ARTICLE

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An expenditure-based analysis of the redistribution of household income

SUMMARY

This article complements existing Office for National Statistics (ONS) analyses which focus on the distribution of disposable income across households by examining the distribution of household expenditure, in particular the effects of taxes.

Analyses of household disposable income and expenditure both show that: households whose members are economically active and composed entirely of adults are more concentrated in the top quintile groups in both distributions; direct taxes are progressive; and benefits are higher for households at the bottom of both distributions.

However, a number of interesting differences were also found. These include: indirect taxes are progressive in expenditure distribution, but regressive in income distribution; inequality in expenditure distribution is lower than in the income distribution; and households composed of single parents, couples with children and people in full-time education are more equally spread within the expenditure distribution than the income distribution, where they tend to be more concentrated in the bottom quintile groups.

Distributional analyses of the economy and of the fiscal system are usually based on the income of households or individuals. For example, the Office for National Statistics (ONS) analyses the effects of taxes and benefits in redistributing resources between UK households by referring to the distribution of their disposable income. However, some of the results of this analysis were found to be different when distribution of expenditure, rather than income, was used to rank households.

This article examines how using the distribution of household expenditure can provide a different view on the material living standards and equality among UK households, and particularly the effects of taxes on them. The aim is not to replace the income-based analysis, but to look at how to complement it by studying the distribution of expenditure. It is also in line with the recommendations presented in the Stiglitz Report¹ for assessing material well-being. The report suggests looking at consumption rather than production when evaluating material well-being. It also recommends giving more importance to the distribution of income, consumption and wealth in social and economic analyses.

Combining the results of the two approaches allows for a more complete understanding of the material living standards of households in the UK. In fact, the results obtained with the two methods share similarities, but also substantial differences.

The most relevant differences between the two analyses are:

- indirect taxes were progressive when analysed using expenditure distribution, but regressive when income distribution was used
- the level of inequality, measured as the ratio between the top and the bottom quintile groups, was lower using expenditure distribution than when income distribution was used – at any stage of the tax and benefit process
- households composed of single parents, couples with children and people in full-time education were more equally spread within the expenditure distribution than in the income distribution, where they tended to be more concentrated in the bottom quintile group

Some of the main similarities between the two analyses are:

- households whose members were economically active, and those composed only of adults, were more concentrated in the top quintile group in both distributions
- direct taxes, considered as a whole, were progressive (that is, they took a larger proportion of income from those with higher incomes)
- benefits (in cash and in kind) were higher for households at the bottom of both distributions

Measuring household material living standards

Material living standards are not readily measurable as they include a variety of aspects. Therefore, when trying to assess the level of welfare proxies are used.

So far, the most common and agreed method for measuring household's material living standards has been to refer to their income, as it has been considered a good indicator of this command over resources. That does not mean, however, that income is the only, or the best, proxy to welfare. Expenditure, as an indicator of household consumption, is another method for estimating material living standards, although it is much less commonly used.

Some of the main reasons why income is chosen over expenditure to measure living standards include:

- income measures the household's potential living standards, rather than the standards the individuals actively seek to achieve (which may not reflect their resources). For example, consider two households in identical situations and with the same level of income. One of them spends all of their income, while the other saves most of it. The income measure gives both of the households the same standard of living and tells us that they both could have achieved the same level of expenditure, if they had chosen to
- income levels can be directly affected by public policy. Therefore distribution of income might be a more sensible indicator when studying the effects of governmental interventions in the economy
- the proportion of income saved by households contributes to their welfare, along with their consumption. This is because savings may provide financial security, even when not used to sustain spending

However, an increasing number of policy makers and academics are considering expenditure as a reasonable financial indicator of material living standards. Several arguments bear out this approach, including:

- income varies over a person's lifetime, whereas material living standards do not reflect such a marked instability. Levels of spending tend to be maintained at a more constant level over time, compared with levels of income, and therefore may be a better

representation of living standards, even in a long-term perspective

- many households at the bottom of the income distribution spend more than households with higher incomes. It indicates that for a significant number of households, a low level of income does not correspond to a general lack of resources. Therefore for these households, expenditure might provide a more precise proxy for their standard of living
- research at the Institute for Fiscal Studies (IFS) has suggested that in some particular cases, such as for self-employed people and individuals with irregular or informal incomes, expenditure data are subject to fewer measurement errors than for income data (see Brewer et al. 2006). However, measurement errors also exist in expenditure data and it is therefore difficult to ascertain whether these errors are indeed smaller or larger than those for income data

Therefore there is no single correct way to measure material living standards. This is because both income- and expenditure-based methods have both positive and negative elements, and tend to pick up different aspects of a household's financial situation.

Concepts and sources

The analysis presented is based on data from the Living Costs and Food Survey (LCF) – formerly named the Expenditure and Food Survey – with a sample of 6,120 households across the UK in 2007/08. The sample only covers private households and is weighted using 2001 Census data². The definition of household expenditure used in this analysis is a modified version of that used in the ONS publication *Family Spending*³. Similar to the definition used in *Family Spending*, total expenditure represents current expenditure on goods and services and excludes recorded payments that relate to savings and investments, income tax payments, National Insurance Contributions, mortgage capital repayments and other payments for major additions to dwellings. However in this analysis, council tax payments are also excluded from the measure of household expenditure. This allows for consistency with the definition of disposable income used in income-based analyses (see Barnard, 2009).

To allow for comparability with the income-based analysis, expenditure

data are equivalised to take account of household size and composition, using the McClements scale⁴. Expenditure distribution is obtained by ranking the households and dividing them into ten or five groups of equal size (referred to as decile and quintile groups respectively).

Comparing income and expenditure of the same household: 'the expenditure tick'

Comparing equivalised disposable income with equivalised expenditure of households in the same decile group highlights a number of patterns.

On average, households within the first two decile groups had higher expenditure than disposable income; several authors refer to this phenomenon as an 'expenditure tick'. This is presented in **Figure 1**.

This result is confirmed in several other analyses. Amongst those, an Institute for Fiscal Studies (IFS) publication (Brewer et al. 2006) highlighted that during 2001/02 and 2002/03, the poorest 1 per cent of households spent, on average, more than any percentile up to the 31st (the beginning of the third decile). This implies that those households at the bottom of the income distribution sustained their expenditure with resources that were additional to their income, such as borrowing or making use of savings. It might also reflect the fact that some of these households were only temporarily at the bottom of the income distribution, maintaining their consumption at a constant level. As previously mentioned, researchers from IFS also took into account the possibility that these results reflect errors in the measurement of income by the LCF.

Moreover, the LCF does not collect any information that would enable a balance sheet of income and expenditure to be drawn up for a household over any particular period. Also, LCF income data do not include proceeds from the sale of assets (for example, the sale of a car) or windfalls such as inheritances, but recorded expenditure might reflect these items.

It is therefore worth investigating the features of households with expenditure significantly higher than their income, in order to identify possible characteristics able to explain this anomaly.

Characteristics of households with expenditure higher than income

Approximately 6 per cent of the households analysed had a level of expenditure that was greater than twice the level of their

Figure 1
Household expenditure and disposable income: by income decile group, 2007/08

Source: Office for National Statistics

Table 1
High expenditure households:¹ household characteristics 2007–08

	High expenditure ¹	All households	Difference	Percentage difference
Average per household (number)				
People	2.2	2.4	-0.2	-8
Adults	1.8	1.8	0.0	0
Children	0.4	0.5	-0.1	-20
Economically active people	0.8	1.2	-0.4	-33
Retired people	0.4	0.4	0.0	0
People in full-time education	0.65	0.48	0.17	35
In state primary schools	0.14	0.21	-0.07	-33
In state secondary schools	0.14	0.16	-0.02	-13
In further and higher education	0.35	0.09	0.26	289
In other educational establishments	0.01	0.02	-0.01	-50
Composition (percentages)				
Age of chief economic supporter				
Under 25	11	4	7	175
Over 24 and under 35	9	15	-6	-40
Over 34 and under 45	17	20	-3	-15
Over 44 and under 55	21	19	2	11
Over 54 and under 65	22	17	5	29
Over 64 and under 75	13	12	1	8
Over 74	7	13	-6	-46
Employment status of chief economic supporter				
Self-employed	13	8	5	63
Full-time employee	19	45	-26	-58
Part-time employee	12	8	4	50
Unemployed	3	2	1	50
Unoccupied and under minimum NI pension age	28	12	16	133
Retired/unoccupied over minimum NI pension age	24	26	-2	-8
Other	0	0	0	0

Note:

Source: Office for National Statistics

¹ Households with expenditure more than twice their income.

disposable income. This group is referred to as 'households with high expenditure'. These households were mainly concentrated at the bottom of the income distribution. In fact, 68 per cent of these households were in the quintile group with the lowest income,

followed by 14 per cent in the second group, 9 per cent in the third group and only 4 per cent in both the fourth and top quintile groups. Conversely, using the distribution of expenditure, high expenditure households were more concentrated at the

top of the distribution. 46 per cent of these households were in the highest quintile group, 20 per cent in the fourth group, 17 in the third group, 12 per cent in the second group and only 5 per cent in the bottom group.

Table 1 compares the composition of households with high expenditure against that of the overall sample. This shows that a main difference is the substantially higher presence of households with a reference person aged less than 25 within the high expenditure group, compared with the overall average (11 per cent and 4 per cent, respectively). Similarly, more than one in three (35 per cent) members of households with high expenditure were in higher and further education, compared with the overall average of 9 per cent.

Among households with high expenditure, there was a higher than average presence of households where the reference person was self-employed (13 per cent, compared with 8 per cent in the overall sample). Another peculiarity of this sub-sample was the high presence (28 per cent) of households with a chief economic supporter unoccupied and under the National Insurance pension age. This proportion is more than twice the overall average of 12 per cent.

Figure 2 shows that high expenditure households had an average annual equivalised disposable income 57 per cent lower than those for all households (£11,440 and £26,360 per year, respectively). In fact, the only income category for which high expenditure households had a higher income compared with the overall average was for 'other income' (£450 per year, against £210 per year); this source of income includes income from odd jobs, short-term benefits and education grants⁵. Similarly, high expenditure households received lower cash benefits than the overall average (£2,980 against £4,780 per year), with the exception being income from student support and job seekers' allowance (48 per cent and 3 per cent higher than average, respectively).

High expenditure households paid 57 per cent less direct taxes than the average for all households. This reflects their lower than average income. On the other hand, these households paid higher indirect taxes (35 per cent more than the overall sample), as these taxes are levied on expenditure, rather than on income.

High expenditure households received higher benefits in kind than the average (£6,820 per year against £5,990 per year). This difference was because of the large

Figure 2

Effects of taxes and benefits on high expenditure households and on all households

Source: Office for National Statistics

number of people in full-time education in high expenditure households, which led to a higher than average level of education benefit (£3,840 per year, compared with £2,390), 61 per cent higher than that received on average by the overall sample. Conversely, they received lower than average benefits in kind from all the other sources, such as NHS (17 per cent lower), housing subsidies (35 per cent lower), rail travel subsidy (22 per cent lower), and school meals and welfare milk (68 per cent lower).

These figures provide a better understanding of the 'expenditure tick'. Many of the peculiarities of high expenditure households can be associated with a temporary condition of low income, rather than with a permanency of poverty. For example, students and young people just starting their careers often have low incomes, but can benefit from resources provided by their families or money derived from borrowing and loans which would not be picked up by the LCF. Similarly, they often incur higher costs than during other periods of their life, such as education fees and first-time purchases of durables (for example, furniture, cars and domestic appliances). However, for most households, this condition can be expected to change, for example as careers are progressed.

How do households sustain expenditure greater than income?

The composition of high expenditure households allows the formulation of hypotheses regarding the resources these households use to sustain their level of spending. Furthermore, the LCF asks these households how they fund their expenditure, from eight different options⁶. Among the high expenditure households 53 per cent chose at least one of the possible options.

Savings were the most common resource indicated as used for sustaining expenditure (32 per cent), followed by overdraft (19 per cent) and 'Credit/Store Card Debt' (15 per cent). Loans from other sources and loans from friends or relatives were next, chosen in 12 per cent and 11 per cent of the cases respectively.

These figures show that a good proportion of the high expenditure households relied on funds previously accumulated in the form of savings. This might be the case for households that were experiencing a temporary period of low income (for example, those temporarily out of employment). The use of overdrafts, credit and store cards and loans, on the contrary, implies that these households relied on the possibility of repaying the current level of expenditure in the future. This scenario is most likely for young households, people in education and those temporarily out of employment.

These data provide more information on the 'expenditure tick'. However they are only indicative, as they are based on the respondent's opinions. Furthermore, these data are not exhaustive, as many high expenditure households did not provide any answer.

The distribution of household expenditure

The 'expenditure tick' supports the hypothesis that analysing a household's material living standards, using expenditure distribution rather than income distributions, provides interesting insights into the welfare of households. Therefore, some of the analyses carried out annually by ONS and presented in 'The effects of taxes and benefits on household income' (see Barnard 2009) have been repeated, ranking the households based on their expenditure, using 2007/08 data.

Household characteristics

By analysing household features, it is possible to see which types of households have the highest level of expenditure. It also shows how taxes and benefits affect different types of households.

Table 2 presents the household composition of quintile groups ranked by equivalised expenditure and shows that:

- among non-retired households, those composed of singles or couples (without children) were more concentrated in the upper part of the expenditure distribution, while single parent households were more likely to be found at the bottom of the distribution
- the middle of the distribution had a higher concentration of couples with children
- retired households spent less than non-retired households, so that they made up 48 per cent of the bottom quintile group, but only 13 per cent of the top quintile group

Household size does not vary much across the expenditure distribution. On the other hand, the number of economically active people per household appears to be related to the level of spending:

- households in the top quintile group had three times as many economically active members as households in the bottom quintile group
- the bottom quintile group contained on average 0.7 retired people per household, compared with an average of 0.2 people in the top quintile group
- there were a higher number of people in full-time education per household in the central part of the expenditure distribution than at the top and bottom of the distribution

There are similarities between these results and those obtained by ranking households based on their income, but also noticeable differences. In both the distributions, the top quintile groups had a high concentration of economically active households and households composed of only adults. However, the proportion of single parents and couples with children at the bottom of the distribution was lower when expenditure, rather than income, was used. Similarly, people in full time education were much less numerous in the bottom quintile group of the expenditure distribution than in the same income

Table 2
Summary of household characteristics of expenditure quintile groups¹, 2007–08

	Quintile groups of ALL households ¹					All
	Bottom	2nd	3rd	4th	Top	households
Number of individuals per household						
Children ²	0.5	0.6	0.6	0.5	0.4	0.5
Adults	1.6	1.9	1.9	2.0	1.8	1.8
Men	0.7	0.9	1.0	1.0	0.9	0.9
Women	0.9	1.0	1.0	1.0	0.9	1.0
People	2.1	2.5	2.5	2.5	2.2	2.4
People in full-time education	0.4	0.6	0.6	0.5	0.4	0.5
Economically active people	0.5	1.1	1.4	1.5	1.5	1.2
Retired people	0.7	0.5	0.4	0.3	0.2	0.4
Household type (percentages)						
Retired	48	32	21	17	13	26
Non-retired						
1 adult	14	11	12	12	21	14
2 adults	10	17	25	29	34	23
1 adult with children ³	9	7	5	4	3	6
2 adults with children	11	18	23	23	20	19
3 or more adults ⁴	8	15	15	14	9	12
All household types	100	100	100	100	100	100

Notes:

Source: Office for National Statistics

- 1 Households are ranked by equivalised expenditure.
- 2 Children are defined as people aged under 16, or aged 16 to 18 unmarried and receiving non-advanced education.
- 3 This group was smaller than the category of one parent families because some of the families will be contained in the larger household types.
- 4 With or without children.

quintile group, and economically active people were more evenly spread across the distribution when expenditure, rather than income, was used.

The effects of taxes and benefits

The effects of taxes and benefits on household income can be analysed using the equivalised expenditure distribution. As with the income-based analysis, particular attention is given to the redistributive effect of taxes and benefits (see **Table 3**).

Original income is the income that households receive from earnings, occupational pensions and investments, before taxes and benefits. It varies substantially between households at different points of the expenditure distribution, as shown in **Tables 4a** and **4b**. The proportion of original income received by quintile groups can be used as an indicator of the extent of inequality. Households in the bottom quintile group of the expenditure distribution received an original income that was about eight times lower than that received by households in the top quintile group (£7,330 and £60,900 per year, respectively). Although this suggests the existence of a substantial

level of inequality for original income, this level was lower than that observed for the distribution of disposable income. In that case, households in the top quintile were receiving an income about 17 times higher than that received by households in the bottom quintile group. Therefore, there was a lower degree of inequality for original income within the expenditure distribution than within the income distribution.

Households also receive money in the form of cash benefits, which are generally higher for households with lower incomes. The quintile of households with the lowest expenditure received on average £9,000 per year in cash benefits, while the group at the top of the distribution received £2,000 per year. Therefore gross income (original income plus cash benefits), is more equally spread than original income among households at different levels of the expenditure distribution. Those in the bottom quintile group had a share of 10 per cent of the total gross income available, and those at the top received 37 per cent of it. Inequality for gross income was higher within the income distribution (7 per cent of gross income received by households in the bottom quintile group, and 44 per

cent received by those in the top quintile group).

Direct taxes, including income tax, National Insurance Contributions (NIC) and council tax, are progressive with respect to income when considered as a whole, as households with higher incomes pay both higher amounts and higher proportions of their income in direct taxes. Direct taxes also appear to be progressive when their effect is analysed using expenditure distribution. Households in the bottom quintile group paid 10.4 per cent of their gross income in direct taxes. This proportion grew for groups higher up in the expenditure distribution, reaching 25.4 per cent for the top quintile of households with the highest expenditure. This pattern is very similar to the one observed when analysing the distribution of income.

Income tax and National Insurance Contributions (NIC) are progressive with respect to both the income and the expenditure distributions. However, households in the bottom two quintile groups of the expenditure distribution paid a slightly higher proportion of their income in income tax (5.1 per cent and 9.2 per cent, respectively) than those in the same quintile groups of the income distribution (3.2 per cent and 6.9 per cent). Similarly, households at the bottom of the expenditure distribution paid a larger part of their gross income in NIC (1.9 per cent and 4.0 per cent for the first and second quintile, respectively) than those in similar positions within the income distribution (1.5 per cent and 3.1 per cent, respectively). Therefore the main conclusions regarding the effect of direct taxes drawn with the income-based analyses remain valid for the expenditure distribution.

Council tax is usually reported as being a regressive tax, as households at the top of the income distribution pay a lower proportion of their income in council tax than those lower down. For example in 2007/08, households in the top quintile group of the income distribution paid 1.8 per cent of their gross income in council tax, while those in the bottom group paid 6.1 per cent. Council tax is also regressive when expenditure distribution is used for ranking households, but to a much lesser extent. On average, the top quintile group of the expenditure distribution paid 2.1 per cent of their gross income in council tax, compared with the 3.4 per cent paid by the bottom one. Furthermore, the second quintile group paid the highest proportion of their income in council tax (3.7 per cent).

As with council tax, indirect taxes

Table 3

Average incomes, taxes and benefits by expenditure quintile groups, 2007–08

	Quintile groups of all households ranked by equivalised expenditure					All households
	Bottom	2nd	3rd	4th	Top	
Average per household (£ per year)						
Quintile points (equivalised £)		10 748	15 810	21 446	30 611	
Number of households in the population ('000s)	5 197	5 018	4 963	5 043	5 067	25 289
Original income						
Wages and salaries	4 699	13 676	21 754	29 699	46 491	23 264
Imputed income from benefits in kind	45	109	203	356	777	298
Self-employment income	559	1 263	2 266	4 409	6 619	3 023
Occupational pensions, annuities	1 550	2 081	2 007	2 732	3 723	2 419
Investment income	338	558	823	1 089	3 084	1 179
Other income	142	180	281	236	203	208
Total	7 333	17 867	27 334	38 520	60 897	30 390
Direct benefits in cash						
Contributory						
Retirement pension	3 501	2 740	1 902	1 431	1 145	2 144
Job seeker's allowance (Contribution based)	49	31	15	1	2	20
Incapacity benefit	436	263	176	115	49	208
Widows' benefits	39	37	6	3	32	24
Statutory Maternity Pay/Allowance	37	32	71	64	85	58
Non-contributory						
Income support and pension credit	1 177	521	204	96	39	408
Child benefit	376	421	459	431	314	400
Housing benefit	1 609	568	233	94	10	503
Job seeker's allowance (Income based)	109	26	8	1	-	29
Carer's allowance	89	93	61	28	9	56
Attendance allowance	107	58	25	25	10	45
Disability living allowance	458	427	324	201	117	306
War pensions/War widows' pensions	47	35	36	41	4	33
Severe disablement allowance	30	47	16	19	6	23
Industrial injury disablement benefit	9	34	25	14	17	20
Student support	44	94	72	56	45	62
Government training schemes	2	9	2	2	1	3
Tax credits ¹	665	470	263	152	73	325
Other non-contributory benefits	196	135	93	82	47	111
Total cash benefits	8 980	6 040	3 990	2 856	2 004	4 774
Gross income	16 313	23 907	31 324	41 376	62 902	35 164
Direct taxes and Employees' NIC						
Income tax	901	2 390	3 931	5 897	11 756	4 975
less:Tax credits ²	76	202	226	182	87	154
Employees' NI contributions	317	956	1 556	2 142	2 931	1 580
Council tax and Northern Ireland rates ³	987	1 045	1 098	1 216	1 361	1 141
less: Council tax benefit/Rates rebates	435	167	84	35	13	147
Total	1 695	4 021	6 276	9 038	15 948	7 396
Disposable income	14 618	19 885	25 048	32 339	46 954	27 769
Equivalised disposable income	15 432	18 311	22 346	29 098	45 708	26 179
Indirect taxes						
Taxes on final goods and services						
VAT	610	1 260	1 757	2 502	4 103	2 046
Duty on tobacco	220	325	375	298	246	293
Duty on beer and cider	35	90	129	163	168	117
Duty on wines & spirits	44	105	141	217	327	167
Duty on hydrocarbon oils	119	356	516	652	755	480
Vehicle excise duty	55	110	145	179	203	138
Television licences	89	103	116	124	128	112
Stamp duty on house purchase	47	93	162	232	456	198
Customs duties	13	19	25	32	51	28
Betting taxes	20	31	38	45	46	36
Insurance premium tax	16	30	43	57	83	46
Air passenger duty	2	18	29	53	163	53

Table 3 continued

Average incomes, taxes and benefits by expenditure quintile groups, 2007–08

	Quintile groups of all households ranked by equivalised expenditure					All households
	Bottom	2nd	3rd	4th	Top	
Camelot National Lottery Fund	35	48	60	54	48	49
Other	3	7	16	25	32	17
Intermediate taxes						
Commercial and industrial rates	111	169	217	287	447	246
Employers' NI contributions	208	316	404	535	833	459
Duty on hydrocarbon oils	70	106	136	180	281	155
Vehicle excise duty	6	8	11	14	22	12
Other	114	174	222	294	458	252
Total indirect taxes	1 816	3 368	4 543	5 942	8 849	4 904
Post-tax income	12 803	16 517	20 505	26 397	38 105	22 865
Benefits in kind						
Education	1 953	2 805	2 983	2 544	1 656	2 388
National health service	4 517	3 774	3 297	3 002	2 616	3 441
Housing subsidy	50	25	14	9	4	20
Rail travel subsidy	3	21	28	48	123	45
Bus travel subsidy	78	76	64	58	73	70
School meals and welfare milk	66	30	16	8	2	25
Total	6 668	6 731	6 402	5 670	4 474	5 989
Final income	19 470	23 248	26 907	32 067	42 579	28 854

Notes:

- 1 Child tax credit and working tax credit.
- 2 Including tax relief at source on life assurance premiums.
- 3 Council tax and Northern Ireland rates after deducting discounts.

Source: Office for National Statistics

Table 4a

Percentage shares of household income: expenditure distribution, 2007–08

	Percentage shares of equivalised income for ALL households ¹			
	Original income	Gross income	Disposable income	Post-tax income
Quintile group ¹				
Bottom	5	10	12	13
2nd	11	13	14	14
3rd	17	17	17	17
4th	25	23	22	22
Top	42	37	35	34
All households ²	100	100	100	100
Decile group ¹				
Bottom	2	5	6	6
Top	26	22	21	21

Notes:

- 1 Households are ranked by equivalised expenditures.
- 2 Totals may not sum to 100 due to rounding.

are usually reported as being regressive. However, the amount of indirect taxes paid by a household tends to be determined by their expenditure rather than by their income, because these taxes are typically levied on expenditure items. In particular, referring to income distribution to identify the incidence of indirect taxes on households with low income can be misleading. This is because in many cases the spending of low-income households is not entirely funded by their income and,

as previously discussed, some of these households have expenditure that exceeds their income. In these cases therefore, looking at the income distribution might lead to overestimating the burden of indirect taxes on households at the bottom of the distribution. The article 'The effect of taxes and benefits on household income, 2007/08' (see Barnard 2009) was based on income distribution, but also presented indirect taxes as a percentage of expenditure to reduce this problem.

Table 4b

Percentage shares of household income: income distribution, 2007–08

	Percentage shares of equivalised income for ALL households ¹			
	Original income	Gross income	Disposable income	Post-tax income
Quintile group ¹				
Bottom	3	7	7	6
2nd	8	11	12	12
3rd	14	16	16	16
4th	24	22	22	22
Top	51	44	42	44
All households ²	100	100	100	100
Decile group ¹				
Bottom	1	3	3	2
Top	33	28	26	28

Source: Office for National Statistics

- 1 Households are ranked by equivalised disposable income.
- 2 Totals may not sum to 100 due to rounding.

Therefore the analysis of indirect taxes using the expenditure distribution, rather than the income distribution, leads to different conclusions regarding their impact on household finance (see **Table 5** and **Figures 3a and 3b**).

In cash terms, households within the top expenditure quintile group paid almost five times as much indirect tax as the bottom quintile, simply because of their higher expenditure. However, the proportion of expenditure paid in indirect taxes tended to

Table 5
Indirect taxes as a percentage of disposable income by expenditure¹
and disposable income² quintile groups, 2007–08

	Quintile groups of ALL households					Per cent
	Bottom	2nd	3rd	4th	Top	All households
(a) Expenditure distribution						
VAT	4.2	6.3	7.0	7.7	8.7	7.4
Duty on alcohol	0.5	1.0	1.1	1.2	1.1	1.0
Duty on tobacco	1.5	1.6	1.5	0.9	0.5	1.1
Duty on hydrocarbon oils & Vehicle excise duty	1.2	2.3	2.6	2.6	2.0	2.2
Other indirect taxes	5.0	5.6	5.9	6.0	6.5	6.0
All indirect taxes	12.4	16.9	18.1	18.4	18.8	17.7
(b) Disposable income distribution						
VAT	12.1	8.4	8.0	7.4	5.9	7.4
Duty on alcohol	1.6	1.2	1.1	1.1	0.8	1.0
Duty on tobacco	2.9	2.1	1.4	0.9	0.4	1.1
Duty on hydrocarbon oils & Vehicle excise duty	3.6	2.7	2.7	2.4	1.5	2.2
Other indirect taxes	11.1	7.4	6.5	5.7	4.6	6.0
All indirect taxes	31.3	21.7	19.6	17.5	13.3	17.7

Notes:

- 1 Households are ranked by equivalised expenditures.
 2 Households are ranked by equivalised disposable income.

Source: Office for National Statistics

be higher for households at the bottom of the distribution (21.7 per cent) when compared with those at the top (16.2 per cent) (see Figures 3a and 3b). Part of this difference can be attributed to the higher percentage of expenditure on tobacco by households in the lowest fifth quintile group compared with those in the top quintile group (2.6 per cent and 0.5 per cent, respectively). They also paid a higher percentage than households in higher quintile groups in other indirect taxes. These include vehicle excise duty, television licences, stamp duty on house purchases, betting taxes, insurance premium tax, air

passenger duty and the Camelot National Lottery Fund.

When indirect taxes are expressed as a percentage of gross or disposable income, their effects are progressive using the expenditure distribution. Households with lower expenditure paid a lower proportion of their income in indirect taxes (Table 5). Households in the bottom quintile group paid 10.4 per cent of their gross income and 12.4 per cent of their disposable income in indirect taxes, compared with households in the top quintile with 14.1 per cent and 18.8 per cent respectively. These results represent

a substantial difference compared to those obtained using the income distribution. In that case, in fact, indirect taxes were regressive when expressed as a proportion of income, their impact declining sharply towards the top of the distribution.

Considering that expenditure could be regarded as a better proxy for the standard of living of households with few resources, these results are important: they allow for a better understanding of the effects of indirect taxes on different households. In fact, referring to expenditure distribution means that indirect taxes would contribute toward reducing inequality, rather than increasing it as is traditionally reported.

The consequences of variations in the level of indirect taxes are different whether income distribution or expenditure distribution are analysed. Referring to the distribution of disposable income, a change in the level of indirect taxes would have a larger effect on the incomes of households in the bottom of the income distribution than of those in higher quintile groups. However referring to the expenditure distribution, the households in the bottom quintile group would be relatively less affected by changes to indirect taxes, which would make more difference to those in the top quintile groups.

Changes in indirect taxes affecting goods and services prices can have an effect on household consumption rather than on their finances. For example, an increase in the indirect tax on a good may result in some households reducing their consumption of that good. Therefore, these households do not experience an increase in the tax they pay and a consequent reduction in their income. However they do experience the burden of the tax by foregoing consumption

Figure 3a
Indirect taxes as a percentage of income within the expenditure distribution¹

Figure 3b
Indirect taxes as a percentage of income within the income distribution²

Notes:

- 1 Households are ranked by equivalised expenditures.
 2 Households are ranked by equivalised disposable income.

Source: Office for National Statistics

of the good they would have otherwise consumed in the absence of the tax (in economics this phenomenon is referred to as the *deadweight loss*).

These points should be borne in mind when assessing the effect of changes to indirect taxes. Such changes have occurred periodically, especially concerning the level of duties on tobacco, alcoholic drinks and fuel. Re-assessing the impact of these changes, referring to expenditure distribution, may therefore lead to different conclusions. It would also be relevant when assessing the effect of recent actions, such as the changes to VAT during 2009.

The last stage in the tax and benefit process is the addition of benefits in kind to post-tax income. Households at the bottom of the expenditure distribution received the equivalent of about £6,670 per year from these benefits, compared with those in the top quintile receiving the equivalent of £4,480. These figures are similar to those observed for income distribution, although in that case the difference between the bottom and the top quintile groups was higher (£7,490 and £4,050 respectively). Benefits in kind also contribute to reducing inequality; as a result, the share of income received by households at the bottom of the expenditure distribution increased from 5 per cent for original income to 13 per cent for final income. On the other hand, households at the top of the expenditure distribution had their share of income reduced from 42 per cent for original income to 30 per cent for final income.

The redistributive effects of taxes and benefits (see **Figure 4**) were larger within the distribution of expenditure, compared with income distribution. For example, households in the bottom quintile of the expenditure distribution had their share of income increased from 5 per cent of the

total original income to 13 per cent of the total post-tax income. The share received by households at the top of the distribution fell from 42 per cent for original income to 34 per cent for post tax income. On the other hand, when income distribution was used, the share of income received by households in the bottom quintile group grew from 3 per cent of the total original income to 6 per cent of the total post-tax income. Households in the top quintile group also had their share of income reduced from 51 per cent to 44 per cent.

The Gini coefficient is one of the most common measures of inequality and is generally applied to income distribution, but it can be used for expenditure distribution too. In this case it shows the extent of inequality of expenditures between households⁷.

During 2007/08, the Gini coefficient for expenditure had a value of 35, indicating a level of inequality similar to the one for disposable income (which was 34).

However, the Gini coefficient is used here for measuring the inequality of expenditure, and does not allow for comparing the extent of inequality of income between expenditure distribution and income distribution. Therefore in order to compare the inequality of income within the two distributions, at different stages of the redistributive process, the top-to-bottom quintile income ratio can be used.

The level of inequality for disposable income, as measured by the ratio between the top and the bottom quintile groups, was substantially lower within the expenditure distribution than within the income distribution, at all stages of the tax and benefit process. Original income for the top quintile group was eight times as much as the one for the bottom quintile group within the expenditure distribution, while

this ratio was equal to 16 using the income distribution. The same ratio for disposable income was three using the expenditure distribution, compared with six using the income distribution. Finally, the ratio for final income was two when measured using the distribution of expenditure, while it was four when referring to the distribution of income.

Conclusions

The most relevant difference between results obtained using expenditure distribution and those obtained using the income-based analysis concerns the effects of indirect taxes. In fact, this study shows that these taxes are regressive when measured using income distribution, but progressive when their effects are analysed using expenditure distribution. They represent a percentage of income that grows from the bottom to the top of the distribution, similar to the trend for direct taxes (as highlighted also in Crossley et al. 2009). The need for an improvement to the income-based analyses for indirect taxes was also highlighted in Barnard (2009), as previously discussed, and in Chose et al. (eds) (2010).

Therefore the effect of indirect taxes on household income, as much as household material living standards, might be better assessed by also referring to the expenditure distribution. This method complements the more standard analysis, based on income distribution, for studying the effects of indirect taxes and policies affecting them.

Notes

1. Commission on the Measurement of Economic Performance and Social Progress (2009) Report by the Commission on the Measurement of Economic Performance and Social Progress, available at: www.stiglitz-sen-fitoussi.fr/documents/rapport_anglais.pdf
2. The survey results have been re-weighted and grossed so that the population totals reflect the whole household population, a process described as population weighting.
3. A detailed list of the components of household expenditure can be found in Table A1 of Family Spending. Please refer to: www.statistics.gov.uk/downloads/theme_social/Family-Spending-2008/FamilySpending2009.pdf
4. The equivalence scale used in this analysis is the McClements scale (before housing costs are deducted). For more information refer to:

Figure 4

Summary of the effects of taxes and benefits on households' income: expenditure distribution, 2007–08

Average per household (£ per year)

Note:

- 1 Households are ranked throughout by their equivalised expenditure.

Source: Office for National Statistics

www.ons.gov.uk/about-statistics/harmonisation/secondary-concepts-and-questions/S4.pdf

5. 'Other incomes' includes: regular allowances from other members of the household; income from odd jobs; short term benefits; education grants; and imputed rent from rent-free accommodation.
6. Respondents were provided with eight options to choose from:
 - credit/store card debt
 - overdraft
 - loans from friends/relatives
 - loans from other sources, for example banks and loan companies
 - savings
 - sell assets (property, possessions, stocks, shares, bonds)
 - other
 - current household income sufficient – no need to borrow or rely on credit card debt
7. The Gini coefficient is the most widely used summary measure of the degree

of inequality in a distribution. The Gini coefficient takes values from 0 to 100 per cent, where a value of zero indicates that each household had an equal level of expenditure, while higher values indicates greater inequality. For more information refer to:

www.statistics.gov.uk/about/methodology_by_theme/gini/default.asp

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