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The wrong sort of rebate: the need to reform the UK budget adjustment

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1 Introduction

The UK negotiated its rebate on EU contributions in 1984: the justification for this was primarily the UK's low level of receipt of CAP subsidies. Since then, successive UK governments have stoutly defended the rebate. The expansion of the EU to 25 members, and the improved relative wealth of the UK in the EU, have led to considerable pressure from other member states for the "cheque Britannique" to be scrapped. The question of the UK rebate is therefore now very near the top of the EU political agenda.

In this paper we argue that there is a continuing need for some form of rebate mechanism to iron out anomalies in the funding of the EU, but that the particular form of mechanism used to pay the UK a rebate has had severely adverse consequences, and needs to be reformed. Specifically, we argue that the current form of rebate paid to the UK has had perverse incentive effects, which go a long way towards explaining the UK's semi-detached relationship with the EU.

We also argue that the reformed proposals for the rebate put forward by the European Commission in July 2004 do not provide a satisfactory solution. Instead, we suggest another approach to reform: short of reform of the expenditure side, we argue that this is virtually the only possible solution to the problem consistent with the twin requirements for equity and for the need not to distort incentives.

The paper is primarily concerned with the effects of rebates at the level of interaction between member states and the EU. However there are certain important implications for Scotland, and the paper also covers these in its final section. In that section we argue that the operation of the UK rebate has interacted with the public expenditure regime in operation in the UK to produce anomalous effects in Scotland which are even more perverse than those experienced in the UK as a whole. We demonstrate how the general approach to the rebate question advocated in this paper could readily be adapted to correct these effects.

2 The origins of the UK rebate

2.1 The origins of the current UK rebate go back to a general principle enumerated at the 1984 Fontainebleau European Council, to the effect that:

> *"Any member state sustaining a budgetary burden which is excessive in relation to its relative prosperity may benefit from a correction at the appropriate time."*
> (As quoted in Commission Document COM (2004)505: Technical Annex: Funding the EU).

This is a useful statement of principle which, we take it, would still command general support. We interpret this principle to mean that the net contribution of each member state should ideally relate in some appropriate fashion to a suitable measure of relative prosperity, like GNP or GDP, where, to allow for scale effects, both the net contribution and the GDP or GNP measures are expressed on a *per capita* basis.

2.2 It became clear immediately after the UK's accession to the EC that there were particular features which meant that this principle was violated in the case of the UK. Specifically,

a. The UK had an agricultural sector which was relatively smaller and structurally different from those of other member states, resulting in lower CAP spending in the UK.

b. The UK made a proportionately larger contribution to the funding of the Community, due to the fact that the UK had a relatively higher share of the VAT harmonised base than of the total GNP of the Community.

The effect of these features was that, by the mid 1980s, and in the absence of any rebate mechanism, the UK would have made a net contribution to the EC which, as a percentage of GNP, would have been the largest in the Community - despite the fact that the UK had the third lowest level of GDP per head in the Community.

2.3 To overcome this anomaly, it was agreed at Fontainebleau that the UK should be paid a rebate essentially equal to 66% of the net contribution it would have paid in the absence of a rebate mechanism: this is paid for by contributions from other member states. In fact, the actual rules for the calculation of the rebate have become progressively more complicated through time for two main reasons:

a. As the own resource system has been progressively modified, with greater emphasis being put on GDP in calculating gross contributions, it has been necessary for the Commission, in calculating the UK contribution, to neutralise each of these modifications in order to work back to what the UK would have paid if the budgetary rules of 1985 were still in operation.

b. Rebates on the extra amounts which other member states have to pay to fund the UK rebate have been introduced to reduce the burden on Germany, the Netherlands, Austria, and Sweden.

For the purposes of the present paper, it is sufficient to describe the UK rebate as if it were still calculated in its original pure and simple form: that is, two thirds of the UK's unrebated net contribution. This assumption does not affect any of the principles involved: but greatly simplifies the presentation of the argument.

2.4 In essence, suppose that, before the rebate: -

The gross contribution of the UK	$= G$
Receipts to UK from EU	$= E$
The net contribution would therefore be	$= G - E$.
The effect of the rebate is to give the UK a refund, where rebate	$= 0.66*(G - E)$
Therefore, the net contribution of UK to the EU	$= 0.33*(G - E)$

(In actual fact, the rebate is paid in arrears: however, this simplified exposition captures the essentials of the situation).

3 Performance of the Rebate Since 1985

3.1 In terms of its primary function, of reducing the UK's net annual contribution, the rebate has operated as intended. As calculated by the Commission itself, (Technical Annex as above), in the absence of any correction mechanisms, the UK would have been on average the largest net contributor over the seven years to 2003, and they estimate the UK would remain as such over the period to 2013.

3.2 What has changed significantly since 1984, however, has been the relative wealth of the UK compared to other members of the EU. Whereas in 1984 the UK was the third poorest member of the EC in terms of GDP per head, the UK is now one of the wealthier members of the Community. The UK's relative standing depends on the precise measure used: but in terms of GDP per head, (on a purchasing power parity basis), the UK was the sixth wealthiest member of the EU in 2003 (source: Eurostat Yearbook, 2004): and in terms of GNI per head, (as quoted in the Commission Technical Annex), the UK was assessed to be the wealthiest.

3.3 Chart 1 shows the net contributions per head of each member in 2003 (after the UK rebate), plotted against GDP per head: (the sources of these figures are (i) for net contributions, European DG Budget, Commission Services, and (ii) for per capita GDP, Eurostat Yearbook 2004). If the UK were not to have its rebate, the effect would be, approximately, to treble the UK's net contribution per head: which would put the UK in the position of being the highest net contributor per head. As it stands, the Chart shows that countries like Germany, Sweden and the Netherlands,

which are of comparable wealth to the UK, are in fact making higher net contributions per head. These countries could argue, with some justification, that the effect of the existing rebate is now to overcompensate the UK relative to their positions.

(As an aside from the main theme of this paper, it can be seen from Chart 1 that the country with the most anomalous funding position is Ireland, which receives the largest net amount per head of any country in the EU, despite now being one of the wealthiest countries on a GDP per head basis. This is relevant to the debate about the contributory factors to Ireland's recent economic success.)

3.4 Looking to the future, the Commission estimate that, if the current rebate rules are not changed, the effect of the enlargement of the EU would be to increase the average UK rebate by more than 50% compared with the average over the past seven years. The effect would be that the UK would become the smallest net contributor to the EU budget along with Finland. (Ref: Technical Annex as above).

3.5 To summarise, therefore:

a. If the UK rebate were scrapped, the UK would become the largest net contributor over the foreseeable future.

b. If the rebate were retained unchanged, the UK would become the smallest net contributor.

Failing a complete overhaul of the expenditure patterns of the EU, (in particular of the CAP), the above facts in themselves present a strong argument, not for scrapping the UK rebate, but for modifications to the rebate mechanism. In fact, however, the case for reform of the rebate system is even stronger than this, once the harmful effects of the perverse incentives built into the current rebate mechanism are also taken into account - particularly the harmful effects on the UK itself. These perverse incentive effects are analysed in the next section.

4 The perverse incentive effects of the current UK rebate

4.1 This section examines the operation of the rebate in more detail, and identifies perverse effects which the Fontainebleau mechanism has on the UK's attitudes to the EU.

4.2 Looking at the operation of the rebate from a UK viewpoint, consider the UK's likely attitude to a new EU policy proposal: (that is, we are concerned at this point in the paper with policies at the proposal stage, when they are being discussed and refined before possible implementation.)

Suppose that the UK, before rebate, contributes a fraction **s** of any extra Community expenditure: (this fraction **s** is based upon the UK's share of the Community's wealth).

Suppose also that, for the particular policy proposal under consideration, the UK would attract a share **e** of the Community expenditure on the policy.

It is also assumed that there is a requirement for a 100% matched funding for this type of expenditure: (that is, for every £1 received from the EU in support of the project, the UK must match this with a further £1 to be spent in the UK on the project).

Suppose that this particular new policy will represent a cost of X on the Community budget. Consider first of all what the implications would be for the UK in the absence of the UK rebate. In these circumstances, given the above assumptions, the additional cost to the UK in terms of the increase in the UK's gross contribution would be **s**X, and the funding received from the EU would be **e**X. Allowing for matched funding the total expenditure in the UK arising from the new policy would therefore be 2**e**X. Therefore the cost to the UK is **s**X +**e**X, (that is, the cost of the increase in gross contribution plus the requirement for matched funding): the extra expenditure in the UK is 2**e**X: and hence the proportion of the extra expenditure in the UK funded by the UK is

$$\frac{\mathbf{s}X + \mathbf{e}X}{2\mathbf{e}X} = 0.5 + \frac{\mathbf{s}}{2\mathbf{e}} . \qquad \text{.......(1)}$$

Now consider what happens when there is a rebate in operation. Since it is useful to express the operation of the mechanism algebraically, it is assumed that the UK rebate factor is **r**: that is, that the UK is given as a rebate a proportion **r** of the difference between its gross contribution and the EU programme funding which it receives: (at Fontainebleau, the rebate factor **r** was set at 0.66).

In these circumstances, Extra Cost to UK as proportion of increase in expenditure in UK = 0.5*(1+**r**) + 0.5*(1-**r**)*(**s**/**e**)........(2)

(this formula is derived in the attached Annex).

It should be emphasised that what this formula shows is the extra cost to the UK as a result of the introduction of the new programme, (which will consist of the increase in the UK's rebated gross contribution, plus matched funding in the UK), expressed as a proportion of the total expenditure on the programme on the ground in the UK, (that is, receipts from the EU for the programme, plus matched funding.)

4.3 The first thing to note is that when there is no rebate, that is when **r** =0, formula (2) does indeed agree with formula (1) as we would expect. Note also that the

proportion given by formula (2) will fall as **e** gets larger. Since the maximum value of **e** is 1, which is when all EU expenditure for a policy is allocated to the UK, it therefore follows that the minimum value of this function will be when **e**=1. Plugging in the current UK values of **r** and **s**, (namely **r** = 0.66 and **s** = 0.16), then the minimum proportion of extra expenditure which will actually be funded by the UK is 0.86. That is for every £1 spent on such an EU approved and supported project in the UK, 86 pence of the expenditure will be provided by the UK.

4.4 What this shows is that, with the rebate mechanism operating, even in the most favourable case (when all of the expenditure on a proposed policy would be allocated to the UK), the UK would still end up funding over 85% of the additional expenditure in the UK from its own resources. Of course, for all real world policies the UK share of the EU budget allocation, **e**, will be very much less than 1, which means that the extra cost to the UK as proportion of the increase in expenditure in the UK will be greater than 0.86.

For values of **e** below a certain point the proportion in formula 2 will be greater than 1: that is, the UK will pay out more as a result of the policy than is spent on the policy in the UK. This point occurs when **e** = **s**, and this is irrespective of the value of **r**.

4.5 We now want to use formula (2) to explore how the presence or absence of the current rebate is likely to affect UK behaviour in its approach to new EU policy proposals. This is best illustrated graphically: the relevant chart is Chart 2. One curve in Chart 2, (marked "with rebate"), shows how the proportion of extra UK expenditure funded by UK varies with **e**, assuming **r** is fixed at 0.66, and **s** takes its current value of 0.16. In the other curve, (marked "without rebate"), **r** is set at 0.

Without the rebate, when confronted with a range of new policy options, one would, of course, expect a country to support strongly those options for which **e** is likely to be greater than **s** for that country: for such policies, the country gets back more than it puts in, and the proportion of the extra expenditure in the country actually funded by the country will be less than 1. For countries which are net contributors to the EU, however, most new policy proposals are likely to have **e** values for the country which are less than the country's **s** value: so the introduction of most new policies will cost the country more than the benefit it will receive. But as can be seen from Chart 2, the slope of the "without rebate" curve rapidly becomes very steep for **e** < **s**: in this area of the curve, even relatively small variations in the **e** values between different policies will make a big difference in how expensive the policy is for the country, relative to the benefit it will receive. The country will therefore have a strong incentive to participate actively in the debate about the choice of new EU policies. In other words, when there is no rebate, net contributor countries are likely to be active participants in the policy formulation process in the EU.

Contrast this with the position faced by the UK, operating on the "with rebate" curve in Chart 2. First of all, (unlike the case of no rebate), where **e > s** the "with rebate" curve does not go down much below 1, so there is no prospect of the UK securing (perhaps by a process of horse trading), the implementation of an occasional policy which will be highly favourable for the UK: as we have already seen, even for the most favourable policy the cost to the UK will be at least 86% of the extra expenditure in the UK. In addition, in the range where most policy proposals will arise, where **e<s** for the UK, the "with rebate" curve is relatively flat: such policies will cost the UK more than it gets back, but the flatness of the curve means that the UK has little incentive to attempt to discriminate between such policies. These circumstances, therefore, are a recipe for a country in the UK's position to adopt a policy of indifference, if not general hostility, to all new policy proposals: rather than being an active participant in the policy debate.

Faced with these characteristics of the rebated reward function (see Chart 2), it is perhaps not surprising that the UK is often perceived as being unenthusiastic about any new EU policies. We suggest that much of the UK's appearance of being semi-detached from the EU policy making process is likely to be explicable in terms of the perverse incentive effect, as analysed here, implicit in the UK rebate mechanism.

4.6 We now turn to UK behaviour as regards certain existing programmes. There is a further perverse incentive effect of the rebate mechanism, which operates for certain established programmes, (as opposed to policies which are which are just at the proposal stage).

Some EU programmes are discretionary, in the sense that it is up to the government of the individual member state to decide whether they want to participate in the programme, or to what extent they wish to participate. For example, in the agriculture area, rural development schemes intended to assist modernisation, to assist young farmers to start up, and to provide compensation for less favoured areas, are discretionary.

From the point of view of an individual government, the decision whether to participate in such a discretionary programme is like, (in the terminology of paragraph 4.2 above), a proposed new policy with **e** = 1, since if the government decides to participate, all of the project funding resulting from the decision to participate will come to the country. The proportion of the expenditure in the country which will be funded by the country is therefore given by formula 2 with **e**=1. So if the UK decides to participate in an existing discretionary programme, then with the rebate in place the UK will actually fund 86% of the expenditure in the UK: (this is the result of substituting **e**=1, **r**=0.66, and **s**=0.16 in formula 2): while if there were no rebate, the UK would fund only 58% of the expenditure itself: (formula 2 with **e**=1, **r**=0, and **s**=0.16).

The difference between these two figures, 86% and 58%, is likely to have a very marked effect on the UK's willingness to engage in discretionary programmes. In the no rebate case, with the EU funding almost half of any discretionary expenditure in the UK, there would be a strong incentive for the UK to participate. But with the rebate, the EU will only fund 14%. Given that the programme might not represent the UK's top policy priority, the UK may well feel that it is not worth losing the flexibility to spend part of its rebate as it sees fit, if the only benefit is going to be the 14% funding provided by the EU. This mechanism is likely to explain why the UK's take up of some discretionary programmes has historically been very low.

In the Scottish context, the above is likely to have a bearing on the decision by the UK government not to pursue structural funding in 2003 to support the fishing industry, a decision which appeared puzzling to many commentators at the time.

4.7 The analysis presented in this section provides further strong arguments for the reform of the rebate system. However, it does more than that. If indeed, as we suggest, the UK's involvement in Europe has been severely damaged by the perverse effects of the current system, then this surely provides a strong incentive for the UK to agree to reform, provided the reformed system gives the UK the advantages of an appropriate reduction in net contributions, without the disadvantages inherent in the current form of the rebate function.

5 Designing an improved system of rebates

5.1 The ideal solution to the rebate problem would be to do away with the need for rebates by reforming the expenditure programmes of the EU - particularly CAP. This approach is indeed stated as being the preferred long-term option in the report of the European Council, Conclusions of Presidency, June 1984. Realistically, however, this ideal is unlikely to be achieved within the foreseeable future: so what is required is a reformed system of rebates.

5.2 From the preceding analysis, the requirements which a reformed rebate system would have to meet are fairly clear. These are as follows:

a. In line with the basic principle outlined in paragraph 2.1, rebates should operate so as to bring each country's net contribution per head into some appropriate relationship with a measure of the country's net wealth per head. This implies, in particular, that a principle of equity should hold: countries with similar wealth should make similar net contributions per head.

b. Countries should automatically drop in and out of the rebate system as their circumstances change.

c. The system should be free from perverse incentives. As we have seen above, the major perverse incentives for the UK arise because marginal changes in the UK's unrebated net contribution are largely cancelled out by immediate changes in the rebate the UK receives. To remove perverse incentives from the system, therefore, this means that the rebate received by a country should not be a function of marginal variations in the country's unrebated net contribution.

5.3 In July 2004, the Commission put forward its own proposals for reform of the rebate system: in summary, these were that:

Æ when a member state makes a net contribution of more than 0.35% of its GNI, it should receive a rebate.
Æ all net contributions exceeding 0.35% of GNI would be refunded at 66%.
Æ there is a limit on the size of the total refund.

These proposals broadly meet criteria (a) and (b) in paragraph 5.2. However, and crucially, since the rebate would be related to the size of the unrebated net contribution, with the same rebate factor of 0.66 as currently applies to the British rebate, the Commission's proposals fail the test of not building in perverse incentives. In fact, the Commission's proposals would extend the perverse incentives which currently apply to the UK to probably seven net contributors on the basis of the forecasts in the Commission's technical Annex. For this reason, we strongly suggest that implementation of the Commission's proposals would have very adverse consequences for the European Union.

5.4 So is it possible to design a rebate system which does come close to meeting the requirements in paragraph 5.2. We suggest that this is possible, but that, for the following reasons, the available options are in fact very limited.

Consider requirement 5.2c first of all- that the size of the rebate is independent of marginal variations in a country's unrebated net contribution. The only way that this requirement can be met is if a country's rebate is, in the short to medium term, independent of changes in that countries unrebated net contribution: or, in other words, if each country's rebate is fixed in the short to medium term.

On the other hand, rebates which are fixed in the longer term are clearly not going to meet the requirement that countries should go in and out of rebate as their circumstances change: and, even if they are appropriately assessed to begin with, are going to "wander off" as times change.
These considerations suggest a system of rebates which are fixed in the medium term, (and what the medium term should be is a good question, to which we return below), but are subject to periodical revision.

More specifically, the proposed system would operate as follows:

a. There would be an agreed view as to what the appropriate underlying relationship should be between a measure of per capita wealth, and a country's net per capita contribution: for reasons to be set out in the next section, it would be advantageous if this relationship was linear. This same common relationship would be applied to all countries.

b. At the start of the system, an adjustment would be calculated for each country as a fixed sum, to bring each country's net contribution after the adjustment into line with the desired underlying relationship. To avoid distortions, it would probably be appropriate to calculate this adjustment on the basis of a few years' data.

c. This adjustment would then be maintained, as a constant for each country, through the medium term. Since the adjustment is fixed, each country would then be able to benefit fully from any extra EU funding it received, so avoiding the perverse incentive effects experienced with the current UK rebate.

d. At a fixed interval, every so many years, the adjustments would be recalculated, and the process would start again. The decision on how long this fixed interval should be would involve striking a balance. If the interval is too short, then negative incentive effects will increasingly come into play: if too long, then some countries will have moved too far into anomalous positions, given differences in relative growth rates etc. As an initial judgement, a review period in the range six to ten years is probably appropriate.

5.5 There is one further modification to this system which it would be worthwhile to introduce. Where there are certain categories of EU funded expenditure which are regarded as being so important from an overall strategic EU viewpoint that it is desired to give them extra encouragement, then these categories could be exempted from the basic calculation of the net contribution in the first place, before the rebate adjustments were set. For example, one such category is likely to be EU funding in support of Research and Development. In this case, a country which was a particularly large recipient of EU R&D funding would not lose its right to receive a rebate, just because of the R&D funding it received.

5.6 As explained above, it appears that a rebate system along the above lines follows inescapably from the criteria in paragraph 5.2 above: accordingly, we suggest a system along these lines should be considered for implementation.

6 The interaction of the UK rebate with the particular circumstances of Scotland

6.1 The main source of funding for the Scottish Parliament is its block grant from the UK Exchequer. Changes to this block grant are determined by the Barnett formula, which gives Scotland its per capita share of the planned changes in the corresponding expenditure programmes in England, primarily, Education, Health, and parts of Trade and Industry and Transport.)

6.2 The way the Barnett formula operates as regards EU funding is that Scotland does not directly get any increase in its block grant if extra EU funds are allocated to Scotland: EU funds are regarded as going to the UK Treasury, and the receipt by the Treasury of extra EU funds on behalf of Scotland does not in itself generate any change to Scotland's block grant. Only if EU funds also go to England, and if these funds then generate a change in planned expenditure in England, will Scotland get a Barnett consequential of the funding change in England. Since in many cases EU funds will be allocated to Scotland for reasons which have no direct English counterparts, this means that in effect Scotland is largely insulated from receipt of EU funds. In practice, Scotland is expected to fund EU projects, that is both the direct funding and the matched funding component, out of its existing block grant, council taxes and non-domestic rates.

The way in which the Barnett formula interacts with EU funding does not appear to be widely understood in Scotland. The point was very well appreciated in Wales, however, when 63% of the area of Wales was granted Objective 1 status in 2000, but Wales stood in danger of having to fund this out of its existing grant: as a result, Wales negotiated a special concession from the Treasury to enable the Welsh block grant to be adjusted for the receipt of EU funds, (although Wales still had to find the required match funding out of its existing grant.) This contrasts with what happened when the Highlands and Islands in Scotland achieved Objective 1 status in the 1990's, but Scotland had to fund all of the resulting expenditure out of an unadjusted block grant.

6.3 It is at this point that the relevance of the UK rebate comes in. Since, as we have argued above, the negative incentives of the UK rebate mechanism act to dampen UK participation in EU programmes, this in turn is likely to dampen the extent of any EU related changes in English spending programmes from which Barnett consequentials could be generated. The interaction of the two systems, Barnett and the UK rebate, is therefore likely to further insulate Scotland from the possibility of actually obtaining any additional funding resulting from EU policies.

6.4 What are the implications for this state of affairs of the changes we have proposed above to the EU rebate mechanism. These are as follows:

Suppose that an amended rebate system has been introduced, along the lines proposed in 5.4 above, and that, as proposed in 5.4(a), the basic underlying relationship between net contribution per head and GDP per head is linear, that is,

net contribution per head = a + b* GDP per head:

this is equivalent to

net contribution = a * population + b* GDP

Now both of the independent variables in this expression, population and GDP, can be disaggregated geographically. So in principle, instead of working out the required rebate at EU member country, the calculation could equivalently be carried out at a lower NUTS level - in this case at Scotland level. (It is precisely for this reason, so that the funding and rebate calculations can be disaggregated to lower geographic levels, that we recommended in 5.4(a) that the basic underlying relationship between net contribution per head and GDP per head should be linear.)

It would not, however, be enough just to calculate rebates at a lower geographical level than member state. The EU would also have to insist that each member had transparent public expenditure control systems in place to demonstrate that the rebate, and also EU programme funding, were allocated in a genuinely additional fashion at the lower geographic level. For the UK, this would require radical revision to the Barnett formula. But if the required changes were implemented, this would have the effect of revolutionising the impact of EU funding and EU membership for areas like Scotland, and would make sure that EU policies were actively pursued, were genuinely additional, and hence were really effective in such areas. We suggest, therefore, that serious consideration should be given to the implementation of the following changes, if an amended system of rebates is introduced: namely that:

a. The new system of rebates should be calculated where appropriate at sub-member state level.

b. Systems of public finance within member states should be reformed so that EU rebates and funding below member state level can be seen to be genuinely additional and transparent.

Annex: The Algebra of the UK Rebate: Derivation of Formula in Paragraph 4.2

1. Suppose the UK pays gross contribution G before rebate and receives European funding of E.

   In fact, the UK gets a rebate of r(G - E).

   So, the UK can be regarded as actually paying
   G - r(G - E) = (1-r)G + rE,

and in return receiving benefit in the form of EU project funding of E.

2. Now suppose that there is a new policy, costing X at Community level, for which the UK will pay sX gross, and receive back eX in funding.

Then the UK's new gross contribution (before rebate) is G+ sX, and European funding received by the UK is E + eX.
After rebate, the UK will pay, as implied by the formula in 1 above,
(1 - r) (G + sX) + r(E + eX) ,
so the change in the UK's rebated gross contribution is (1-r)sX + reX.

Allowing for matched funding of 100%, the extra expenditure which will take place in the UK is 2eX. The extra cost to the UK is the matched funding plus the change in the rebated gross contribution: that is

eX + (1 - r)sX + reX = (1 + r)eX + (1 - r)sX

So, of the extra expenditure of 2eX taking place in the UK as a result of the new policy, the proportion which will actually be funded by the UK is

$$\frac{(1+r)eX + (1-r)sX}{2eX} \quad = \quad \frac{(1+r)}{2} \quad + \quad \frac{(1-r)s}{2e} \quad ,$$

which is the required formula.

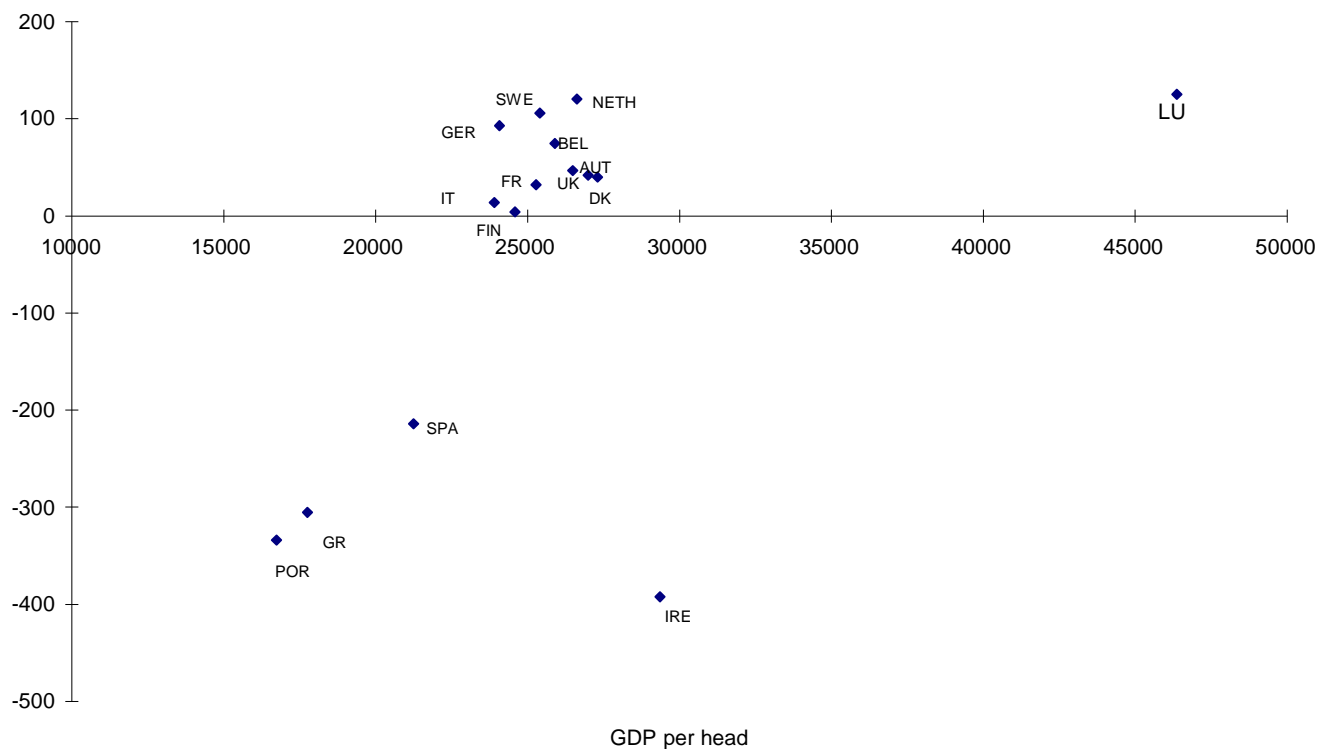## Chart 1: Net Contribution per Head against GDP per head: **2003**

GDP per head

for given policy, proportion of total funding coming to the UK