

Pasimeni, Paolo; Riso, Stéphanie

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The redistributive function of the EU budget

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THE REDISTRIBUTIVE FUNCTION OF THE EU BUDGET

Paolo Pasimeni, Stéphani Riso¹

ABSTRACT

This paper measures the net redistributive impact of the EU budget. It finds that for every € 1,000 difference in income per capita across countries, € 9 is offset by lower contributions to the budget and € 3 is offset by higher expenditures by the budget. The overall equalising effect is small (1.1%) and mainly depends on the revenue side, in particular on the national contribution based on GNI and VAT, which is also the main source of stabilisation. The analysis shows how the various cor-rections mechanisms applied to the revenue side of the budget reduce its redistributive and stabili-sation capacity. The policy conclusions are that on the revenue side, since the national contribution based on GNI is the main source of redistribution and stabilisation, its reduction could reduce the already minimal capacity of the budget to perform these functions. On the expenditure side, the shift from pre-allocated types of expenditures towards non-pre-allocated ones may determine a reduction of the overall redistributive capacity of the budget.

¹ European Commission. The opinions expressed in this paper are the authors' alone and cannot be attributed to the European Commission. Corresponding author: Paolo.Pasimeni@ec.europa.eu. Helpful comments are acknowledged, with the usual disclaimer, from Sebastian Gechert, Pasquale D'Apice and Andrew Watt.

The redistributive function of the EU budget

Paolo Pasimeni and Stéphanie Riso¹

Abstract

This paper measures the net redistributive impact of the EU budget. It finds that for every € 1,000 difference in income per capita across countries, € 9 is offset by lower contributions to the budget and € 3 is offset by higher expenditures by the budget. The overall equalising effect is small (1.1%) and mainly depends on the revenue side, in particular on the national contribution based on GNI and VAT, which is also the main source of stabilisation. The analysis shows how the various corrections mechanisms applied to the revenue side of the budget reduce its redistributive and stabilisation capacity. The policy conclusions are that on the revenue side, since the national contribution based on GNI is the main source of redistribution and stabilisation, its reduction could reduce the already minimal capacity of the budget to perform these functions. On the expenditure side, the shift from pre-allocated types of expenditures towards non-pre-allocated ones may determine a reduction of the overall redistributive capacity of the budget.

JEL codes: E61; E62; H11; H61; H77.

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1. Introduction

This paper focuses on the function of redistribution operated by the EU budget. Redistribution is considered here only as net cross-country transfers operated through the budget, and it requires looking at both sides of the budget: revenues, in the form of contributions by the member states to the budget, and expenditures, in the form of payments by the EU budget in each member state. The concept of operating budgetary balance is used in this case; however it is important to remember that this concept provides only a limited indication of all the possible benefits arising from EU policies, which go beyond the simple account of payments to and from the budget. It is just a proxy to perform a quantitative assessment of the redistributive capacity of the EU budget.

Some authors (Escolano et al. 2014) have noticed that in most federations the redistributive function of a federal budget is primarily carried out through social security. In the EU this is not the case, since the common budget does not include social security, which remains mainly a national competence. Moreover, several policies financed by the EU budget do not have a redistributive objective. Nevertheless, it does have a redistributive function, linked to the objective of promoting economic, social and territorial cohesion. This objective is explicitly defined in the Treaties² as the reduction of disparities between the levels of development of the various regions. It seems therefore relevant to study to what extent the budget performs this function and which are the main channels.

The analysis begins with a quantitative assessment of the redistribution actually operated by the budget, as a share of EU's GDP, and shows its evolution over the past 15 years. It then compares the evolution of the redistributive capacity to the evolution of underlying divergences in the Union, and analyses how progressive this redistribution is, in terms of net operating balances compared to income per capita. In order to measure the net redistributive impact of the budget, the analysis measures the fiscal response of the EU budget to differences in income, analysing the contribution of both revenues and expenditures sides. A detailed decomposition of both sides of the budget in their main components shows the exact contribution of each heading of expenditures and of each source of revenue to the overall redistributive capacity of the EU budget. The analysis then focuses on the responsiveness of the budget to changes in income, providing a first estimate of the actual stabilisation operated by the budget. The actual redistributive capacity of the EU budget, in terms of equalisation and responsiveness, is then compared with a counterfactual budget, as it would have been without the existing revenue correction mechanisms. This allows for a measurement of the net impact of the correction mechanisms on the redistributive capacity of the budget.

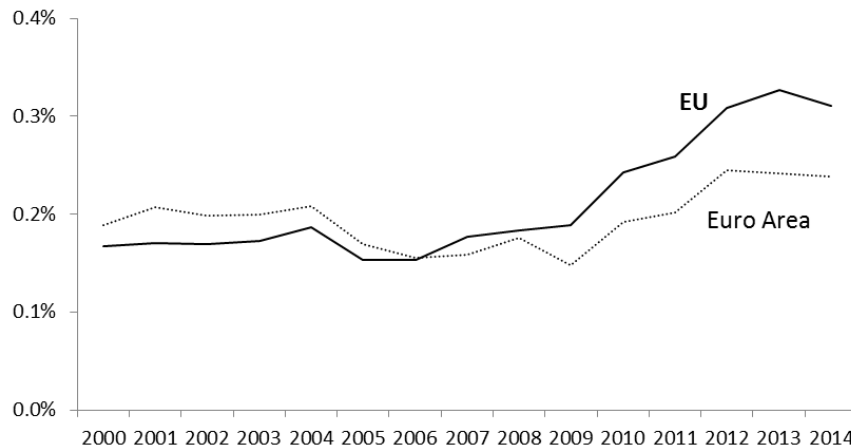
² Articles 174 to 178 of the Treaty on the Functioning of the European Union (TFEU).

2. How much does the EU budget redistribute?

The EU budget accounts for roughly 1% of the Union's GDP. Around 80% of it, on average, returns back to each country in the form of various allocated expenditures³, and only a limited part is actually redistributed among countries. On average over the past 15 years, the redistribution operated by the budget at the level of the EU was equal to 0.2% of the Union's GDP. As a matter of comparison, the average yearly cross-border flows operated through the federal budget in the US⁴ is equal to 1.5% of GDP (D'Apice, 2015).

The amount redistributed in the EU, however, has increased over time, reaching 0.3% in the recent years. It is interesting to compare the trend of redistribution in the whole EU with the one for the Euro Area only: we observe that the latter has been rather stable over the whole period, and that up to 2005 redistribution within the Euro Area used to be larger, though limited in absolute terms, while since 2006 redistribution at the level of the EU has increased faster.

Figure 1: Redistribution operated by the EU budget in % of GDP



Source: own elaboration on European Commission data.

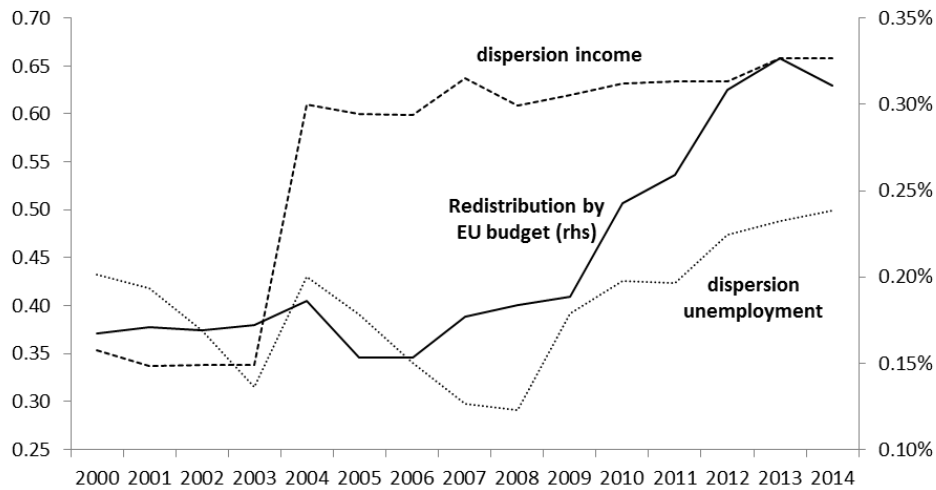
The increase in cross-country flows operated by the EU budget goes in parallel with an increase in divergences⁵ within the Union. Figure 2 shows that divergences have increased within the EU in terms of income per capita and unemployment rates. As one would expect, the sharp increase in the dispersion of income per capita was determined by the large accession in 2004 of ten new member states, with a lower level of income per capita. The increasing dispersion in unemployment rates, instead, is rather a consequence of the economic crisis, and it started in 2009 with a more gradual although constant path.

³ Data available at: http://ec.europa.eu/budget/figures/interactive/index_en.cfm

⁴ Over the period 1980-2005.

⁵ Measured by the Coefficient of Variation (C_V) which is defined as the ratio of the Standard Deviation (σ) to the Mean (μ): $C_V = \sigma/\mu$.

Figure 2: Divergences and Redistribution in the EU



Source: own elaboration on Eurostat and DG Budget data.

Net redistribution operated by the EU budget through cross-country flows (right scale in the figure) did not increase immediately after the accession of new member states, but it is rather the effect of the first multiannual financial framework established after the enlargement.

3. How progressive is this redistribution?

Countries transfer a certain amount of resources to the budget, in various forms of contributions, and receive in turn payments, in various forms of expenditures. Our dataset covers a 15 year period, from 2000 to 2014 and provides a detailed breakdown of countries' contributions to the budget and of expenditures by the budget spent in each country. This allows for a calculation of the so-called net operating balance for each country, each year.

The first step in this analysis is to calculate for each country the net operating balance per capita. Then, in order to assess how progressive this system is, the per capita net operating balance of each country is plotted with its level of income per capita. Full progressivity would imply a perfect negative correlation between the two measures, i.e. countries with higher income per capita having a lower net operating balance.

The following figure provides a first graphical representation of this correlation:

Figure 3: GDP per capita and operating budget balance per capita, per year

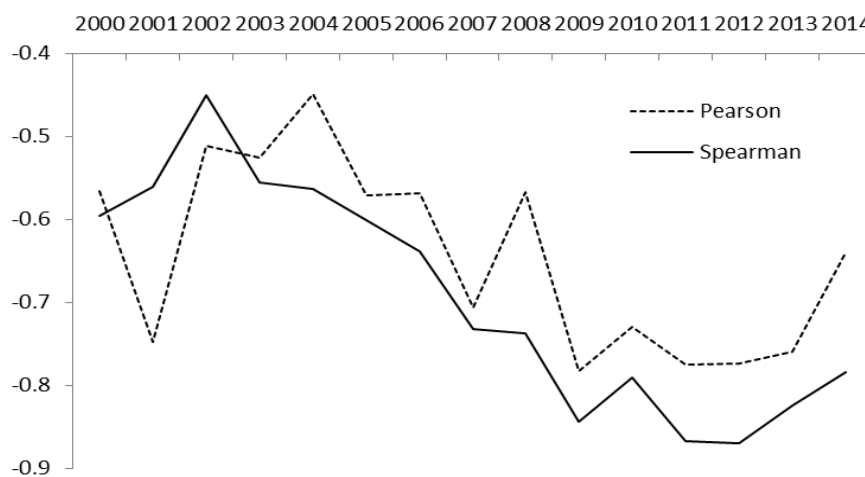


Source: own elaboration on Eurostat and DG Budget data.

The relation looks indeed negative, implying a certain degree of progressivity. In order to measure it more precisely we can look at the coefficients of correlation: a perfect progressivity would imply a coefficient of -1 . The linear regressions⁶ show that the relation becomes stronger from 2004 onwards, which reflects the big enlargement to ten new member states, whose relative income was lower than those already in. This tendency towards a stronger correlation and higher progressivity, however, stops in the recent years.

A more in depth observation, though, suggests that this reduced progressivity of the last years is driven by an outlier, Luxemburg⁷, which in 2014 becomes a net beneficiary. Indeed, if we use a non-parametric coefficient⁸, which is less sensitive about the outliers, the correlation is stronger.

Figure 4: Evolution of correlations: GDP per capita and operating budget balance per capita



Source: own elaboration on Eurostat and DG Budget data.

We can conclude that the net balance between expenditures by and contributions to the budget was moderately progressive before the big enlargement of 2004; the inclusion of new member states with significantly lower levels of income per capita changed this situation, making the budget more progressive; but this trend towards more progressivity has however stopped in recent years.

⁶ Measured by the Pearson coefficient.

⁷ Luxembourg's net position fluctuates quite significantly over time because, given its small size, a significant payment to or from the EU budget can substantially affect the resulting net balance (this is the case of expenditures linked to the "Galileo" project in 2014).

⁸ The Spearman coefficient.

4. What is the overall redistributive impact of the EU budget?

In order to properly measure the redistributive capacity of the EU budget it is worth looking beyond the accounting of how much it redistributes, and trying to measure its net impact. In order to do so, we have to consider both the revenue side and the expenditure side, since each of them plays a role in the actual redistribution operated.

Following an analysis recently done for the US, by Feyrer and Sacerdote (2013), a similar methodology is applied, by reducing all variables to per capita levels, and then comparing them. The larger and more detailed dataset of expenditures and revenues of the EU budget can overcome several methodological problems that previous studies in the literature faced.

A first step of the analysis consists in estimating two similar equations, in order to disentangle the redistributive effect of the revenue side of the budget and of the expenditure side. The first set of equations to be estimated is:

$$EXP_{ct} = \alpha - \eta Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (1)$$

$$REV_{ct} = \alpha + \theta Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (2)$$

The independent variable is income per capita, and the analysis tests to what extent expenditures and revenues per capita are responsive to it. All variables are expressed in euros per capita. *EXP* indicates expenditures per capita, *REV* indicates revenues per capita paid by each country to the budget, and *Y* indicates income per capita. We chose income per capita as regressor in order to measure how expenditures and revenues of the EU budget relate to relative living standards, as in Feyrer and Sacerdote (2013). Then, α is the constant, η is the coefficient we want to measure in the case of expenditures and has a negative sign because redistribution occurs if expenditure is inversely correlated with income per capita, θ is the coefficient we want to know in the case of revenues and has a positive sign because redistribution occurs if revenues paid are positively correlated with income per capita, *c* indicates countries, *t* indicates years, γT is a factor controlling for time trends, and β represents population weights⁹ in order to give to each per capita level the appropriate weight, finally ε is the error term.

It is important to stress that this methodology controls for population size, apart from time trends. The similar methodology applied to the study of US budget (Feyrer and Sacerdote, 2013) did not account for this specific control, but given that the heterogeneity of EU countries in terms of population size is significantly higher than in the US, this step is particularly important to obtain reliable results. Table 1 presents the results:

⁹ Population weights are the shares of countries' population in the total EU population, and they are updated every year for every country.

Table 1: Levels of expenditures and contributions per capita on income per capita

	Expenditures p.c.	Revenues p.c.
Levels of income per capita	- 0.0027** (0.001)	0.0085*** (0.000)
Constant	-9538.1** (3283.3)	-4853.9** (1645.9)
Observations	353	353
Rsq	0.042	0.769

Explanatory note: The panel is composed by annual data per country per year from 2000 to 2014. Robust standard errors are in brackets. Significance levels: *** p<0.001; ** p<0.01; * p<0.05

First of all, we observe that the explanatory capacity of the model is much lower for the expenditure side, which implies that income is not a very relevant variable in the allocation of expenditures of the budget¹⁰. The revenue side, instead, can be explained to a large extent by levels of income, which is certainly due to the fact that its largest component is actually based on GNI.

Interestingly, both expenditures and revenues of the EU budget are significantly related to per capita income levels, although with small coefficients. In particular, for every euro in level difference in income per capita across EU countries 0.85 cent is offset by lower contributions paid to the common budget and 0.27 cent is offset by higher expenditures paid by the budget. Overall, the total equalising effect of the EU budget is 1.12 cent per each euro difference, i.e. in percentage terms 1.1%. As a matter of comparison, Feyrer and Sacerdote (2013) find that in the US the equalising effect of the federal budget is 40%, i.e. thirty-five times higher.

Our dataset allows for a greater level of detail in this analysis, by decomposing this overall effect into the different categories of expenditures and revenues. The expenditure side of the budget is composed by five main headings, the revenue side by two broad categories. On the basis of the following identity:

$$EXP - REV = (H1a + H1b + H2 + H3 + H4 + H5) - (TOR + NC) \quad (3)$$

A set of parallel equation for each side of the budget can be estimated, disentangling the specific contribution of each of them to the overall redistributive effect of the budget.

¹⁰ The detailed analysis of the relevant variables explaining the allocation of expenditures is treated in a following note, on the allocation function of the budget.

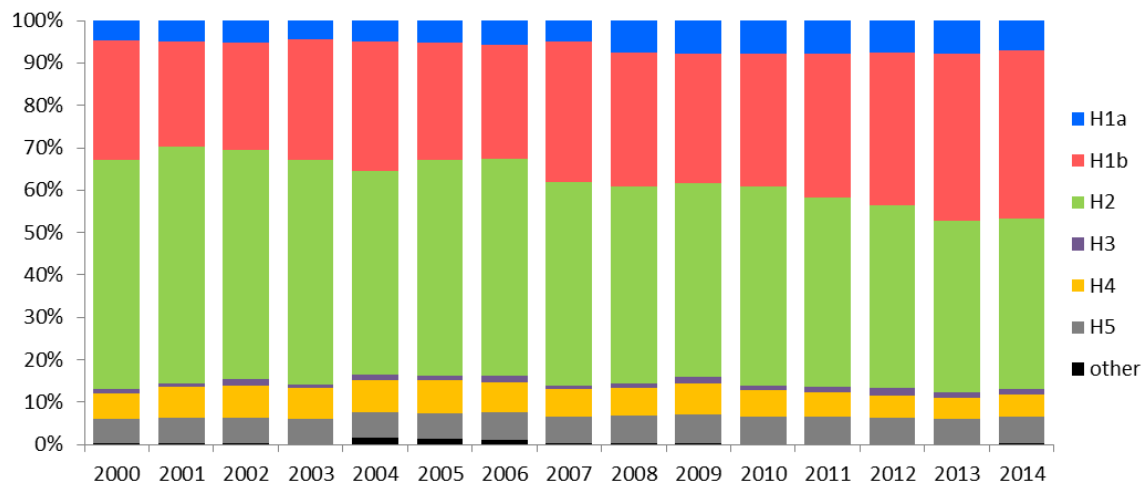
4.1 The expenditure side

The expenditure side is composed by five headings, the first of which can be further broken down into two main categories. The Headings are:

- Heading 1a: Competitiveness for growth and employment
- Heading 1b: Cohesion
- Heading 2: Preservation and management of natural resources
- Heading 3: Citizenship, freedom, security and justice
- Heading 4: EU as global player ¹¹
- Heading 5: Administration
- other

The yearly distribution of the total expenditures per heading is shown in the following figure:

Figure 5: Total expenditures per Heading (2000-2014)



Source: European Commission, DG Budget data.

The category "other" is a temporary heading which includes reserves and compensatory payments relating to the expansion of the EU; it is basically insignificant for our analysis. The set of parallel equations to be estimated therefore becomes:

$$H1a_{ct} = \alpha - \eta_{1a} Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (4)$$

¹¹ Heading 4 mainly finances external relations and development aid, devoted to third countries, under the name "the EU as a global partner". Most of the expenditures under this Heading are directed towards third countries, outside the EU; however a small amount is also dedicated to help pre-accession countries achieve a minimum degree of convergence with EU countries. In the equivalence between past financial framework and the present one, those funds have also been included under this heading. This is relevant in explaining our results because the member states which joined the EU in 2004 (and 2007) still benefitted by some expenditures under this heading after the accession. These expenditures eventually phased out after some years. This explains why Heading 4 is relevant to our analysis.

$$H1b_{ct} = \alpha - \eta_{1b}Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (5)$$

$$H2_{ct} = \alpha - \eta_2Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (6)$$

$$H3_{ct} = \alpha - \eta_3Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (7)$$

$$H4_{ct} = \alpha - \eta_4Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (8)$$

$$H5_{ct} = \alpha - \eta_5Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (9)$$

Where H indicates each heading of the budget, c indicates countries, t indicates years, α is the constant, η is the coefficient we want to measure in the case of each heading and has a negative sign because redistribution occurs if expenditure is inversely correlated with income per capita, γT is a factor controlling for time trends, β represents population weights, and ε is the error term.

If the analysis is correct, then the sum of all significant specific coefficients η_i of each heading should equal the overall coefficient η found for the total expenditures, in formula:

$$\eta_{1a} + \eta_{1b} + \eta_2 + \eta_3 + \eta_4 + \eta_5 = \eta \quad (10)$$

The following table shows the results:

Table 2: Per capita expenditures per Heading on income per capita

	H1a p.c.	H1b p.c.	H2 p.c.	H3 p.c.	H4 p.c.	H5 p.c.
Level of income per capita	0.0007*** (0.000)	-0.0053*** (0.001)	0.0001 (0.000)	0.0000 (0.000)	-0.0003*** (0.000)	0.0022*** (0.001)
Constant	-1599.4*** (241.5)	-8976.3*** (1688.3)	1168.1 (1556.2)	-210.3* (96.2)	-2.3 (89.9)	53.0 (1174.5)
Observations	353	353	353	353	353	353
Rsqr	0.322	0.358	0.002	0.018	0.248	0.044

Explanatory note: The panel is composed by annual data per country per year from 2000 to 2014. Robust standard errors are in brackets. Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

First of all we can see that only Heading 1a, Heading 1b, Heading 4 and Heading 5 are significantly correlated with income levels. This means that Heading 2 and Heading 3 spending have no relation at all with levels of income per capita, which in fact has an almost zero explanatory power in these two cases. Interestingly, Heading 2 which is the largest one has no redistributive impact. The reason is probably that funds for "preservation and management of natural resources", mainly including the Common agricultural policy and the funds for rural development and fisheries, operate a sectoral

redistribution. In any case, they are not a significant source of equalisation of per-capita income across countries.

Income levels, instead, seem to have certain relevance for the other four headings, which have a statistically significant redistributive impact. The first thing to notice is that this impact does not go in the same direction for the four headings. As previously mentioned, redistribution occurs when expenditures are inversely related to income levels, therefore Heading 1b and Heading 4 have a positive redistributive effect, but this effect is partially offset by Heading 1a and Heading 5, which have a negative redistributive effect.

More in detail we can see that, as one would expect, Heading 1b, which finances cohesion policy, has a redistributive effect of € 0.0053 per each euro difference, in per capita terms. This effect is reinforced by Heading 4, which adds another € 0.0003. It is worth remembering that expenditures under Heading 4 are mainly directed to third countries, outside the EU. However a small amount is also dedicated to help pre-accession countries achieve a minimum degree of convergence with EU countries; this is relevant to explain our results because the member states which joined the EU in 2004 (and 2007) still benefitted by some expenditures under this heading after the accession. This explains why Heading 4 has a significant correlation with income per capita in the period considered.

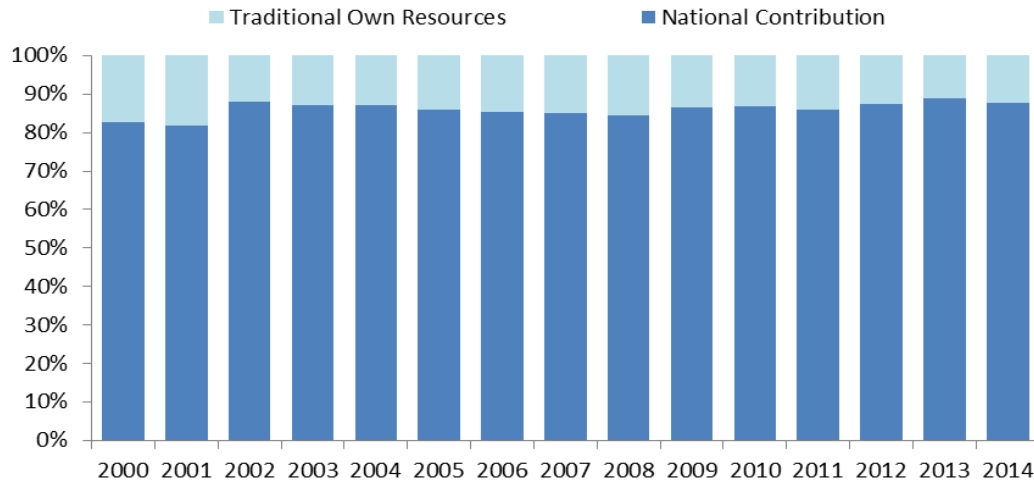
The two positive effects of Heading 1b and 4 are partially counteracted by Heading 1a and 5. These have in fact a significant but positive correlation with income levels, which means they actually redistribute from lower incomes to higher ones, although to a very limited extent. Heading 1a, in particular, per each euro difference in income per capita exacerbates this difference by € 0.0007, and Heading 5 by € 0.0022. It is worth remembering, however, that the objective of these two heading is not the one of cohesion, equalisation, or redistribution. This is particular evident from the very low explanatory capacity of the regression model for Heading 5. These headings fund different policies, not related to the objective of cohesion, which have as a side effect a small but significant distributional impact.

The sum of all the effects of the various headings perfectly equals the estimated overall impact of the expenditure side of the budget, i.e. € 0.0027 per each euro difference of income per capita.

4.2 The revenue side

The revenue side of the budget can be decomposed in two broad categories¹²: the traditional own resources and the national contributions. The first category mainly consists of customs duties on imports from outside the EU and sugar levies; member states keep 25% of the amounts as collection costs. The second category consists of resources based on the value added tax (VAT), whereby a uniform rate of 0.3 % is levied on the harmonised VAT base of each member state, and a national contribution based on their gross national income (GNI), whereby each country transfers a standard percentage of its GNI to the EU. Although designed to cover the balance of total expenditure not covered by the other own resources, the GNI-based resource has become the largest source of revenue of the EU budget. The following figure shows the evolution of these two broad categories over the past 15 years:

Figure 6: Sources of revenues (2000-2014)



Source: European Commission, DG Budget data.

It is important to note, for the purpose of this analysis, that "traditional own resources" in spite of being by definition resources of the EU budget can also be ascribed to the member state that collects them, as our database actually does. This allows including them into the analysis. In order to test the contribution that each of the two main components to the overall redistributive impact of the revenue side of the budget, two parallel equations are estimated:

$$TOR_{ct} = \alpha + \theta_{tor} Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (11)$$

$$NC_{ct} = \alpha + \theta_{nc} Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (12)$$

¹² The different types of own resources and the method for calculating them are set out in a Council Decision on own resources (<http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32007D0436>). It also limits the maximum annual amounts of own resources that the EU may raise during a year to 1.23% of the EU gross national income (GNI).

Where TOR indicates the traditional own resources ascribed to each country in per capita terms, NC indicates the national contributions paid by each country in per capita terms, c indicates countries, t indicates years, α is the constant, θ is the coefficient we want to measure in the case of each source of revenue and has a positive sign because redistribution occurs if revenues paid are positively correlated with income per capita, γ T is a factor controlling for time trends, β represents population weights, and ε is the error term.

If the analysis is correct, then the sum of the two specific coefficients θ_i of each source of revenue should equal the overall coefficient θ found for the total revenues, in formula:

$$\theta_{tor} + \theta_{nc} = \theta \quad (13)$$

The following table shows the results:

Table 3: Redistributive impact of the sources of revenue

	National contribution p.c.	Own resources p.c.
Levels of income per capita	0.0069*** (0.000)	0.0016*** (0.000)
Constant	-5530.9*** (1704.2)	696.3 (509.0)
Observations	353	353
Rsq	0.723	0.316

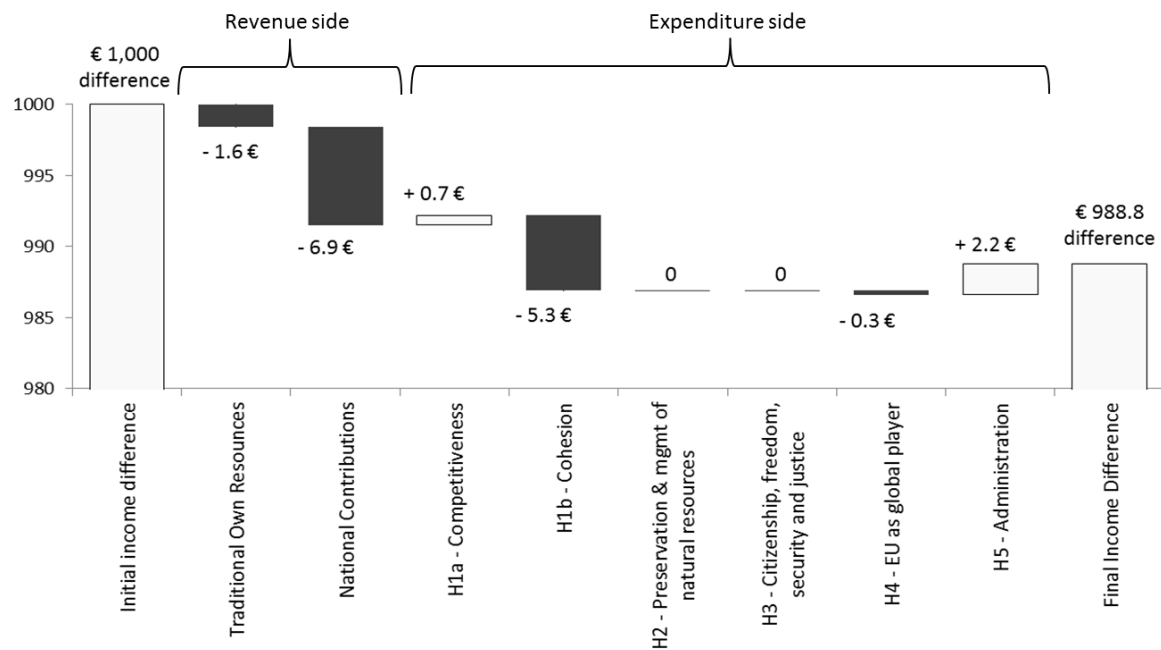
Explanatory note: The panel is composed by annual data per country per year from 2000 to 2014. Robust standard errors are in brackets. Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

First of all we see that both sources of revenues are significantly and positively correlated with income levels, and this means that both have a positive redistributive impact. The national contribution in particular has the strongest redistributive impact (€ 0.0069 per each euro difference). Even if we compare with each of the headings on the expenditure side, the national contribution stands out as the most important source of redistribution in the budget. The own resources have a much smaller equalising potential. The sum of these two effects perfectly equals the estimated overall impact of the revenue side of the budget, i.e. € 0.0085 per each euro difference of income per capita.

4.3 The aggregate effect

We can finally obtain the figure of the overall redistributive effect of the EU budget by aggregating all components on the expenditure and revenue sides. The following figure shows the redistributive effect of each component, per each euro difference in levels of income per capita.

Figure 7: Decomposition of the net redistributive impact of the EU budget



Source: own elaboration. Explanatory note: figures are expressed in € per capita, per each euro difference in levels of income per capita. Expenditures are composed by the five Headings. National contribution plus own resources compose the total revenues. The panel is composed by annual data per country per year from 2000 to 2014.

For every € 1,000 difference in levels of income per capita the EU budget offsets only €11, i.e. an equalising effect of 1.1%. As a matter of comparison, Feyrer and Sacerdote (2013) find that in the US the equalising effect of the federal budget is 40%, i.e. thirty-five times higher. The main source of redistribution comes from the revenue side and is the national contribution. This is quite consistent with the notion that the contribution based on GNI and VAT is the most related to income levels.

On the expenditure side, the main contribution to redistribution comes from cohesion policy, as one would expect, although to a lesser extent than the national contribution. Still on the expenditure side, the largest item of the budget, Heading 2, has no significant redistributive impact in terms of equalisation of income levels across countries; this is probably due to its function of cross-sectoral redistributive instrument. Finally, some categories of expenditures, such as those for competitiveness and administration, have a negative, although small, redistributive impact, partially offsetting the positive impacts of the other components.

5. How responsive is the budget to changes in economic conditions?

In order to answer to this question, the analysis must focus on changes, rather than levels, of revenues and expenditures per capita of the EU budget and test how related they are to simultaneous changes in income per capita across time. This allows testing the responsiveness of the budget to changing economic conditions. The equations to be estimated for the comparison of changes become the following:

$$\Delta \text{EXP}_{ct} = \alpha - \eta' \Delta Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (14)$$

$$\Delta \text{REV}_{ct} = \alpha + \theta' \Delta Y_{ct} + \gamma T + \beta_{ct} + \varepsilon_{ct} \quad (15)$$

where Δ indicates the changes, and the other elements are the same as above; these estimations as well include controls for time trends and population weights. The results show that the expenditure side of the budget is not at all responsive, while revenues are. The analysis is therefore replicated at a more detailed level to test the behaviour of each component, and find that none of the Headings on the expenditure side is responsive to changing in income per capita, while both sources of revenue are. The following table shows the detailed results:

Table 4: Changes of expenditures and revenues per capita on income per capita

	Δ Expenditures p.c.	Δ Revenues p.c.	Δ National contribution p.c.	Δ Own resources p.c.
Change in income per capita	0.0017 (0.001)	0.0083** (0.003)	0.0066* (0.003)	0.0017*** (0.000)
Constant	-688.5 (1092.7)	-1838.5 (1490.4)	-1311.2 (1471.8)	-526.9* (252.6)
Observations	325	325	325	325
Rsquared	0.004	0.115	0.078	0.118

Explanatory note: National contribution plus own resources compose the total national contribution. The panel is composed by annual data per country per year from 2000 to 2014. Robust standard errors are in brackets. Significance levels: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

First of all, the whole model in all specifications has a much lower explanatory capacity compared with the analysis of levels, as proved by the very low R squared. This is consistent with the notion that the EU budget in general is not very responsive to changes in income.

Second, changes in expenditures per capita are not at all significantly correlated with changes in income per capita, only changes in contributions are. A one euro fall in per capita GDP determines a € 0.008 reduction in the per capita contribution by a country to the common budget. As a matter of comparison, the same reduction in taxes paid by states to the federal budget in the US, associated to a one dollar reduction in income per

capita, is \$ 0.253 (Feyrer and Sacerdote, 2013), i.e. the responsiveness of the US federal budget is thirty times higher.

Third, when assessing separately the responsiveness of each of the two components in which total contributions can be broken down, we observe that both are significantly associated to changes in income per capita, and the above mentioned € 0.0083 reduction in per capita contribution, linked to a one euro fall in income per capita, is composed by a € 0.0066 reduction of the "national contribution" and a € 0.0017 reduction in the "traditional own resources" per capita, across the EU. This confirms the intuition that that the "national contribution", being based on GNI and on VAT, is more responsive to cyclical conditions than the traditional own resources, and is the single most responsive component of the whole budget.

Overall the results of this analysis confirm the notion that the EU budget is rather irresponsive to changing economic conditions. The expenditure side is the least flexible one, due to its structure. The only source of responsiveness is on the revenue side, and its main contributor is the national contribution based on GNI and VAT.

6. What is the net impact of correction mechanisms on the redistributive capacity?

The EU budget has a number of correction mechanisms granted to some member states. The first correction mechanism was introduced in 1985 to correct the imbalance between the UK's share in payments to the budget and its share in the expenditures¹³. The cost of the UK rebate is divided among EU Member States in proportion to the share they contribute to the EU's GNI. However, Germany, the Netherlands, Austria and Sweden, who considered their relative contributions to the budget to be too high, pay only 25 % of their normal financing share of the UK correction.

Denmark, Ireland and the UK have also an exemption from financing certain specific parts of freedom, security and justice policies. The Netherlands and Sweden benefit from gross reductions in their annual GNI contribution through lump-sum payments. Finally Germany, the Netherlands, Austria and Sweden benefit from reduced rates of call for the VAT own resource¹⁴.

Altogether these correction mechanisms tend to reduce the contributions some countries pay to the budget. It is possible to measure their impact on the redistributive capacity of the budget by building a counterfactual budget, without these corrections, and comparing its redistributive capacity to the actual one. First of all, the counterfactual

¹³ This mechanism has been modified on several occasions to take account of changes made to the system of EU budget financing, but the essential principles remain the same. The UK is reimbursed by 66 % of the difference between its contribution and what it receives back from the budget.

¹⁴ Reduced VAT call rates for Austria (0.225 %), Germany (0.15 %), the Netherlands and Sweden (0.1 %).

budget is constructed by subtracting all corrections granted each year to each country, with the respective contributions paid by the others. As a second step, the same analysis as above is repeated, calculating the redistributive capacity of the new counterfactual budget and its responsiveness. Finally, the results obtained this way are compared with the previous ones, based on the actual budget. The results¹⁵ show that indeed the corrections have a significant net impact in reducing the redistributive capacity of the budget, on the revenue side.

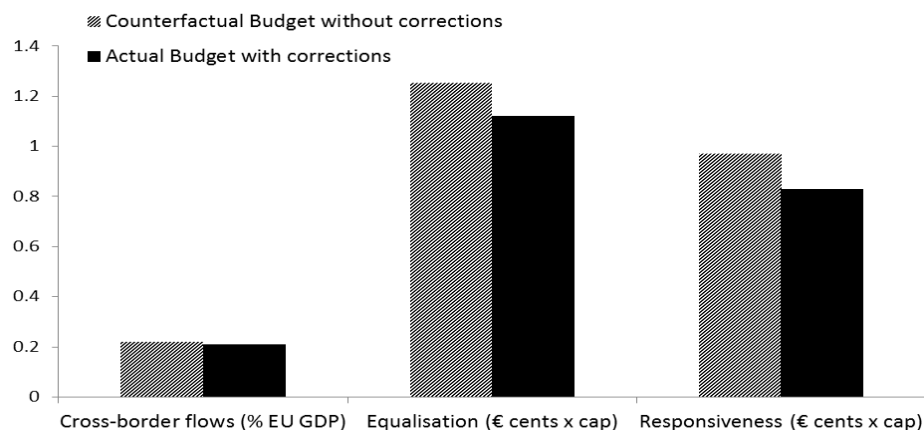
Table 5: Net impact of corrections on the redistributive capacity

	Actual budget	Budget without corrections	Net impact of corrections	% Change
Cross-border flows (% of EU GDP)	0.21%	0.22%	- 0.01%	- 5%
Equalising effect (in € cents per capita)	1.12	1.25	- 0.13	- 10%
Responsiveness (in € cents per capita)	0.83	0.97	- 0.14	- 14%

Source: own elaboration.

The actual cross-border flows in percentage of EU GDP operated by the budget decrease by 0.01%; the equalising effect of the budget is reduced by 0.13 € cents per each euro difference; the responsiveness to changes in income is reduced by 0.14 € cents per each euro change over time.

Figure 8: Redistributive capacity of the budget with and without correction mechanisms



Source: own elaboration.

The redistributive capacity of the budget is therefore reduced by the mechanism of corrections applied to it. Given the already limited redistributive capacity of the budget

¹⁵ For the detailed results of the regression analysis see the appendix.

previously illustrated, these small impacts have a non-negligible effect: cross-border flows are diminished by 5%, the equalising effect is diminished by 10%, and the overall responsiveness is reduced by 14% compared with a scenario without corrections.

7. Conclusion

The analysis presented in this note has provided a detailed estimation of the redistributive capacity of the EU budget. The starting point is that over the past 15 years on average about 20% of the budget has been redistributed through cross-country flows, while 80% has returned to the same member state. The redistribution operated corresponds to 0.2% of EU GDP; however, this has increased up to 0.3% in the most recent years. The increase in redistribution, although limited, corresponds to a parallel increase in divergences within the EU, both in terms of income per capita and unemployment rates. These divergences have not been reduced so far, but are rather increasing.

The difference between what each country contributes to the budget and what it gets from its expenditures, the so-called operating budget balance, has become more correlated with levels of relative prosperity, as measured by income per capita. The big enlargement of 2004 to new member states, with significantly lower levels of income per capita, considerably increased the progressivity of the budget; this trend towards more progressivity has however stopped in most recent years.

Then, the analysis provides an estimation of the net redistributive impact of the EU budget: for every € 1,000 in level difference in income per capita across EU countries, € 9 is offset by lower contributions paid to the common budget and € 3 is offset by higher expenditures paid by the budget. Overall, the total equalising effect of the EU budget is very small, around 1.1%. As a matter of comparison, in the US the equalising effect of the federal budget is 40%, i.e. thirty-five times higher.

The main source of redistribution comes from the revenue side and is the national contribution based on GNI and VAT. On the expenditure side, the main source of redistribution comes from cohesion policy, the largest item (Heading 2) has no significant redistributive impact, and some categories, such as competitiveness and administration, have a negative, although small, redistributive impact, partially offsetting the positive impacts of the other components.

The EU budget is not particularly responsive to changing economic conditions; changes in expenditures per capita are not significantly correlated with changes in income per capita over time, only revenues are. A fall in income per capita of € 1,000 determines a reduction of € 8 in the per capita contribution paid to the common budget. As a matter of comparison, the responsiveness of the US federal budget is thirty times higher. The most responsive part of the budget is on the revenue side, and it is the national

contribution based on GNI and VAT. This is the most responsive component to changes in income, therefore the main source of stabilisation in the EU budget.

The analysis has also shown that the various corrections mechanisms applied to the budget considerably reduce its redistributive capacity. The net impact is quite small, but non negligible given the already limited redistributive capacity of the budget, both in terms of equalisation of income levels and of responsiveness to income changes.

The extent to which these results suggest policy recommendations depends on the extent to which the redistributive function of the EU budget is considered relevant. If this is the case, then some considerations are in order.

First, on the revenue side, the reform of the own resources system should carefully assess the possible substitution of the national contribution based on GNI with another source of revenue. Since the national contribution based on GNI is the main source of redistribution (and also of stabilisation) of the budget, its reduction could reduce the already minimal capacity of the budget to perform these functions. The key parameter then would become the tax base chosen for the new source: if it was a highly cyclical base, the loss of redistributive capacity could be mitigated.

Second, on the expenditure side, the shift from pre-allocated types of expenditures towards non-pre-allocated ones brings significant redistributive effects. As the analysis shows, Heading 1b has a significant redistributive effect, which is counteracted by the negative redistributive effect of Heading 1a. So far the latter is considerably smaller than the former, but shifting the relative balance between the two would determine a reduction of the overall redistributive capacity of the budget.

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Appendix

Appendix to Section 6

The estimations for the counterfactual budget constructed in the hypothesis of zero correction mechanisms are based on the same kind of equations estimated for the actual budget. In order to measure the equalising effect I compare levels, therefore estimate equations (1) and (2). For the two components of the revenue side, I run again equations (11) and (12) in the case of the counterfactual budget. The results are the following:

Table A: Equalising effect of a counterfactual budget without corrections

	Expenditures p.c.	Revenues p.c.	National contribution p.c.	Own resources p.c.
Levels of income per capita	- 0.0027** (0.001)	0.0098*** (0.000)	0.0082*** (0.000)	0.0016*** (0.000)
Constant	-9507.9** (3281.1)	-5811.7*** (1009.4)	-6488.8*** (861.0)	696.3 (509.0)
Observations	353	353	353	353
Rsq	0.042	0.896	0.926	0.316

Explanatory note: National contribution plus own resources compose the total national contribution. The panel is composed by annual data per country per year from 2000 to 2014. Robust standard errors are in brackets. Significance levels: *** p<0.001; ** p<0.01; * p<0.05

In order to measure the responsiveness of the counterfactual budget I compare changes in the same variables, through the same equation used for the actual budget, (14) and (15). The results are the following:

Table B: responsiveness of a counterfactual budget without corrections

	Δ Expenditures p.c.	Δ Revenues p.c.	Δ National contribution p.c.	Δ Own resources p.c.
Change in income per capita	0.0017 (0.001)	0.0097*** (0.002)	0.0080*** (0.002)	0.0017*** (0.000)
Constant	-694.0 (1092.2)	-2041.0 (1101.3)	-1547.0 (1069.6)	-526.9* (252.6)
Observations	325	325	325	325
Rsq	0.004	0.153	0.116	0.118

Explanatory note: National contribution plus own resources compose the total national contribution. The panel is composed by annual data per country per year from 2000 to 2014. Robust standard errors are in brackets. Significance levels: *** p<0.001; ** p<0.01; * p<0.05

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Phone: +49-211-7778-331, IMK@boeckler.de, <http://www.imk-boeckler.de>

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