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THE EUROPEAN BUDGET: AN ALTERNATIVE TO BUDGETARY BALANCES TO ASSESS BENEFITS FOR THE MEMBER STATES

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Sommario

Il bilancio comunitario comporta circa 100 miliardi EUR di spese annue. La scadenza, nel 2006, dell'attuale quadro finanziario imporrà a breve di riconsiderare la ripartizione dell'onere di bilancio tra gli Stati membri. Il saldo tra contributi versati dagli Stati membri e pagamenti ricevuti determina attualmente se uno Stato è "contribuente netto" o "beneficiario netto". Per procedere ad una corretta valutazione dei benefici che ogni Stato membro ricava dal bilancio europeo si propone una metodologia per quantificare gli effetti della spesa comunitaria sulla domanda generata di beni e servizi nei singoli Stati membri. Tale proposta è fondata sull'ipotesi che i flussi di cassa non costituiscano una base appropriata per identificare i benefici reali derivanti dalla spesa comunitaria, in particolare a causa dell'integrazione esistente tra i sistemi economici dell'Unione. Infatti, le somme erogate in un Paese attivano flussi d'importazione provenienti dal resto dell'Unione e, a causa della diversità delle strutture industriali nazionali, tale effetto può risultare molto differenziato tra gli Stati membri. Per quantificare compiutamente gli impatti (e i conseguenti benefici) derivanti dall'erogazione della spesa comunitaria è necessario integrare, a partire da una riclassificazione economica della spesa dell'Unione Europea a favore dei singoli Stati membri, le analisi sui flussi di cassa con gli strumenti tipici dell'analisi input-output. I risultati del lavoro mostrano che Stati ritenuti "contribuenti netti" sulla base dei flussi di cassa sarebbero in realtà "beneficiari netti" tenendo conto dell'incremento di produzione di cui beneficiano.

Abstract

The Community Budget involves the expenditure of approximately 100 billions EUR *per annum*. The expiring in 2006 of the current financial framework will in the short term also necessitate re-examining the budgetary burden-sharing between the Member States. At present, the balance between contributions paid by the Member States and payments received by them determines whether a given State is a "net contributor" or a "net beneficiary". The evaluation of the benefits accruing to a Member State from the Community budget represents a major element of the Community decision-making process. In order to provide an appropriate evaluation of the benefits that each Member State draws from the European budget the proposed methodology aims at quantifying the effects of Community expenditure on the induced demand of goods and services in the various Member States. The present proposal is based on the hypothesis that budgetary flows do not represent an appropriate base to identify the real benefits arising from Community expenditure, owing namely to the existing integration between the economic systems of the Union. The payments to a country generate indeed import flows from the rest of the Union. Because of the diversity of the national industrial structures such an effect can vary greatly between Member States. To quantify fully the impact (and the relative benefits) arising from the Community payments it is necessary to combine, through an economic reclassification of the payments of the European Union to the different Member States, the analyses of budgetary flows with the typical instruments of the input-output analysis. The results of the study show that some Member States considered at present "net contributors" would actually become "net beneficiaries" if the increase in production from which they benefit was taken into account.

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1. Introduction

"To wish to benefit from the success of the Community is a very good thing. But what is quite different, and indeed highly undesirable, is constantly to try to strike a narrow arithmetical balance as to exactly how much day-to-day profit or loss each country is getting out of the Community. (...) The Community can and must be more than the sum of its parts. It can create and give more than it receives, but only if the Member States, people and governments alike, have the vision to ask what they can contribute, and not just what they can get"[2].

This statement has been made in 1977 by Roy Jenkins, at a time when the *"I want my money back"* syndrome was particularly sensitive among Member States. In spite of what Jenkins said, reality has shown that the Member States' practice of attempting to calculate the benefits accrued from EU expenditure has been developed further. The existence since 1986[3] of a mechanism of correction of budgetary imbalances granted to the United Kingdom (the so-called "UK rebate") has rendered official practice what Roy Jenkins defined "*highly undesirable*". The "Calculation method"[4] is actually enshrined in a Council of Ministers' Decision[5]. The principle of the calculation of the Member States's net positions draws thus support by an official methodology. Moreover, data on budgetary balances are regularly published by the Commission since 1998[6]. Such calculations become obviously a key element of the decision making process of the Union, especially at a time when (as it is currently the case) new financial arrangements have to be agreed among the Member States for the period from 2007 onwards.

As the Commission itself stresses, *"allocating expenditure to Member States is merely an accounting exercise that gives a very limited view of the benefits that each Member State receives from the Union (…). This accounting allocation, among other drawbacks, gives no indication of many of the other benefits gained from EU policies"*[7].

This study attempts to demonstrate that a proper macroeconomic analysis based on input-output tables as well as on trade flows between Member States may enable us to overcome the conceptual and operational drawbacks of the present methodology,

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[2] Jenkins (1977).
[3] The decision has been taken at the European Council of Fontainebleau, June 1984.
[4] European Commission working document on calculation, financing, payment and entry in the budget of the correction of budgetary imbalances, Council of the European Union, 10646/00 ADD 2.
[5] It is made reference here to the "Own Resources" Decision; see later section 3.
[6] In reality such data are calculated at least since 1995. See, European Commission (1998), annex 3, page 5.
[7] See European Commission (2003), page 2. Similar concern had been expressed by the European Court of Auditors (1998), Para. 3.29. The Berlin European Council (1999) has also recognised that *"[..] the full benefits of Union membership cannot be measured solely in budgetary terms* (See Presidency conclusions, point 68). A full statement has been made by the Commission in the Own Resources Report (1998), chapter 2, and in "Budget Contributions, EU Expenditure, Budgetary Balances and relative Prosperity of the Member States", paper presented by President Jacques Santer to the Ecofin Council of October 13, 1997.

based exclusively on budgetary flows.

2. Main features of the European budget

The European budget amounts today to approximately 100 billions EUR, i.e. around 1% of the Gross National Income (GNI)[8] of the Member States. Its size, although relatively modest, is therefore not negligible. By comparison, in 2002 the sum total of the national budgets (EU-15) reached 4 343 billions EUR, the European budget just 96 billions.

One of the peculiarities of the European budget is that it is concentrated on two main policies: the agricultural policy aimed essentially at sustaining the level of the market prices or at funding direct payments to farmers (45,7 billions EUR or 46% of the 2004 budget) and the structural actions to help less favoured areas (30,8 billions EUR or 31 % of the 2004 budget). The third main section of the European budget concerns the so-called "internal policies", among them mainly the Research and development policy (7,5 billions EUR, or 8 % of the 2004 budget). Other policies in favour of third countries, namely external and development aid and pre-accession aid, account together for 8 % of the 2004 budget.

The EU Treaty (art. 269) stipulates that the European budget is financed from "Own resources" of the Community. The "Own resources" system defines the typology of financial resources (Custom and Agricultural duties, Sugar levies, VAT resource, GNI resource and Miscellaneous revenue) as well as the overall ceiling of total resources which can be called[9]. The system, first set up by the Council Decision of April 21st 1970, has been amended several times, mainly in order to modify the burden of financing among Member States. The GNI resource, based on each Member State's Gross National Product, was introduced in 1989[10] to increase the share of contributions based on the relative prosperity of the Member States. The share of the budget financed by the GNI resource has been gradually increased by an equivalent reduction of the VAT resource. As a consequence nowadays the European budget is financed chiefly through the GNI resource (in 2004; 73,42% of total financing or 0,73% of the total estimated GNI of the Member States) and, secondly, by the VAT resource (in 2004;

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[8] The Gross National Income (GNI) is an economic macro-aggregate defined by the European system of integrated economic accounts (ESA 95). This concept is applicable since 2002 and has replaced the concept of Gross National Product (GNP).

[9] The overall ceiling of own resources is fixed at 1,24 % of the total GNI of the Member States. According to the applicable rules, Revenue and Payment appropriations must balance each other. This means that expenditure cannot go beyond this limit. For example, the amount of own resources needed to finance the 2004 budget is the equivalent of 0,98 % of the EU-25 GNI or 99,72 billions EUR. The 2005 budget is estimated (May 2004) to the equivalent of 1,03 % of the EU-25 GNI or 108, 55 billions EUR.

[10] At the time called the GNP resource.

14,36% of total financing or 0,32 % of the total estimated VAT national assessment basis of the Member States).

It should be pointed out that the resources financing the European budget are not administered nor fixed *de facto* in an autonomous way by the Community but rather by the Member States. The European budget's financing is provided by a decision which has first to be unanimously adopted by the EU Council of Ministers and, to come into force, needs to be ratified by the Member States according to their own constitutional rules. The "Own resources" decision[11] constitutes in practice a "treaty" within the EU Treaty. By their nature the "Own resources" therefore aim not at providing a genuine "European" income, but simply to finance the expenditure foreseen in the budget. As the European budget is financed through national contributions Member States feel legitimated to calculate the benefits accruing from it.

3. The concept of "excessive budgetary imbalance"

Almost immediately after the accession of the United Kingdom to the European Union in 1973, the UK Government raised the problem of capping of its contribution to the European budget[12]. It argued that the United Kingdom was contributing excessively to the EU budget in comparison to the EU expenditure in its favour, and this for two main reasons. Firstly, the huge share of the agricultural expenditure in the total budget was considered to be the principal factor of the imbalance. The second reason invoked was the relatively higher United Kingdom's share in the VAT base compared to UK share in the total GNP of the Community, at a time when the VAT resource was providing a large part of the financing of the European budget[13].

A large agricultural expenditure being considered an inherent characteristic of the European budget, the UK Government tried to obtain an equally permanent mechanism to reduce its contributions. After several attempts to find a solution[14], UK obtained as from 1986 a mechanism reducing its contributions to the European budget[15].

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[11] Currently the decision 2000/597/EC/Euratom of 29.9.2000.

[12] This issue was at the heart of the debate when, in 1975, the UK Government decided to hold a referendum to confirm its accession to the EU.

[13] Readers are reminded that the GNP resource was introduced in 1989.

[14] A first mechanism was applied between 1976 and 1980. A partial reimbursement of UK VAT based contributions would have been applied depending on three conditions to be met simultaneously, GDP per capita less than 85% of the Community average, growth rate less than 120 % of the Community average, UK contributions higher than 10% of its share of the Community GDP. No payments were actually made on this basis while between 1981 and 1984 the United Kingdom received a compensation through special measures in its favour. A reduction of 1 billion EUR in the UK VAT contribution was granted for 1985.

[15] The new mechanism presented two main differences if compared to the period pre-1986. It was enshrined in the "Own resources" Decision and assumed therefore in practice the nature of a permanent mechanism whose modification in the future would necessitate the agreement of the United Kingdom's Government. Secondly, the mechanism was not anymore a "lump sum" as between 1981and 1985, to be negotiated each year with the other Member States. Being a proportional and automatic mechanism it represented for the

The principle of the rebate, still applicable today, consists in reducing the negative budgetary balance of the United Kingdom by two thirds[16]. The imbalance is calculated multiplying by the total of "allocated expenditure"[17] the difference between the share of the United Kingdom in the VAT-GNI[18] payments to the budget and that country's share in "allocated expenditure". The historical application of the "UK rebate" and its substantial effect in reducing UK contributions are shown in the table below .

Table 1. **Financial impact of the "UK rebate"** (Mio EUR, average 1999-2002)

Theoretical UK VAT-GNP resources	UK rebate	Share of UK rebate in theoretical UK resources (%)
12 744	4 817	37,8

Source: European Commission's reports allocating EU operating expenditure to the Member States

Although indicating that *"Expenditure policy is ultimately the essential means of resolving the question of budgetary imbalances"*, the Fontainebleau's European Council also established the principle 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"*.

Despite its theoretical application *erga omnes*, the concept of "excessive" burden has not been defined by specific rules. The eventual benefit of a rebate is examined on a case by case basis. Its application is founded on the agreement of the other Member States[19] which, as a consequence, would have to increase correspondingly their own contributions. Despite specific requests by several Member States[20], the rebate has thus been applied in practice only in favour of the United Kingdom. Its general extension to other "net contributors" would have implied a huge - more than fourfold - increase of the rebates[21]. Moreover, as Member States benefiting of the rebate do not participate to

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United Kingdom a guarantee to limit the effects of any future increase of the European budget.

[16] The actual definition of the "UK rebate" is provided for by article 4 of Council decision 2000/597/EC/Euratom of 29.9.2000. The establishment of the ceiling for the rebate at two thirds of the negative balance is purely conventional, and in a way arbitrary.

[17] "Allocated expenditure" is nothing else than the result of the allocation to the Member States of all EU expenditure which can be attributed to one of them (in practice: Agriculture, Structural measures, Internal policies including Research and Administrative expenditure). Therefore, the definition of "allocated expenditure" excludes External expenditure as well as any expenditure benefiting recipients outside the European Union. Adjustments are applied to neutralise the advantage for United Kingdom of the increase in the percentage of custom and agricultural duties and sugar levies (from 10 % to 25 %) retained by the Member States since 2001. Similarly, total "allocated expenditure" is reduced by an amount equal to pre-accession expenditure in the Acceding countries in the last year before enlargement. "Allocated expenditure" represented in 2002 around 91 % of total EU budget expenditure.

[18] Custom and other duties and levies are not taken into account as a national contribution, as they result from common policies and belong therefore to a level of governance higher than that of the State which collects them.

[19] This means in practice a modification of the "Own resources" decision, which requires unanimity.

[20] In early 1998 Germany, Austria, Sweden and the Netherlands made such a request.

[21] On the basis of the same parameters applied to the United Kingdom the same rebate could have been granted in 1998 to Germany, France, Italy, Austria, Netherlands and Sweden. This would have generated an

its financing, a linear application of the “UK rebate” rules would have implied that these huge rebates were to be born by the less favoured Member States. This is also the reason why other ways of reducing the financial burden of certain Member States have been found[22].

In an attempt to manage worries from both kinds of Member States - "net" beneficiaries as well as "net" contributors - the Commission has just proposed[23] a generalised correction mechanism, calculated on the basis of the net budgetary balance of each Member State. To satisfy "net" contributors Member States a rebate would be applicable if net contributions exceed 0,35% of each country's GNI, this threshold representing a kind of "reasonable net contribution" (contributions above this would be refunded at a rate of 66%). On the other side, the total volume of corrections would be limited to 7,5 billion EUR a year (financed by all Member States based on their relative share of GNI), thus insuring "net" beneficiaries Member States (which do not benefit of the rebate) against excessive costs of the mechanism. However, although the likely Member States' "net" balances have been projected by the Commission against various future financing scenarios, the concept of "imbalance" continues to be based on payments from and to Member States. The inherent drawbacks of such a concept, illustrated in section 5 of the study, would therefore apply also to such a new mechanism. Moreover, correcting budgetary imbalances through ad hoc mechanisms essentially amounts to refusing to intervene directly on the sources of the imbalances.[24]

4. The share of the financial burden falling on Member States and their budgetary balances

As most of the financing of the European budget derive from the VAT and GNI resources, the “financial” burden is shared among Member States basically in function of their part in the total GNI and, to a lesser extent, on the basis of their final consumption liable to VAT. The exception to this principle is precisely the “UK rebate”.

Table 2 shows the biggest contributors' share in the financing of the Budget while Table

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increase from 2,9 billions (UK sole beneficiary) to 12,4 billions EUR (UK and the other six Member States), as it has been calculated by the European Court of Auditors (1998), par. 3.27. See also European Commission (1998), page 33.

[22] For example, the progressive reduction in the financing of the weight of the VAT resource and the establishment and continuous increase of the GNI resource; a different share among Member States for the financing of the "UK rebate"; the increase from 10 % to 25 % of the collection costs for custom and agricultural duties and sugar levies. All these measures were meant to contribute to the reduction of the share in the financing of the budget of Germany and other "net contributor" countries. See Cipriani-Maré (2003), points 3.1.3, 3.1.4 and 3.1.6.

[23] European Commission Own Resources Report (2004), sections I (pages 6-8) and II (pages 25-40)

[24] See European Commission (1998), page 19.

3 indicates their Gross Domestic Product (GDP). The different years have been selected in order to show the situation obtaining when the principle of a rebate in favour of the United Kingdom was decided (1975) and when the present mode of calculation was first applied (1986) as well as the last year available for both the ratio of financing and the GDP data (2003).

Table 2. **Expenditure and financing of the European budget**

Years	Total EU expenditure (Mio EUR)	% Agriculture expenditure[25]	% of Total financing[26]				
			Germany	France	Italy	UK	Others
1975 (1)	6 411,2	75,2	28,1	22,8	17,5	13,6	18,0
			11,2	12,7	7,6	0,0	36,5
1986 (2)	34 192,8	64,7	26,2	20,7	14,2	14,5	24,4
			17,6	15,8	10,6	7,8	48,2
2003 (3)	88 799,4	44,7	23,0	18,1	14,1	11,9	32,9
			20,2	16,9	12,7	9,4	40,8

Source: European Court of Auditors, Annual reports for the years concerned; Commission, Budgetary Vade-mecum 2000 and Accounts for 2003. (1) EU 9 Member States. (2) EU 12 Member States. (3) EU 15 Member States.

Table 3. **Gross Domestic Product (GDP) of major Member States**

Years	GDP (Mrd EUR)					*% of Total EU GDP*				
	Germany	France	Italy	UK	Others	Germany	France	Italy	UK	Others
1975 (1)	344	284	172	189	166	*29,8*	*24,6*	*14,9*	*16,4*	*14,3*
1986 (2)	928	755	616	568	755	*25,6*	*20,8*	*17,0*	*15,7*	*20,8*
2003(3)	2 136	1 548	1 301	1 573	2.723	*23,0*	*16,7*	*14,0*	*16,9*	*29,4*

Source: European Commission, Directorate-General for Economic and Financial affairs. (1) EU 9 Member States. (2) EU 12 Member States. (3) EU 15 Member States.

Table 2 indicates also (column 3) the share of the agricultural expenditure in the total budget, as the huge proportion of agricultural expenditure in the European budget was at the time a key argument used to explain the imbalance against the United Kingdom, a country predominantly industrial and with a relatively reduced agricultural activity, and therefore justifying the rebate in its favour.

The following conclusions can be drawn from Tables 2 and 3:

1. Thanks to the "UK rebate" the United Kingdom's share of the financial burden is substantially lower than its share in the Gross Domestic Product of the European Union. This is particularly true if one looks to its share in the VAT/GNI resources;

[25] European Agricultural Guidance and Guarantee Fund (EAGGF) - Guarantee Section.
[26] The first row relates to all own resources, the second row only refers to own resources other than Custom and Agricultural duties and levies (i.e., VAT and GNP/GNI resources).

2. The share of agricultural spending in the EU budget has substantially decreased over the years. One of the main arguments behind the “UK rebate” is therefore no longer applicable;
3. In 2003 Germany’s share of VAT/GNI resources is almost double that it was in 1975. A substantial increase of the same size is noted for Italy and France. If compared to the 1975 GDP however, Germany’s share in the EU GDP has largely decreased (despite the reunification). France also records a large decrease, while Italy’s share of the EU GDP in 2003 is not very different from that of 1975.

Since it provides a balance between contributions paid by the Member States and payments received, the allocation of the EU expenditure made in the frame of the "UK rebate" represents in a way the "official" reference to define winners and losers in the framework of the European Budget. It is on this basis that the Members States consider themselves (and are conventionally considered) "net contributors" or "net beneficiaries". The definition used to this purpose is that of “operating expenditure”, which is an ancillary definition of "allocated expenditure" and differs from the latter in that it omits administrative expenditure relating to EU institutions (around 5 billions EUR yearly, or 6% of the total expenditure). The following table shows the average “operating expenditure” in the last four years for which information is available.

Table 4. **Operating expenditure allocated to major Member States**
(Mio EUR, average 1999-2002)

	Germany	%	France	%	Italy	%	UK	%	Others	%
Agriculture	6 036	15	9 366	23	5 191	13	3 999	10	16 739	40
Structural Measures	3 533	14	2 035	8	3 361	13	1 664	7	14 396	58
Internal policies	887	18	643	13	556	11	684	14	2 240	45
Research	*528*	*18*	*403*	*14*	*385*	*13*	*492*	*17*	*1 156*	*39*
TOTAL	10 456	15	12 044	17	9 108	13	6 347	9	33 375	47

Source: European Commission’s reports allocating EU operating expenditure to the Member States

As previously indicated, the large agricultural expenditure share was one of the main arguments behind the introduction of the "UK rebate". One should note that not only the agricultural spending share of the Budget has substantially decreased during the last decade (see Table 2), but also that the United Kingdom’s share of EU agricultural spending is far from being negligible (10 % of the total), only a few percentage points behind Italy's (13 %). Further, the United Kingdom receives from agricultural spending a larger part of its "operating expenditure" than the other Member States (62 % against 58 %).

The Table above also shows that among the Member States examined Germany records the highest share in both Structural measures and Internal policies. By contrast the United Kingdom has the lowest share in Structural measures, close to that of France. In conclusion it is largely thanks to agricultural spending that France records the overall highest share among the major Member States.

Finally, Table 5 indicates the net balance for major Member States, expressed as an average of the past four year's outturn. It appears that although all Member States considered pay more than they receive from the European Budget, the "deficit" shown by Germany is in proportion markedly higher.

Table 5. **Net balances of major Member States**
(Mio EUR, average 1999-2002)

Countries	MS VAT-GNP resources paid	EU operating expenditure	Balance	MS VAT-GNP/ EU VAT-GNP (%)	MS Operating expenditure/ EU Operating expenditure (%)
Germany	17 125	10 456	- 6 669	24,8	14,9
France	12 885	12 044	- 841	18,7	16,5
Italy	9 907	9 108	- 799	14,4	12,8
United Kingdom	7 927	6 348	- 1579	11,5	9,1

Source: European Commission's reports allocating EU operating expenditure to the Member States

5. Conceptual drawbacks and inadequacies of a method based on budgetary balances

As previously indicated, the difference between budget contributions and budget expenditure by each Member State tends to misrepresent the benefits from EU membership. The Commission itself listed a series of reasons for which conventionally measured budgetary balances fail to adequately represent the benefits of EU membership, ending up with results that are not uncontroversial [27]. These reasons can be summarized as follows.

a) Given the diversity of circumstances and productive structures among Member States, a given EU expenditure will not result in the same economic benefits for all the Member States. This happens for instance in the case of the agricultural policy's goals (adequate level of production, at a reasonable cost to consumers, while ensuring a fair standard of living for the agricultural community and safeguarding the future of rural areas).
b) Moreover, EU expenditure only registers the amounts used, for example, to fund agricultural market support measures or payments of direct aid to farmers. The

[27] See the Commission Own Resources Report (1998), chapter 2 and annex 3 and the Commission's reports on allocation of "operating expenditure".

benefits gained, and the costs incurred, by producers and consumers in the Member States are largely due to factors which for obvious reasons go unregistered in the EU budgetary accounts. These factors, which are often very difficult or impossible to quantify, are the flow of income from consumer to producer both within and between Member States, the benefits derived from stability of price and security of supply, the effects of the EU subsidies on the allocation of productive resources.

c) Around one third of the agricultural spending is devoted to market support measures. However, those measures are supposed to benefit all countries and not only the ones receiving the payments from the European budget.

d) Structural expenditure accruing to one Member State has also important spill-over effects, reflecting largely the enhanced interdependence characterising the EU. Financing projects in less favoured areas generates production of goods and services in other areas[28]. For example, as service activities have a high potential for implying providers in countries other than the recipient of the payment, it is highly relevant that around half of the almost 200 billions EUR for Structural actions (programming period 2000-2006) are supporting service activities.

e) The greatest economic benefits of the Internal Policies are likely to relate to economic integration. The present high level of economic integration in the EU has been fostered by a series of policies such as customs union, common trade policy, internal market, competition policy and co-ordination of macroeconomic policies. Yet spending programmes related to these policies only represent about 8 % of total EU operating expenditure in 2002. The limited usefulness of measuring benefits from EU membership in budgetary terms alone is highlighted by the disparity between the budgetary cost of these policies (and, consequently, their effect on the budgetary net positions of the Member States) and their impact in terms of growth and employment.

The methodologies based on budgetary balances furthermore do not take into account important "financial" aspects.

f) The method is based on the calculation of a balance between two sets of data conceptually different. While VAT and GNI resources are financed through general taxation by all taxpayers, a similar parallelism does not exist for the payments made from the European budget to a given country. The fact that European budget resources are channelled predominantly into two main policies reduces at the same time the number of potential direct beneficiaries. In terms of "financial" flows these

[28] The second interim Commission's report on economic and social cohesion (COM (2003) final of 30.1.2003, page 15) indicates concerning expenditure related to Objective 1 that there are substantial effects outside the eligible areas. It is estimated that due to the single market one quarter of the expenditure will be employed in other areas, and almost 1/10 even outside the EU.

latter are substantially fewer than the "taxpayers"[29].

g) Payments are normally allocated to the Member State in which the principal recipient resides. This is not a guarantee that the payment benefits to the country of residence. For example, agricultural expenditure on exported goods may be recorded as allocated to the Member State from which goods are exported, when in fact the ultimate beneficiaries are the producers in other Member States. A similar situation can arise for research contracts, often implemented by several partners while, for the purpose of allocating the "operating expenditure", the payment is totally attributed to the partner heading the consortium.

The methodology proposed in this paper does not solve all the foregoing problems, but it faces mainly those items under a) – d).

6. Estimating economic benefits accruing from EU expenditure: a methodology based on the increase in the demand of goods and services

We believe that the benefits which each Member State derives from the EU budget could be estimated in a more comprehensive way, avoiding the conceptual and operational drawbacks of the present methodology. The starting point is that each unit of (European) expenditure generates, somewhere (within/outside the EU), a given quantity of production (goods and/or services). This induced production can be further divided by type (agriculture, industry, services, building) and can be assumed as a proxy of the benefits for each EU Member State (and, indeed, for States outside the EU). For this exercise we used basically two tools, the input-output data of the Member States and the actual expenditure they received from the European budget.

The proposal aims to develop a methodological framework to evaluate the global benefits caused by the European Union expenditure to each Member State. The main characteristics of this methodology are:

- clearly specified hypotheses,
- a methodology founded on an economic background largely accepted, and
- an algorithm which is completely standardised.

Furthermore, in this evaluation the main methodological tool is the input-output analysis. An input-output model is essentially a simplified general theory of production; it explains the magnitudes of the inter-industry flows in terms of the levels of production in each sector. This model is based on the premise that it is possible to divide all economic productive activities into sectors whose interrelations can be meaningfully expressed in a set of simple input functions. It is not sufficient to consider

[29] It is mainly for this reason that in 1998 the Commission indicated, among other possible "European" taxes, a tax to be paid by agricultural producers.

only one economic system described in terms of interdependent industries; it is also necessary to combine several national models into a larger economic unit[30].

The proposed methodology is directly operative as it will be illustrated in concrete terms by giving an example applied to 15 EU countries.

6.1. *The basic model*

In order to evaluate the impacts of EU expenditure on the Member States' economies it is necessary to estimate the global benefits caused by such expenditure. In this study only the expenditure having an effect on production level has been considered. In this section the methodology is exposed in a descriptive way, while the formal demonstration of the basic concepts is illustrated in Annex 1.

Basically we assume that the EU gives a contribution *X* to the country *Y* in order to increase the production level of sector *Z* of economic activity (see par. 6.2.3). At this stage it is essential to identify the economic sector (*Z*) on which the EU expenditure (*X*) weighs; it is therefore necessary to classify the EU budget in a way consistent with the economic classification. In order to evaluate the global impact on national economy it is necessary to estimate the quantity of additional production of *Z* activated by *X*.

In general, the global benefit of EU expenditure (*B*) can be defined by the equation $B = PI + PE$, where *PI* and *PE* represent the amount of domestic and foreign production due to *X*. With this information it becomes possible to follow the main stages of the procedure:

The EU gives a contribution in order to increase the production of a particular sector of activity in a specific country;

Such amounts cause an increase of production (*PI*) both in the specific sector and in all the other economic activities interrelated with the previous one. The increase of production causes an increase in the imports (*PE*) required to produce *PI*. $PI + PE$ represent the total benefits; *PI* however is the domestic benefit while *PE* is the foreign component and must be imputed to other countries.

From a statistical point of view, the main difficulty concerns estimating the two amounts *PI* and *PE*. Such an estimate must be realised using a data set with a high degree of reliability and comparability among the EU Member States. We can find both these characteristics in Eurostat's "input-output database".

The input-output model summarises all the transactions that characterise an economic system. It is a matrix in which the horizontal rows show how the output of each sector of the economy is distributed among the others. Conversely, the vertical columns show how each sector obtains from the others its needed input of goods and

[30] See Leontiev (1966), Chenery (1959).

services. A simplified input-output matrix is showed in Figure 1.

Using the input-output table columns it is, in fact, possible to know the values of input needed to produce output *Z*. In formal terms this can be represented by the equation $Z_i = C_{i1} + C_{i2} + ... + C_{in} + VA_i$; where: C_{i1}, C_{i2}, ..., C_{in} are the values of input used (goods and services purchased) to produce *Z* and *VA* is the value added that correspond to the total payments for primary inputs (capital stock, labour and land). The inputs used in this production (C_i) can be produced in country Y (CI_i), in EU countries (CUE_i) or finally in extra EU countries (CEU_i). Therefore, the previous equation can be written as

$$Z = (CI+CUE+CEU)_{i1} + (CI+CUE+CEU)_{i2} + ... + (C+CUE+CEU)_{in} + VA_i \qquad [1]$$

Figure 1 **A simplified input-output matrix**

		INDUSTRY PURCHASING					
		Agriculture	Industry	Services	Intermediate consumption	Final demand	Total output
INDUSTRY PRODUCING	Agriculture	CI_{11}	CI_{21}	CI_{31}	$CI_{.1}$	D_1	Z_1
	Industry	CI_{12}	CI_{22}	CI_{32}	$CI_{.2}$	D_2	Z_2
	Services	CI_{13}	CI_{23}	CI_{33}	$CI_{.3}$	D_3	Z_3
	Total costs	$CI_{1.}$	$CI_{2.}$	$CI_{3.}$	$CI_{..}$	$D_.$	Z
	Value added	VA_1	VA_2	VA_3			
	Total output	Z_1	Z_2	Z_3			

It is now evident that each increase in *Z* production determines, *coeteris paribus*, an increase in inputs C_i (because Z_i production needs more resources). These additional resources can come from domestic (CI_i) or foreign production (CUE_i or CEU_i).

In this study we assume that EU expenditure (*X*) in a particular sector of activity causes an increase of production in the same sector. Using the input-output model, by extending equation [1] it becomes therefore easy to calculate both the domestic and foreign results due to *X*. These results represent the total benefits (*B*) and are measured in terms of additional domestic (*PI*) and foreign (*PE*) production. In this way we can quantify not only the benefits in country *Y*, but also the benefits in the whole EU expressed in terms of imports of EU goods and services in country *Y*. We can furthermore split both the domestic and the foreign benefits in "direct" and "indirect". The former are produced in a shorter period than the latter.

In order to analyse more in depth the relationship among the EU countries we need to split between EU and extra EU countries the amount of foreign benefits. We have further to assign to each Member State a share of EU foreign benefits. In order to do this it is necessary to know import-export flows among the EU Member States and between the whole of the EU and all other countries. A specific Eurostat database

allows us to group the import-export flows in this way and then to identify from which country *Y* purchases the inputs needed to produce *Z*.

Taking simultaneously into account the input-output data set and the import-export database we can locate the total imports of each country and, consequently, the benefits produced by such imports in the various EU Member States.

6.2. *The main characteristics of databases*

6.2.1 Input-Output tables

As a starting point of the analysis we use Eurostat's "input-output database". This database contains harmonised input-output tables concerning the EU Member States as well as producing tables (as complete as possible) for the EU as a whole. This work has been regularly carried out since the early Sixties, according to the five-yearly input-output programme defined in co-operation with the national statistical offices (NSO). The input-output system of Eurostat includes detailed information for a given year on production activities, supply and demand of goods and services, inter-industry transactions, primary inputs and foreign trade. The economy is broken down into various branches (agriculture, industry, services), clearly presenting thus the interdependencies between economic variables. Transactions in goods and services are broken down by:

- supplier and user,
- type of use (intermediate or final)
- geographical origin and destination.

Input-output tables also show the cost structure of production activities (intermediate inputs, compensation of labour and capital, taxes on production). The tables supplied within this database are harmonised with reference to the European System of Integrated Economic Accounts (ESA), which is the Community version of the United Nations' System of National Accounts (SNA)[31]. Although differences in statistical sources and methods still exist among the EU Member States, the adoption of the ESA's common definitions and common classifications allows a high degree of comparability. The analysis has been carried out with reference to 1995 because this was the most recent year for which there was a complete input-output data set for 10 Member States[32].

In order to use the import flows in an input-output model we need to split the total import flows between final and intermediate uses. In fact, in this analysis the attention is focussed on import flows used in the domestic production process. To this

[31] Eurostat (1995), UN (1993).
[32] For France, Greece, Ireland and Portugal only the 1991 input-output data are available.

end have been used the symmetric input-output tables both for internal production and for imports. Furthermore, the imports of intermediate goods and services have been split by countries of origin using the database on the statistics of trade (see par. 6.2.2).

6.2.2.Statistics on trade

We use the Eurostat database on the external trade. This database records for each Member State, with reference to the years 1998-2001, the import-export flows broken down by 48 sectors of economic activity and by country of origin. The classification of economic activities of this database is analogous to the input-output classification; the two databases can thus be easily matched.

Tables 6 shows the cross classification of imports by country of origin and destination. In particular the volume of imports is shown in table 6a and the shares of imports coming from each country on the total imports of the country of destination are listed in table 6b.

Tables 6a and 6b highlight the importance of the trade among the EU-15 Member States and corroborate the hypothesis that the operational expenditure of the EU going to a given Member State benefits all other Member States (see section 5).

6.2.3 EU expenditure

The definition of EU expenditure used corresponds to that of " operating expenditure" within the meaning of the exercise carried out annually by the Commission for the purpose of calculating the "UK rebate" [33].

[33] See footnote 17. "Operating expenditure" equals "Allocated expenditure" less EU Institutions' administrative expenditure.

Table 6a. **Volume of imports classified by country of origin and destination, EUR*1.000, average 1998-2001.**

Countries of destination	Country of origin														
	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Belgium	0	1 700	32 705	1 130	6 077	32 257	1 028	11 084	3 992	20 726	2 034	1 318	983	2 588	17 617
Denmark	909	0	8 922	376	1 304	2 911	668	1 832	30	2 123	439	278	2 083	5 599	4 222
Germany	33 402	10 673	0	4 495	27 791	68 086	3 553	46 285	3 019	39 088	34 897	6 112	5 722	12 320	46 582
Greece	313	102	1 621	0	385	629	37	1 320	3	331	111	91	70	127	779
Spain	3 756	756	15 085	1 202	0	23 610	644	11 347	211	4 728	907	11 841	460	1 056	11 211
France	25 878	2 909	50 416	2 199	30 324	0	2 427	29 508	1 642	12 308	3 042	4 480	1 435	4 137	29 753
Ireland	8 207	622	10 781	280	2 440	5 699	0	3 579	51	3 844	432	273	336	1 213	15 315
Italy	7 844	2 087	34 426	4 230	15 452	31 386	1 055	0	218	6 220	5 491	2 979	1 174	2 230	16 345
Luxembourg	1 183	61	2 113	22	349	2 559	15	829	0	510	154	89	53	110	493
Netherlands	33 613	3 489	56 887	1 936	8 366	25 312	2 035	14 946	652	0	3 616	2 015	2 415	4 634	24 167
Austria	1 245	553	21 515	281	1 915	3 492	166	6 549	117	1 477	0	301	425	738	3 000
Portugal	1 740	328	5 091	97	4 971	5 070	124	1 247	25	1 175	185	0	149	362	2 687
Finland	1 256	1 319	5 187	377	1 307	2 384	324	1 907	16	2 071	698	243	0	3 692	4 465
Sweden	4 539	5 971	9 174	535	2 396	4 625	459	3 621	57	4 550	1 044	508	5 071	0	7 421
United Kingdom	15 881	4 129	35 655	1 610	12 072	27 669	21 355	13 691	512	18 165	1 982	2 337	2 260	6 159	0
Total	139 766	34 699	289 577	18 770	115 148	235 688	33 891	147 745	10 543	117 316	55 033	32 865	22 635	44 964	184 056

Table 6b. **Shares of imports coming from each country on the total imports of the country of destination, average 1998-2001**

Countries of destination	Country of origin														
	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK
Belgium	0,0%	4,9%	11,3%	6,0%	5,3%	13,7%	3,0%	7,5%	37,9%	17,7%	3,7%	4,0%	4,3%	5,8%	9,6%
Denmark	0,7%	0,0%	3,1%	2,0%	1,1%	1,2%	2,0%	1,2%	0,3%	1,8%	0,8%	0,8%	9,2%	12,5%	2,3%
Germany	23,9%	30,8%	0,0%	23,9%	24,1%	28,9%	10,5%	31,3%	28,6%	33,3%	63,4%	18,6%	25,3%	27,4%	25,3%
Greece	0,2%	0,3%	0,6%	0,0%	0,3%	0,3%	0,1%	0,9%	0,0%	0,3%	0,2%	0,3%	0,3%	0,3%	0,4%
Spain	2,7%	2,2%	5,2%	6,4%	0,0%	10,0%	1,9%	7,7%	2,0%	4,0%	1,6%	36,0%	2,0%	2,3%	6,1%
France	18,5%	8,4%	17,4%	11,7%	26,3%	0,0%	7,2%	20,0%	15,6%	10,5%	5,5%	13,6%	6,3%	9,2%	16,2%
Ireland	5,9%	1,8%	3,7%	1,5%	2,1%	2,4%	0,0%	2,4%	0,5%	3,3%	0,8%	0,8%	1,5%	2,7%	8,3%
Italy	5,6%	6,0%	11,9%	22,5%	13,4%	13,3%	3,1%	0,0%	2,1%	5,3%	10,0%	9,1%	5,2%	5,0%	8,9%
Luxembourg	0,8%	0,2%	0,7%	0,1%	0,3%	1,1%	0,0%	0,6%	0,0%	0,4%	0,3%	0,3%	0,2%	0,2%	0,3%
Netherlands	24,0%	10,1%	19,6%	10,3%	7,3%	10,7%	6,0%	10,1%	6,2%	0,0%	6,6%	6,1%	10,7%	10,3%	13,1%
Austria	0,9%	1,6%	7,4%	1,5%	1,7%	1,5%	0,5%	4,4%	1,1%	1,3%	0,0%	0,9%	1,9%	1,6%	1,6%
Portugal	1,2%	0,9%	1,8%	0,5%	4,3%	2,2%	0,4%	0,8%	0,2%	1,0%	0,3%	0,0%	0,7%	0,8%	1,5%
Finland	0,9%	3,8%	1,8%	2,0%	1,1%	1,0%	1,0%	1,3%	0,1%	1,8%	1,3%	0,7%	0,0%	8,2%	2,4%
Sweden	3,2%	17,2%	3,2%	2,8%	2,1%	2,0%	1,4%	2,5%	0,5%	3,9%	1,9%	1,5%	22,4%	0,0%	4,0%
United Kingdom	11,4%	11,9%	12,3%	8,6%	10,5%	11,7%	63,0%	9,3%	4,9%	15,5%	3,6%	7,1%	10,0%	13,7%	0,0%
Total	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Source: Eurostat database on external trade.

"Operating expenditure" is allocated by the Commission to three main budgetary areas: agriculture, structural actions and internal policies. As the level of the expenditure for a given Member State can be influenced by the implementation of a particular financial year we took the average of the "allocated operating expenditure" for the years 2000-2001-2002. For the purpose of identifying a direct link between the type of expenditure and the type of production directly generated (agriculture, services, industry, building) we have treated these three fields as follows:

- We have deducted from the "allocated operating expenditure" for Agriculture the part relating to budgetary lines like "set-aside" or "early-retirement" which are more of a subsidy than of an incentive to product. Other budget lines have been excluded due to the difficulty of allocating them to one of the four sectors of production selected. The part finally deducted equals 6,6 % of the total allocated expenditure for this section. The rest of the budget lines have been attributed to one of the four sectors of production according to the type of production that each kind of expenditure is likely to generate. The expenditure has been attributed to the Member States according to the budgetary implementation (average 2000 to 2002).
- Concerning expenditure for Structural actions we were forced to choose a different procedure, since the budgetary implementation does not allow the necessary detailed analysis to attribute the expenditure to a sector of production. We have therefore assumed that we could apply to this part of the operating expenditure the typology of interventions financed for the period 2000-2006. On this basis we have divided by sector of production the operating expenditure by Member State. A small part of the total has been excluded (1,1 %), either because of its subsidy nature or due to difficulty of attribution.
- As far as the internal policies part is concerned, we have assumed that the total was to be attributed to the input of production of services. Each Member State' part in this section of the "operating expenditure" has then been attributed consequently.

Table 7 illustrate the result of this apportionment. Ultimately, 68,5 billions of Euro have been allocated to the Member States (EU-15), among the four sectors of production. This amount represents around 96 % of the total average operating expenditure for the years concerned.

6.3. *The results of the estimate*

To shed light on the theoretical arguments mentioned above, we would now describe an application of the procedure to 15 countries of the EU. As starting point we take EU expenditure towards each Member State as showed in table 7, split into the four macro-sectors of economic activity: agriculture, service, industry and building.

Table 7 **Apportionment of EU operating expenditure among Member States**
(Mio EUR, average 2000-2002)

Sector of economic activity	B	DK	D	EL	E	F	IRL	I
Excluded	49,8	76,2	503,6	152,1	509,8	763,7	71,6	330,0
Agriculture	817,9	1 111,0	5 397,0	2 290,7	5 318,4	8 086,5	1 436,8	4 780,4
Services	883,0	227,1	2 829,3	1 005,1	3 199,7	1 774,8	429,4	1 957,3
Industry	107,6	33,3	819,5	584,2	1 505,7	563,5	205,4	1 111,3
Building	35,4	2,2	1 107,6	1 289,4	2 697,2	584,5	341,3	974,5
TOTAL	1 893,67	1 449,76	10 657,03	5 321,55	13 230,73	11 772,96	2 484,53	9 153,39

Sector of economic activity	L	NL	A	P	FIN	S	UK	Total	%
Excluded	0,8	48,4	40,2	53,5	67,2	79,0	286,2	3 032,1	4,2
Agriculture	23,8	1 044,7	891,1	727,8	595,1	706,7	3 508,0	36 735,9	51,4
Services	82,1	540,7	310,5	1 137,5	315,7	295,0	2 202,2	17 189,2	24,0
Industry	1,8	133,0	52,9	452,7	46,9	49,6	260,2	5 927,4	8,3
Building	5,1	35,3	141,6	973,1	161,5	32,0	273,4	8 654,2	12,1
TOTAL	113,63	1 802,14	1 436,21	3 344,63	1 186,37	1 162,19	6 530,09	71 538,9	100,0

Source: European Commission, Budgetary accounts for the years concerned; Reports allocating EU operating expenditure to the Member States; Structural actions programmes 2000-2006

In Table 8 the results of the estimates are presented for each country. The total increase in internal resources (or total internal result) induced by the EU expenses is shown in the second column of Table 8, while in the following column we can find the domestic benefits, namely the increase of internal production generated by EU expenditure. The fourth column shows the foreign imports necessary to increase the internal production. These imports are split among the countries of origin. In the last two columns, in particular, we can find the breakdown of imports within EU-15 and from outside EU-15 countries. Imports coming from EU-15 countries amount to 4 654 Mio EUR, while the imports from outside EU-15 equal to 4 148 Mio EUR. It is interesting to note that, while total imports from EU-15 are greater than the imports from outside this area, in some cases (France, Ireland, Sweden and United Kingdom) EU expenditure generates a higher value of production outside EU-15 countries as compared to EU countries.

In order to shed light on the difference between the internal results and the total benefits, it could be useful to analyse the results obtained for a specific country (e.g. France). In this case the increase in total internal results equals 21 277 Mio EUR, but this amount does not represent the domestic benefits (named PI in par. 6.1) induced by the EU expenditure, because it is necessary to subtract the value of imports (1 626 Mio EUR) that represent the output of other countries. The domestic benefits for France are therefore equal to 19 651 Mio EUR.

Table 8. **Analysis of total benefits induced by the EU expenditure in 15 Member States (Mio EUR).**

Countries	Total increase in internal resources	Domestic Benefits	Benefits caused in other countries	B	DK	D	EL	E	F	IRL	I	L	NL	A	P	FIN	S	UK	Intra Eur 15	Extra Eur 15
Belgium	3 477	3 144	334	0	4	49	2	12	60	1	15	8	52	3	2	1	3	24	237	97
Denmark	2 607	2 359	248	4	0	45	3	8	13	3	11	0	9	2	2	7	28	21	157	91
Germany	18 260	17 123	1 138	61	24	0	16	52	114	5	74	7	92	77	8	9	21	66	626	512
Greece(*)	8 626	7 848	778	36	4	38	0	54	94	1	71	0	26	3	9	1	4	53	395	383
Spain	24 139	22 855	1 284	38	11	135	11	0	207	5	106	2	53	8	160	5	12	103	857	427
France(*)	21 277	19 651	1 626	148	7	137	8	81	0	8	114	5	56	8	16	4	12	123	727	899
Ireland(*)	5 416	4 911	504	15	2	28	1	9	16	0	11	0	9	1	1	4	3	74	175	329
Italy	15 080	14 064	1 017	37	7	155	20	65	125	4	0	1	32	24	9	3	8	55	546	471
Luxembourg	N.C	N.C	N.C.	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C	N.C
Netherlands	3 188	2 948	240	28	3	48	1	8	20	1	9	0	0	4	1	2	4	19	148	92
Austria	2 173	2 022	151	2	1	41	1	6	6	0	14	0	3	0	1	1	1	5	83	68
Portugal(*)	6 979	6 450	528	8	2	29	1	83	26	1	16	0	13	1	0	6	2	19	208	320
Finland	2 037	1 942	96	3	7	14	1	7	6	1	5	0	7	2	1	0	18	9	81	15
Sweden	1 810	1 671	139	3	9	8	1	4	5	0	4	0	5	1	1	10	0	7	58	82
United Kingdom	12 162	11 443	719	27	7	69	5	34	65	51	30	1	39	7	6	4	10	0	356	363
Total	127 233	118 431	8 802	412	89	795	72	423	757	85	480	24	397	140	215	59	126	578	4.654	4.148

(*) Due to the lack of more recent information the 1991 Input-output table have been used. N.C. = not computable.

In order to obtain the total benefits it is necessary to sum domestic benefits and imported ones (named PE in par. 6.2), indicated in the last row of table 8. This represents the benefits that each country obtains through the increase of production realised in other EU countries (in the case of France this amount is 757 millions of euro). In other worlds this amount represents the benefits that each country imports from other EU countries when the latter increase their internal production due to EU expenditure.

Table 9 shows the final synthesis: the second column indicates the domestic benefits of each country, in the next column we find the imported benefits and in the last column the total benefits for each country (obtained adding up the second and the third columns, named *B* in par.6.1)

It is important to stress that the total amount of the estimated benefits is bigger than the EU expenditure (approximately + 80 %). This is due to the fact that the methodology considers not only the first productive cycle but also all subsequent iterations until exhaustion of the initial demand shock (EU expenditure).

Table 9. **Total benefits induced by the EU expenditure (Mio EUR)**

Countries	Domestic Benefits	Benefits imported from the other countries	Total Benefits
Belgium	3 144	412	3 556
Denmark	2 359	89	2 448
Germany	17 123	795	17 918
Greece(*)	7 848	72	7 920
Spain	22 855	423	23 278
France(*)	19 651	757	20 409
Ireland(*)	4 911	85	4 996
Italy	14 064	480	14 544
Luxembourg	N.C	24	N.C
Netherlands	2 948	397	3 345
Austria	2 022	140	2 162
Portugal(*)	6 450	215	6 665
Finland	1 942	59	2 001
Sweden	1 671	126	1 797
United Kingdom	11 443	578	12 021
TOTAL	118 431	4 654	123 084

Table 10 provides for each Member State two sets of balances which have been calculated according to the budgetary flows (VAT-GNI resources paid less Operating expenditure received - column c) and to the induced demand method (VAT-GNI resources paid less Total benefits - column d). This Table (see also Figure 2) shows unsurprisingly very different results which can be summarised as follows:

a. Countries appearing as "net" contributors according to the budgetary flows (for

example Belgium, Denmark, Germany, France, Italy, Austria, United Kingdom) are in fact "net" beneficiaries when taking into account the induced demand. The cases of Germany and France are interesting for opposite reasons. In the case of Germany the positive balance when evaluating the induced demand seems quite limited in comparison with other countries, also taking into account the input of EU operating expenditure received (see Table 4). France provides a good example to this respect. This country records the fourth *negative* balance according to the budgetary flows, but at the same time the second *positive* balance according to the induced demand. In all likelihood, a consequence of the high share of agricultural spending of the European budget.

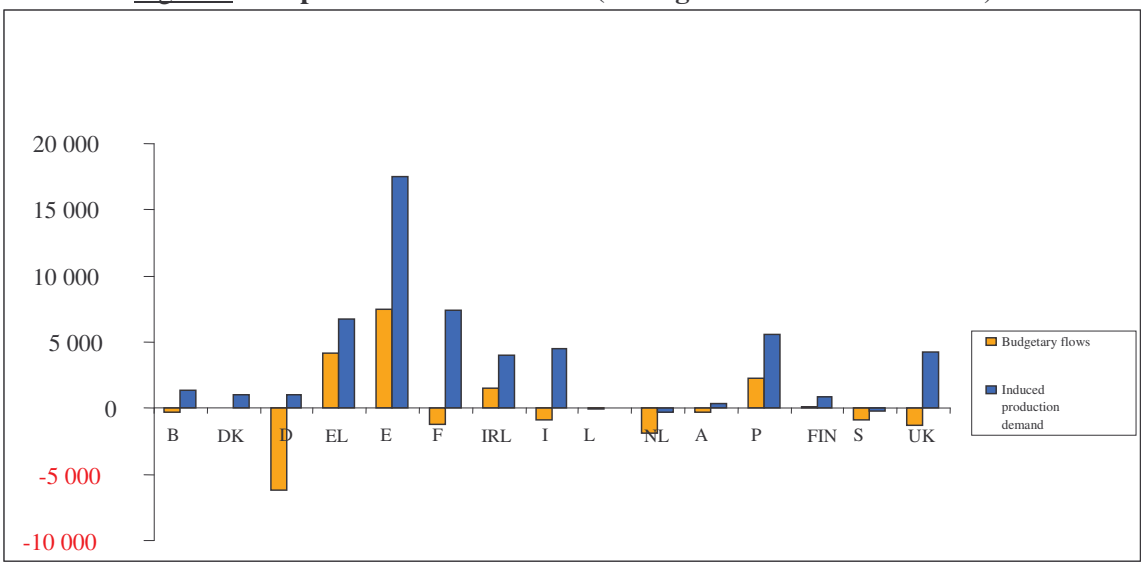
b. *Mutatis mutandis* the same happens with countries like Spain, which are traditionally "net" beneficiaries. The value of the "real" net balance for Spain is more than two times higher than its "budgetary" balance.

c. The Netherlands and Sweden remain "net" contributors in the two scenarios, although the *deficit* according to the induced demand is rather limited compared to the budgetary flows.

Table 10 **VAT-GNI resources and net balances (average 2000-2002)**
(Mio EUR)

Member States	VAT-GNI contributions paid	Net Balance	
		Budgetary flows	Induced demand
a	*b*	*c*	*d*
Belgium	2 192	-299	1 364
Denmark	1 454	-4	994
Germany	16 873	-6 216	1 045
Greece	1 172	4 149	6 747
Spain	5 727	7 504	17 552
France	13 010	-1 237	7 398
Ireland	953	1 531	4 043
Italy	10 047	-894	4 497
Luxembourg	190	-77	N.C.
Netherlands	3 676	-1 874	-331
Austria	1 781	-345	381
Portugal	1 092	2 253	5 574
Finland	1 111	75	889
Sweden	2 025	-863	-228
United Kingdom	7 801	-1 270	4 221

Figure 2 **Comparison of net balances (average 2000-2002 -** Mio EUR)



7. Concluding remarks

The results of this study should be considered in a context where one of the main aims of the European Budget is to re-distribute resources among Member States so as to fund a more harmonised development of the different economies. It is therefore quite normal that more prosperous Member States should be "net" contributors, although the relative size of their "balance" is ultimately a matter of political choice and acceptance. It seems however established that when evaluating the benefits accruing from European expenditure the analysis of the budgetary flows constitutes a very limited, and in a way misleading, instrument. As the evaluation of these benefits constitutes for the Member States a precondition of fundamental political decisions (first of all, the amount of the resources of the European Budget), a proper analysis would require estimating the increase in domestic output generated by EU expenditure together with the side effects generated in other countries.

Beside the possibility to properly estimate benefits accruing from EU expenditure the proposed methodology has several advantages. In contrast to a method based on budgetary flows the proposed methodology :

1. Takes explicitly into account the interrelations among the different productive activities on the basis of an input-output model;
2. Quantifies the increase of production as a result of EU expenditure and makes therefore possible to estimate the quantitative and geographical effects of an eventually different sectorial allocation of the EU expenditure ;
3. Highlights the fact that if the level of the additional production induced is

greater than the EU expenditure, this same level depends on the economic structure of each country;

4. Stresses the importance of intra-community commercial flows in order to estimate the benefits accruing to country X from EU expenditure in country Y.

The results of this study apply to the EU-15. The recent accession of 10 new Member States is not taken into account. We can assume that this accession will have a positive impact on the economies of the "old" Member States[34] and is therefore likely to influence the allocation of benefits shown in Table 9. However, the increase of the European budget's size following the enlargement has been rather limited. This excludes in principle substantial differences in the near future within the geographical allocation of the benefits accruing from EU expenditure.

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[34] For instance the impact of the Enlargement for Denmark, Germany, Italy and Austria has been examined in studies carried out for the European Commission (see http://europa.eu.int/comm/budget/financing/enlargement_en.htm)

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Annex 1 Algorithms to calculate the input-output coefficients

In this section we present the algorithms used to calculate the input-output coefficients on the basis of which we estimate the benefits caused by the EU contributions.

Equation [1], showed in section 6.1, can be written as

$$tC.j + pm\ Vaj = Zj \qquad (A.1)$$

Equation A.1 states that the total production Z (henceforth named P) of a generic sector of economic activity j is equal to the values of inputs purchased from other sectors C, plus value added in that sector. In section 6 we demonstrate that the inputs can be disaggregated in: domestic (CI), intra EU (CUE) and extra EU (CEU).

Using the input-output model we can calculate the matrix of direct use of domestic inputs pa. The generic i row of this matrix is given by: CIi1/P1, CIi2/P2, ..., CIin/Pn. In the same manner we can construct the matrix of direct use of imported input ma. The generic i row of this matrix is given by: (CUEi1+ CEUi1)/P1, (CUEi2+ CEUi2)/P2, ..., (CUEin+ CEUin)/Pn. It is easy to demonstrate that we can split ma in two matrixes: imports from EU (maCUE) and extra EU (maCEU).

Multiplying the matrix of direct use of domestic inputs (pa) by the vector of domestic production flows (P), we obtain the vector of production used as intermediate inputs.

If we furthermore define D as the vector of the final use of the domestic production (household's consumption + public consumption + gross fixed capital formation + exports), we can write the following equation:

$$pa\ P + D = P \qquad (A.2)$$

We can write another equation referred to the import flows:

$$ma\ P + mD = mP, \qquad (A.3)$$

in which the vectors mD e mP represent the imports addressed to final use and the total import respectively. The equation A.3 can be decomposed in:

$$maCUE\ P + mD = mPCUE \qquad (A.3a)$$

for the imports coming from EU, and

$$maCEU\ P + mD = mPCEU \qquad (A.3b)$$

for the other imports.

One of the basic assumption of the input-output model is that if we know the level and the disaggregation by product of the domestic demand it is possible to quantify the output and the imported input that we need to satisfy such demand. In order to settle this issue we can write the equation A.2 as:

$$(I - pa)\ P = D \qquad (A.4)$$

The matrix (I - pa) is often called the Leontiev matrix. To find the general solution we need an operation corresponding to matrix inversion of (I - pa). The result of this

operation is the reciprocal or inverse matrix $pA=(I-pa)^{-1}$. Then the solution of (A.4) is:

$$P = pA\ D \qquad (A.5)$$

Equation (A.5) states a link between the level of demand and domestic production flows. Therefore, using A.5 we can quantify the level of domestic production that we need to satisfy an increase in the demand level. If we assume that this increase is equal to the EU expenditure, then we can quantify the corresponding benefits measured in terms of increase in production.

We can use a similar procedure for the flows of imports. We can rearrange the equation (A.3) as

$$mP - mD = mA\ D \qquad [A.6]$$

where

$$mA = ma\ pA$$

Assuming that D is equal to the EU expenditure then it is possible to quantify the amount of imports included in the domestic production stimulated by EU expenditure. To this end we have in particular to estimate only the intra EU flows of imports, on the basis of the decomposition showed in A.3a and A.3b. We can write A.6 as

$$mPCUE - mD = mA\ CUE\ D \qquad [A.6a]$$

In the section 6 we defined the global benefits (*B*) by the equality *B=PI+PE*; where *PI* and *PE* represent the amount of domestic and foreign production due to the EU expenditure. Using the equations A.5 and A.6a, such benefits can be written as

$$B = pA\ D + mA\ CUE\ D \qquad [A.7]$$

where, as we stated in section 6, *PI* = pA D is the domestic benefit while *PE* = mA CUE D is the foreign component and must be attributed to other countries.

We can do a further decomposition of the domestic and foreign benefits in "direct" and "indirect". To this end we rearrange A.7 as:

$$B = (I-pa)^{-1}\ D + ma\ CUE\ (I-pa)^{-1}\ D$$

Using the Mac Laurin formulas we can then define "direct" benefits as:

$$D + pa\ D + ma\ CUE\ D \qquad [A.7a]$$

and "indirect" benefits as

$$pA\ D - (D + pa\ D) + ma\ CUE\ pa\ D + ma\ CUE\ pa^2\ D + . \qquad [A.7b]$$