tax Policy Center model in the US and the IFS model in the UK. Such models do not take behavioural responses into account, but are a commonly used starting point for the assessment of distributive effects of policy changes. In any event, the key focus here is on differences in the benchmark against which policy is assessed: the same issues arise for both static and behavioural response models in this context. Further details on the SWITCH model are provided in the appendix.

(c) Wage indexation of tax and welfare parameters

When examining the impact of budgetary policy on income distribution and relative income poverty, it is useful to have a benchmark which can be regarded as "distributionally neutral". Under such a benchmark, major population groups would share equally in the benefits of economic growth. Growth in disposable income would be the same for all major population groups, and shares of income for different groups in the population would remain the same after the budget as in the year before. While some would argue that the government should undertake more redistribution, and others that it should do less, the "distributionally neutral" benchmark at least provides a yardstick against which changes can reasonably be measured.

A number of choices arise in implementing such a benchmark. The approach implemented here involves indexing tax and social welfare to the growth in gross wage income, the predominant element in national income.[7] In effect, then, the benchmark represents a budget which is neutral in terms of the share of wages going in tax, and in terms of the relationship between wages and the incomes of social welfare recipients. For wage earners, this is achieved by increasing tax-free allowances and tax bands in line with the growth in gross wages. For those depending on social welfare payments for their income, an increase in welfare rates equal to the rate of increase in pre-tax wages would, in general, ensure that they shared equally in the growth in income.[8] It is worth noting that this "wage indexation benchmark" can also be viewed as a "neutral" option in macroeconomic perspective: indexing policy to wage growth would keep government revenue and expenditure roughly constant as a proportion of national income.

Which benchmark?

A natural approach to the assessment of policy impact is to ask what would have happened to the values of income tax parameters and welfare payment rates in the absence of an explicit policy change. The default option for what happens to welfare payment rates and tax bands (which we will term the "opening budget") varies across countries. For some countries (e.g., Ireland) the answer is very simple: tax and welfare parameters would remain unchanged in nominal terms if no changes were announced in the annual Budget statement by

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[7] Incomes from self-employment are more variable from year to year than wages, so indexing taxes and social welfare to wage growth provides a more stable benchmark.

[8] If tax cuts over and above indexation were implemented, then welfare payments would have to rise faster to keep pace with growth in net wage incomes.

the Minister for Finance. Other countries have some elements of price and/or wage indexation built into parts of the tax and welfare code (see Immervoll, 2000). In the UK, for example, key parameters in the income tax code are indexed to changes in the retail price index (consumer prices). Pensions in some countries are indexed to changes in wages, and in others to prices. For some countries indexation (whether to price or to wage growth) may be part of the legislative framework; but for others it may instead be something which has become an accepted practice, although not formalised into legislation.

While national practices as regards what happens in the absence of a budget differ considerably, the assessment of distributional impacts by reference to the "opening budget", indexed at most by price inflation, appears rather common.[9] This means that the assessment of distributional impacts across countries could depend heavily on the nature of the "opening budget" in the country in question. We argue that the natural standard against which to measure the distributional impact of policy changes is the wage-indexed benchmark, which approximates distributional neutrality. If accepted, this would also provide a common standard which could be applied across countries, as illustrated in Section 3.

In order to examine the question of which benchmark is the most appropriate for measuring distributional impact, we start by exploring the implications of using each of these benchmark. In the real world, identifying budgetary impacts can be hampered by concurrent changes in economic and social structures and by difficulties in identifying behavioural responses to tax and welfare policy changes. Here we construct a much simpler economic backdrop in which the direct impact of budgetary changes on the income distribution and on relative income poverty can be measured. Differences between the alternative benchmarks in assessing budgetary impacts emerge much more clearly against this backdrop.

The simplified economic backdrop is one in which, the economy can be regarded as being in a "steady state", with prices and wages growing at fixed rates, and economic and social structures perfectly stable e.g., employment and unemployment rates, the age distribution of the population and so on. All earnings (by employees and by the self employed) are assumed to grow at the same rate – there are no shifts in the earnings distribution towards greater or lesser inequality, or shifts in relativities. Occupational pensions are also set to rise by the same proportion. Essentially, the only changes are to incomes and prices, and not to employment, unemployment or household composition.

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[9] See, for example, Giles and Johnson (1995), Myck (2000), Brewer *et al.* (2005) in the UK and Mitrusi and Poterba (2000) in the US

Table 1: *An Illustrative Scenario*	
Prices rise by	5%
Real wages rise by	5%
Nominal wages rise by	10.25%

Our analysis is conducted using SWITCH, the Irish national model. The baseline year used is 1999, though similar results would be expected for any other year. The projection to the year t+1 involves growth of 10.25% in wages, self-employment income, occupational pensions and all other "market" incomes, as distinct from State transfers[10]. The increase, if any, in State transfer incomes such as old age pensions, unemployment benefits, child benefit depends on the benchmark policy: it may be unchanged in nominal terms, indexed to prices, or indexed in line with wage growth.

We first examine how real disposable income growth varies across the income distribution under an "unchanged policy" benchmark (simply freezing policy in nominal terms) and under the wage indexation alternative. Family units are ranked from poorest to richest, based on income per adult equivalent (where the first adult counts as 1, other adults as 0.66, and children as 0.33). Families are then divided into 10 equal sized groups or "deciles", and the growth in income for each decile is shown. Figure 1 shows that under the wage indexation benchmark real disposable income growth is the same for all ten income groups. Furthermore that rate of growth is equal to the growth in real earnings before tax.

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[10] This illustrative scenario is not meant to be a representation of the year 2000, but is a counterfactual construct which helps to clarify differences in the nature of the alternative benchmarks.

Figure 1: Real Income Growth under Alternative Budgetary Benchmarks, Illustrative Scenario

% growth in disposable income

Deciles of income per adult equivalent
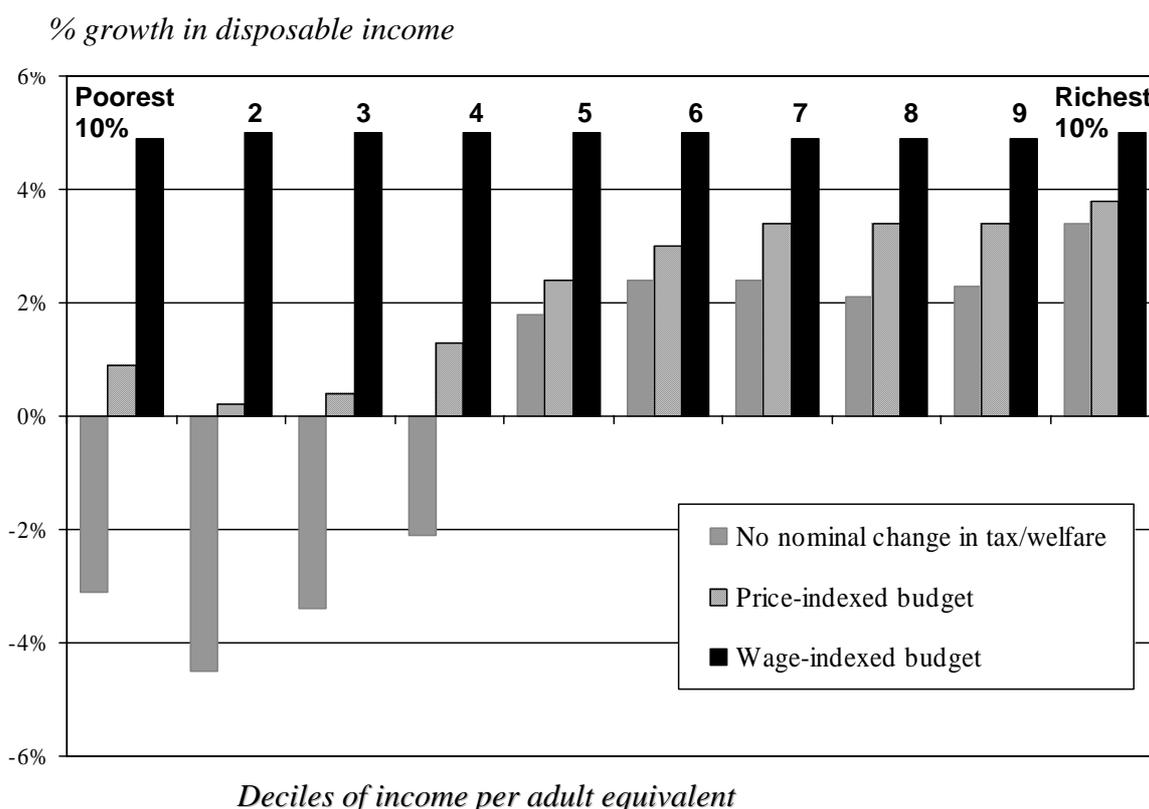
If the "unchanged policy" budget were actually implemented, this would be far from neutral in its effects across the income distribution. With tax and welfare parameters frozen in nominal terms, there would be real income losses for those dependent on welfare. Higher up the income distribution, the average tax rate would rise because of the progressivity of the income tax system i.e., there would be "fiscal drag" due to both inflation and real growth in incomes. As a result, growth in real disposable incomes would be somewhat below real earnings growth in the upper income groups. Once again, the fact that it is itself distributionally skewed – albeit less so than a budget "frozen" in nominal terms – makes it inappropriate as a benchmark for distributional analysis.

The price indexation benchmark would also involve non-neutrality. Real incomes rise by less than 1 per cent for the bottom three deciles, but grow by 3 per cent or more for the top half of the income distribution. This non-neutrality means that the price-indexed policy is also unsuitable as a benchmark for distributional impact.

Similar considerations apply to the measurement of budgetary impact on poverty. We illustrate this in terms of one of the most commonly used indicators of poverty, the proportion

of households below half of mean income.[11] We use the same illustrative scenario, involving steady growth. Table 2 shows that just under 20% of households fell below half of mean disposable income per adult equivalent in the base year (year zero). Under the benchmark involving no change in nominal values of tax and welfare parameters this proportion would rise by 2.3 percentage points. There would be a smaller rise (0.7 percentage points) under a price-indexed budget. Under a wage indexed budget the relative income poverty rate would remain constant.

Table 2: *Relative Income Poverty Rate at Half Average Income Under Alternative Policy Scenarios*

	Year zero	*Year one*	*Change in percentage points*
No nominal change in tax and welfare parameters	19.8%	22.1%	+2.3
Price indexation	19.8%	20.5%	+0.7
Wage indexation	19.8%	19.8%	+0.0

Source:　　Calculations using SWITCH, the ESRI tax-benefit model for Ireland.

If actual policy followed the route of price indexation, this would be seen as a budget with a favourable impact on the poverty rate compared to the "no change in nominal policy" benchmark (a fall of 1.6 percentage points), but a rise in poverty compared to the wage-indexed benchmark. If actual policy simply froze tax and welfare parameters in nominal terms, this would be seen as having no effect on poverty *relative to the "no nominal change" benchmark* as the actual policy and the benchmark policy would then be identical.

Critically, however, this does not seem to be a sensible characterisation of the impact of the budget. Relative income poverty would increase between the base year and year one, This would not be due to any economic shock or downturn increasing unemployment, but would simply reflect the decision made in the budget to freeze welfare in nominal terms, thereby leading to losses in real and relative income for those at the bottom of the income distribution. .

It seems more accurate to characterise such a rise in the relative income poverty rate as due to the tax welfare policy package chosen. This is what happens when a "distributionally neutral" budgetary policy is used as the starting point. The application of price indexation to welfare payments could be interpreted as delivering a constant real standard of living to welfare recipients. Wage indexation of tax and welfare policies can be

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[11] Similar results obtain for poverty lines framed in terms of median income, which are used in the second part of this paper.

seen as providing a distinctive, distributionally neutral benchmark, which under steady state conditions would imply no change in the proportion of persons falling below relative income poverty lines. In what follows, we compare actual policy changes with the benchmark constructed by indexing tax and welfare policies to growth in wages in 5 EU countries.

3. Impact of Policy Changes on Income Distribution and Poverty

The five countries selected (mainly on the basis that, at the time this analysis was undertaken, suitably validated policies were available for use with the EUROMOD tax-benefit model for both 1998 and 2001)) were Austria, Greece, Ireland, Portugal and the United Kingdom. In uprating tax and welfare parameters, we used the same estimates of nominal wage growth which were used in uprating the basic data between the relevant years: to do otherwise would introduce an inconsistency into the analysis. These estimates of nominal wage growth (see Table 3) varied from 7 per cent growth in Austria to 26 per cent in Ireland. This growth rate was used to index the 1998 tax and welfare parameters in order to provide a distributionally neutral benchmark against which the actual 2001 system could be compared. The fact that this indexed policy is being used as a benchmark does not imply a judgement about its merits or demerits as a policy: it is a benchmark simply because it would see incomes at different income levels grow at the same rate, keeping the distribution of income constant.

Table 3: *Estimated Nominal Wage Growth and Consumer Price Inflation, 1998-2001*

	Nominal wage growth	Consumer price inflation
Austria	7	5
Greece	17	9
Ireland	26	12
Portugal	18	10
United Kingdom	11	3

Table 4:   *Policy Impact on Income by Quintile, 5 EU Countries, 1998-2001*

Quintile	Austria	Greece	Ireland	Portugal	UK
	%	%	%	%	%
1	1.4	9.7	-0.3	3.8	7.8
2	1.6	4.5	2.8	3.0	4.9
3	0.7	2.0	8.4	3.0	2.7
4	0.4	1.1	9.0	2.7	1.7
5	-0.1	0.3	8.6	2.0	0.6
All	0.5	1.9	4.6	2.6	2.3

Note: Figures show percentage change in income under actual policy relative to a wage-indexed baseline policy

Policy impacts relative to this baseline (and calculated on a "static" basis, before any behavioural change) are reported in Table 4. The results suggest that tax-benefit policy changes over the 1998-2001 period were progressive in 4 of the 5 countries. Ireland is the exception, with policy changes boosting the incomes of the top 60% of families by close to 9%, as against modest gains or a small loss for lower income groups. The greatest gains for the bottom quintile were in the UK and Greece, with declining gains for other quintiles. For the UK, the main policy factors driving these changes were substantial increases in Income Support rates for pensioners, coupled with sharp increases in Income Support rates for children, particularly younger children.[12] In Greece the boost to the income of low income groups is also associated mainly with marked increases in the rates of payment for certain retirement benefits.[13] The pattern in Portugal was rather more even across the income distribution, while in Austria the changes were rather small for all income groups.

Table 5 presents initial estimates of impact of policy changes on head-counts of relative income poverty, for a range of poverty lines based on both median and mean incomes. These results show that the greatest reductions in head-counts of poverty have been achieved in Greece and the UK – the countries where the distributional pattern of policy impact was most progressive. For the UK, a reduction of between 2 and 3 percentage points is estimated for this 1998 to 2001 period. In Ireland, on the other hand, the head counts for relative income poverty as a proportion of median income rose by between 3 and 5 percentage points. This reflects a distributional impact which saw losses for the poorest quintile, and strong gains for the top three quintiles. The background was one in which real wage growth was strong, and income tax cuts added to disposable income for those in employment. Welfare payment rates, on the other hand, failed to keep pace with the growth in disposable income so that the relative position of welfare recipients worsened.

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[12] There were also substantial increases , well ahead of the rate of wage growth, in the additions to payment rates for carers and in respect of disabled children for families on low income. See Sutherland (2001) and Sutherland and Guttierez (2004) for details.

[13] Specifically, the rates increased sharply for the farmers' basic pension, social pension and pensioner social solidarity benefit. See Matsaganis and Tsakloglou (2004a,b) for details.

Table 5:   *Policy Impact on Relative Income Poverty, 5 EU Countries, 1998-2001*

	Austria	Greece	Ireland	Portugal	UK
Poverty line cut-off % of median	*Change in head count measure of poverty (% points)*				
50%	0.5	-1.2	3.8	-0.4	-2.5
60%	-0.2	-1.1	3.3	-0.1	-2.8
70%	-0.7	-1.4	4.8	-0.2	-2.8
% of mean					
40%	0.1	-1.1	0.3	-0.6	-2.4
50%	-0.2	-1.0	2.7	0.0	-3.2
60%	-0.3	-1.6	3.0	-0.2	-2.5

4. Conclusions

The main purpose of this paper is to argue for a "distributionally neutral" policy benchmark against which to measure the distributional impact of actual policy changes. This runs counter to the common practice of using a fixed nominal policy (or a price-indexed policy) as a benchmark against which to assess distributional impact.

A number of practical issues arise in constructing a "distributionally neutral" benchmark. Broadly speaking, a tax and benefit policy indexed for growth in wages is sufficient to ensure similar net income growth across the income distribution. However, different measures of wage or income growth may have a claim on our attention, and forecasts are almost certain to overestimate or underestimate actual wage growth. Different choices are possible in applying the method – one might use an initial forecast of wage growth, and revise it as new information comes to light.

Is wage-indexation an appropriate benchmark in a context where tax or welfare policy either makes no pre-commitment to a particular level of indexation, or makes a commitment to price indexation? We argue that it is, because the policy counterfactual created by wage indexation has a unique claim on our attention: it is the only one which comes close to providing a distributionally neutral benchmark. Attempting to measure the distributional impact of policy relative to a skewed benchmark is inappropriate.

An initial application of the method suggests that over the 1998 to 2001 period, all 5 countries analysed (Austria, Greece, Ireland, Portugal and the UK) had tax/transfer policy changes which were particularly favourable to lower income groups. The greatest gains for low income groups were in Greece, Ireland and the UK. Correspondingly, these were the countries for whom head counts of relative income poverty were most reduced – with a reduction of between 2 and 3 percentage points in the UK.

The "open method of coordination" adopted for social policy at Lisbon lays particular stress on comparisons of national policies with "best practice" in the EU in addressing social issues such as unemployment and social exclusion. To date, this has tended to centre on specific schemes or initiatives dealing as examples of "best practice" in dealing with certain client groups. While valuable in itself, this needs to be complemented by "system-wide" comparisons across countries, which take account of the big picture. A selected number of schemes or policy initiatives may work well in terms of reducing relative poverty, but may be "swimming against the stream" in terms of the impact of broader policy developments. Analyses of the type conducted here can help to ensure that individual policy initiatives and broader policy developments receive due weight in assessing "best practice" in countering poverty.

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Appendix 1: SWITCH: the ESRI tax-benefit model

Tax-benefit models are needed for a comprehensive assessment of the effects of tax and welfare policy changes, taking into account the wide variation in individual and family circumstances relevant to welfare entitlements and tax liabilities. *SWITCH*, the ESRI tax-benefit model, is a well-established tool for analysing the "first-round" effects of tax and welfare policy changes. It has been based on large-scale nationally representative survey of households undertaken by the ESRI (most recently the Living in Ireland Survey). The model database is adjusted each year to ensure that it reflects recent changes in incomes, employment, unemployment and population − and draws on projections of such changes for some years ahead, in order to provide a framework for medium-term analysis of budgetary issues.

The model uses detailed information on individual and family circumstances (including information on wages and hours of work for those in paid employment, and on labour force status and receipt of social welfare benefits for those not in paid employment) to assess the social welfare entitlements and tax liabilities of each family in the database. The model can therefore simulate for each family the disposable income they would receive under actual policy, or under alternative policies of interest.

Using these detailed calculations it is possible to summarise the impact of policy changes in many different ways. Here we focus in particular on how the average gain or loss varies depending on the income of the family. Family units are ranked by income, adjusting for differences in family size and composition using a simple equivalence scale: 1 for the first adult in the family, 0.66 for a second adult and 0.33 for children. Thus, a married couple with a disposable income of £200 per week would have an "equivalised" income of just over £120 (i.e., £200 divided by 1.66). A married couple with one child would have an equivalised income of just over £100 (i.e., £200 divided by 1.99 (=1+0.66+0.33)). Families are then divided into 10 equal sized groups or "deciles", from poorest to richest.

One underlying technical assumption is that labour market behaviour and wage rates are the same under each policy; but the model can shed light on how such behaviour may change by identifying the impact of policy changes on financial incentives to work. For structural estimates of labour supply and estimates of the impact of tax policy changes on labour supply behaviour see Callan *et al.* (2003).