THE COMPOSITION OF PUBLIC SPENDING IN EUROPE AND LONG-TERM GROWTH

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Introduction

In March 2000, as part of the Lisbon Agenda, the European Council outlined a broad set of economic policy measures designed to help raise the potential growth rate of the European Union. The contribution that public finances can make to the attainment of this strategic objective is twofold. First, the achievement of balanced budgets and improvements in the sustainability of public finances promote long-term economic growth, by helping to maintain a stable macroeconomic environment, which facilitates expectations formation and decision making by private agents. Second, for a given level of public surplus or deficit, factors such as the composition of revenues and expenses, efficiency in the use of public resources and even the specific size of general government may affect long-term growth, to the extent that they help improve the allocation of resources in the economy.

This second channel through which fiscal policy may affect economic growth is the subject of this article. More specifically, budget headings such as infrastructure investment and spending on education, health and research and development tend, a priori, to increase the productive potential of the economy. Also, the greater the efficiency of government activity (i.e. the smaller the volume of resources needed to achieve the target level of provision of goods and services), the higher the contribution of fiscal policy to long-term growth will be.

The rest of the article is organised as follows: the second section outlines the main features of the theoretical framework within which fiscal policy may affect long-term growth and discusses the difficulties involved in its empirical validation. The third section explains the main channels through which public spending may influence long-term growth from a macroeconomic viewpoint. The fourth section considers the role of the institutional environment in which the spending decisions of fiscal authorities are made and, finally, the conclusions are set out in the last section.

The theoretical framework and its limitations for empirical validation

At the theoretical level, the assumptions underlying the different models of economic growth are crucial in determining whether the composition and size of public finances can affect the long-term rate of expansion of an economy. In neoclassical type models, the long-term growth rate of output is constant and depends on population growth and the growth rate of technical progress, both exogenous factors. Accordingly, fiscal policy has no impact on the long-term growth rate, although it may, through policies that raise saving and investment rates, affect both the long-term level of output and its growth rate during the transition thereto. This requirement for fiscal policy to be able to affect economic growth is not irrelevant, since convergence periods may be very long, typically lasting several decades.

In contrast, the analytical framework of so-called endogenous growth models does allow fiscal policy variables the possibility of affecting the economy's long-term growth rate. In these models, the growth rate of the economy also depends, apart from on the relevant variables in neoclassical models, on the capital stock, defined broadly to include both physical and human capital. Within this framework, productivity increases as a consequence of the accumulation of physical and human capital, as firms learn to use capital more efficiently or benefit from their own innovation or that of their competitors, but also as the skills of the labour force increase. As a result, endogenous growth models are a useful conceptual framework for analysing the chan-

nels identified in the introduction to this article through which public spending may influence an economy's potential growth rate.

The literature has identified as productive spending (in the sense that it has a positive impact on the productivity of private factors), investment in transport and communications infrastructure, R&D, education and health. Fiscal measures to promote private investment, business activity and the dissemination of technical know-how potentially have the same effect.

However, the empirical evidence is not capable of conclusively confirming these theoretical predictions. Contradictory results are often found in the literature, due to the different types of samples used, the shortness of the time series available, the difficulty in identifying productive expenditure and the econometric problems that arise in the estimation of growth equations.

Public spending and economic growth

The first difficulty for the analysis of the contribution of public spending to long-term economic growth is the identification, from a theoretical viewpoint, of the components that are productive, in the sense of giving rise to a more efficient allocation of resources than when provision is private.

In particular, the supply of pure public goods may be considered productive. These are goods consumed simultaneously by a large number of agents for which there is no price setting mechanism to enable provision through market mechanisms. These goods include spending on items such as the general functioning of the government, defence and internal security. Other spending programmes aim to correct market failures originating in the existence of externalities, which mean that market provision tends to be sub-optimal from a social viewpoint. This is the case of transport infrastructure, goods subject to increasing returns associated with network externalities (such as telecommunications and energy infrastructure, giving rise to public intervention in the form of direct provision or market regulation)[1] and public spending on R&D, education and even health care. All these goods constitute additional factors of production for the private sector, so that they have a positive impact on total factor productivity.

The level of spending as a percentage of GDP varies significantly across the EU-15 Member States, ranging in 2006 from 55.4% in Sweden to 34.1% in Ireland (left-hand panel of Chart 1). Public spending in these countries increased sharply after the oil price shocks of the 1970s, although after peaking in the mid-1990s it has tended to decline moderately (see right-hand panel of the same chart).

An important question that should be raised is to what extent such growth in public spending has been concomitant with an increase in the weight of productive spending. However, the classifications available for spending do not offer the ideally desired breakdown between that which may be considered productive and that which may not, hampering in practice the isolation of productive spending. In fact, there are two classifications: the economic one (which contains the major aggregates of the National Accounts for general government, in accordance with ESA 95) and the functional one (where the different categories reflect the different functions performed by general government).

The advantages of the economic classification are the greater length of the series and their more rapid availability. Moreover, it distinguishes between current and capital expenditure, so that the

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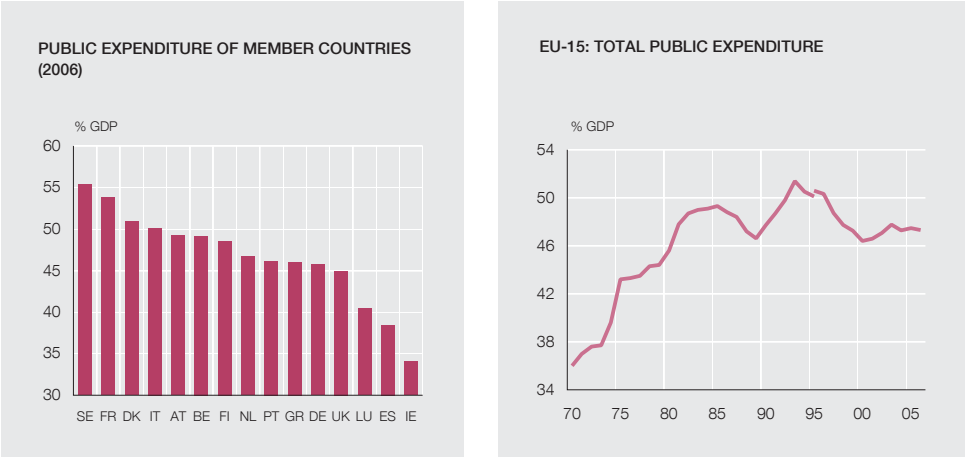
1. Admittedly, however, technical progress in recent decades has weakened the arguments for direct public provision of this type of goods.

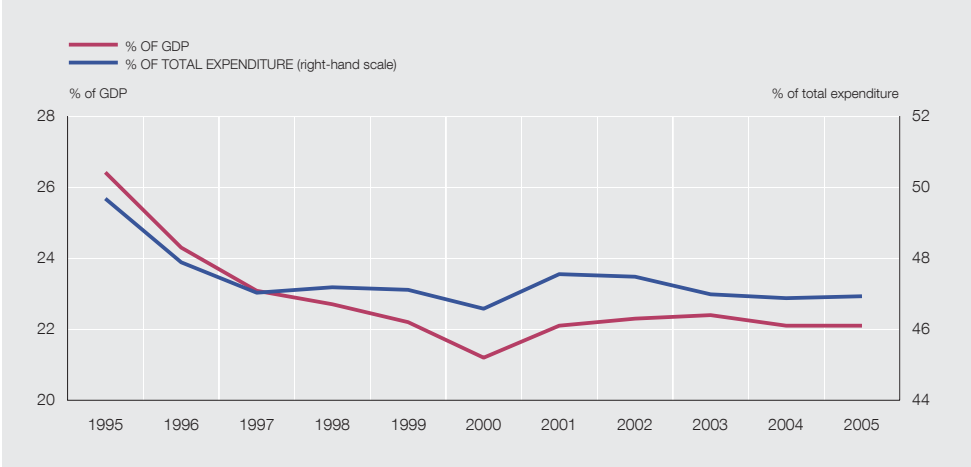
PUBLIC EXPENDITURE IN THE EU-15 CHART 1



SOURCE:European Commission.

a. There is a break in the series in 1995. Until 1995 the series was based on ESA 79 and excluded Luxembourg. Since 1995 it has been based on ESA 95 and Luxembourg is included.

EU-15: PRODUCTIVE PUBLIC EXPENDITURE INDICATOR CHART 2



SOURCE: Eurostat.

latter may approximate expenditure on infrastructure, there being no functional category that represents it on its own. However, the greatest disadvantage of the economic classification is the fact that it does not provide information on the types of goods and services supplied.

The functional classification is, a priori, better suited to distinguishing more growth-oriented expenditure. In particular, ten different categories are considered, among which the most notable (in terms of their importance in total spending) are social insurance, general public services (including, inter alia, expenditure on the functioning of government), health care, education and economic affairs (which includes public expenditure on infrastructure, along with sectoral subsidies). Against these advantages, this classification also has some shortcomings, in that the existing series are short (particularly for some countries), only available with significant delays and lack the sufficient degree of detail.

Chart 2 shows a measure of productive public expenditure, which comprises general public services, economic affairs, education and health care headings of the functional classification.

For the EU-15 as a whole, the level of productive spending, so defined, has remained virtually unchanged since 1998, both in relation to total expenditure and GDP. However, it should be taken into account that the composition of public spending in terms of resources employed may partly be the result of exogenous factors (such as demographic developments and the level of unemployment) and not of deliberate policies.

At the same time, the volume of funds assigned to each expenditure heading provides no information on the efficiency of public programmes in achieving their objectives. In this respect, the analysis of efficiency in the different headings of public expenditure is becoming increasingly important in European economic policy discussion fora and also in the literature. Hence, some recent studies have tried to construct efficiency indicators for various public spending items [see for example, Afonso et al. (2005)]. Unfortunately, the analytical tools available for this purpose are not sufficiently developed yet and suffer from numerous problems. The latter relate, firstly, to the measurement and definition of the "output" obtained for each expenditure heading, so that the efficiency of the "inputs" (i.e. the resources) used can be assessed and, secondly, to a failure to consider exogenous factors that may have a significant influence on the results.[2] In consequence, the cross-country comparisons in the literature must be interpreted with great caution. Also, these deficiencies warrant the call by the ECOFIN Council for improvement of the analytical tools that permit the efficiency of different public spending programmes to be appraised.

PUBLIC INVESTMENT SPENDING

A priori, this heading of the economic classification of public spending is part of the productive component and thus a source of economic growth, since the accumulation of public capital can be expected to boost private capital productivity [Aschauer (1989a)]. The effects of public investment on long-term output growth have been studied on many occasions. However, the empirical evidence available is not conclusive, as the results obtained are sensitive to the methodologies and data used. Firstly, there are studies whose purpose is to estimate the parameters of an aggregate production function in which public capital is one of the factors of production. The seminal study of this branch of the literature [Aschauer (1989b)] concluded that, in the case of the United States, a 1% increase in the stock of public capital leads to a 0.4 pp increase in the level of output, by helping to reduce production costs and thereby stimulating private investment.[3] However, the numerous subsequent studies conducted for other countries and time periods have generally found much smaller (or even non-significant) effects.[4]

Secondly, there are studies that have examined whether public investment (or some of its components) is capable of explaining the cross-country differences observed in the growth rates of per-capita output. The results of such studies tend to differ according to the dependent variable used. Thus, Barro (1991) and Easterly and Rebelo (1993) find non-significant effects of overall public investment on per-capita economic growth. However, in the second of these studies, the impact was significant when only public investment by the central government was considered (excluding that of public enterprises). As for the components of public investment, spending on transport and communications infrastructure and on telecommunications seems to have a positive impact on economic growth [see, for example, Easterly and Rebelo (1993), Calderón and Servén (2004) and Röller and Waverman (2001)].

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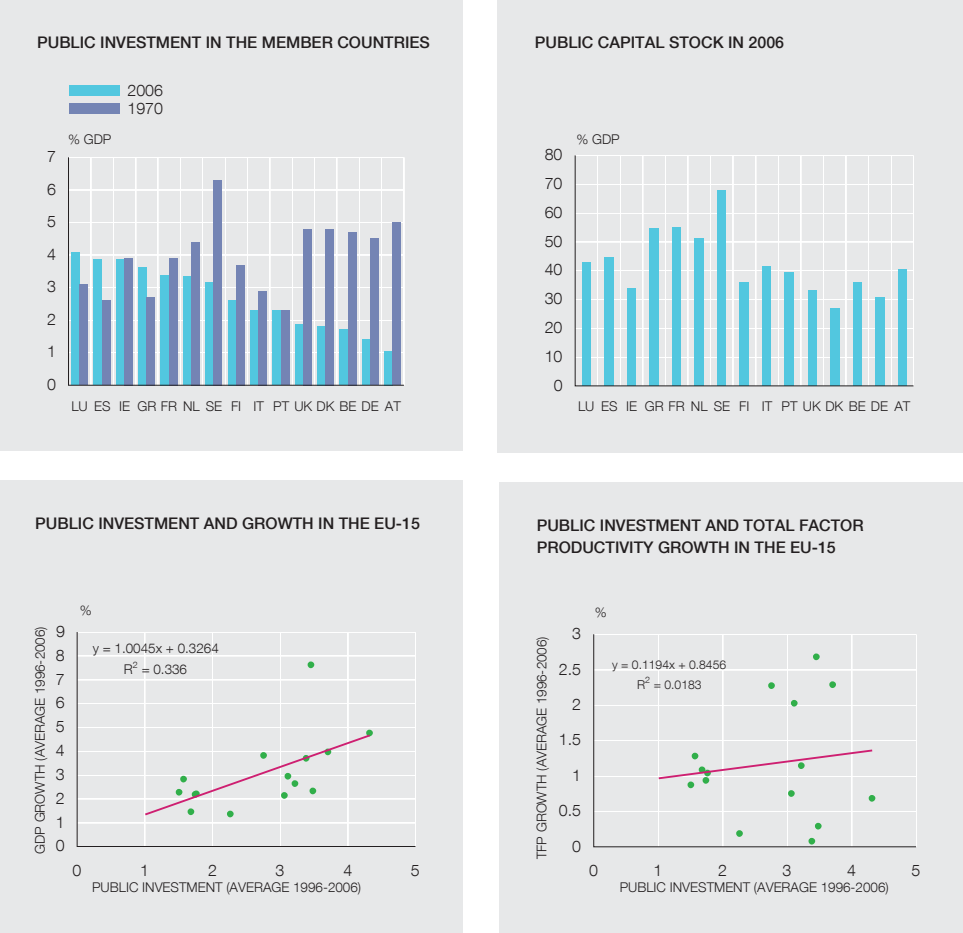
2. As an illustration of these problems, the efficiency index for health care expenditure calculated by Afonso et al (2005) is based on taking life expectancy and infant mortality as indicators of results. However, these variables also depend on factors exogenous to health care expenditure (such as climate and diet), whose efficiency it is sought to measure. **3.** On the basis of these results, Aschauer attributed the slowdown in productivity growth in the United States in the 1980s to the decline in public investment as a percentage of GDP. It should be noted, however, that although this variable continued to fall during the following decade, productivity growth rose significantly. **4.** For example, Ford and Porret (1991), in a sample of 11 OECD countries, only find effects for three of them.

PUBLIC INVESTMENT AND GDP GROWTH IN THE EU-15 CHART 3



SOURCES: European Commission and Banco de España.

Thirdly, studies that use private firms' cost or profit functions usually find that public capital reduces the former or increases the latter, although the effects are small. In this respect, Lynde and Richmond (1993) and Morrison and Schwartz (1996) find that public investment in infrastructure reduces firms' costs.

Finally, studies that, instead of being based on economic theory, rely on VAR methodology usually find a positive relationship too, although they are frequently not capable of determining the direction of causality. That is the case, inter alia, of Clarida (1993) and of Sturm *et al*. (1999).

The difficulty in finding a positive impact on economic growth for public investment may arise for various reasons. In particular, a significant part of the expenditure under this heading is not justified on the basis of a more efficient allocation of resources, but of other economic policy objectives, which weakens the link between public investment as a whole and output growth. This is the reason why several of the aforementioned studies focus on spending on transport infrastructure or on telecommunications, rather than on public investment as a whole. However, the scarcity of disaggregated data for these specific headings often means that estimations must be based on total public investment, so that components are included whose relationship with economic growth is more tenuous.

In the EU-15, public investment spending fell from 4.1% of GDP at the beginning of the 1960s to 2.5% in 2006 (see Chart 3). This decline was seen in most of the EU-15 countries,

Spain being one of the few exceptions (Chart 3). Thus, as far as the EU-15 is concerned, there appears to have been a sharp slowdown in public capital accumulation which, notwithstanding the non-conclusive evidence in this respect, might entail negative consequences for long-term growth. It has been suggested that the decline is a consequence of public investment being a natural candidate for fiscal consolidation. Unlike other budget headings, it is a discretionary component of spending which can be reduced, without being subject to inertia or resistance from the groups affected by cuts in other headings. However, other factors may also have contributed to the decline, such as the widespread privatisation programmes, the declining need for public infrastructure as the degree of development of European countries has increased and the emergence of new forms of financing (such as public-private partnerships), which enable investment projects to be undertaken without any immediate impact on general government accounts. That said, it is not clear that higher levels of public investment occur in countries with greater infrastructure needs. Indeed, the upper right-hand panel of Chart 3 shows that, in many cases, the highest levels of investment are seen precisely in those countries with larger public capital endowments.[5]

The significant positive correlation between public investment and output growth for the EU-15 countries on average during the period 1996-2005 (lower left-hand panel of Chart 3) seems to be in line with the hypothesis that additions to the stock of public capital may have a positive impact on economic growth. However, the relationship between public investment and average growth in total factor productivity (TFP) is not significant. Apart from the inclusion in public investment of spending that is not capable of affecting private-sector productivity, as discussed above, this result may arise for a number of reasons. First, total factor productivity is not measured for the private sector only (as it should be) but for the economy as a whole. In addition, the estimators of this regression may be biased, owing to the likely endogeneity of the regressors and the possible omission of relevant variables in the analysis. Finally, the possible effects of public investment on TFP may depend upon the efficiency of spending under this heading.

SPENDING ON EDUCATION

This heading of the functional classification of spending, by contributing to the accumulation of human capital and so boosting labour and capital productivity, is one of the driving forces for output expansion in endogenous growth models. Public provision of education is warranted by the presence of market failures that would lead to sub-optimal provision of this good by the private sector. When deciding how much to invest in education, individuals only consider their private return. Moreover, when provision is exclusively private, individuals may not invest sufficiently in their education, even if they have the incentive to do so, if they lack the necessary resources (i.e. they do not have enough of their own and are unable to make up the shortfall on credit markets).

The empirical evidence regarding the impact of public spending on education on growth does not appear to leave much room for doubt. Among others, de la Fuente and Doménech (2000) and Bassanini and Scarpetta (2001) find significant positive effects. Chart 4 shows notable differences in public spending under this heading as a percentage of GDP across the EU-15 countries. While the Nordic countries allocate more than 6% of GDP to this heading, Luxembourg, Greece, Spain, Germany and Italy allocate no more than 4%. Also, apart from certain exceptions, the countries with the highest level of public spending on education tend to be those that allocate a larger volume of resources per pupil.

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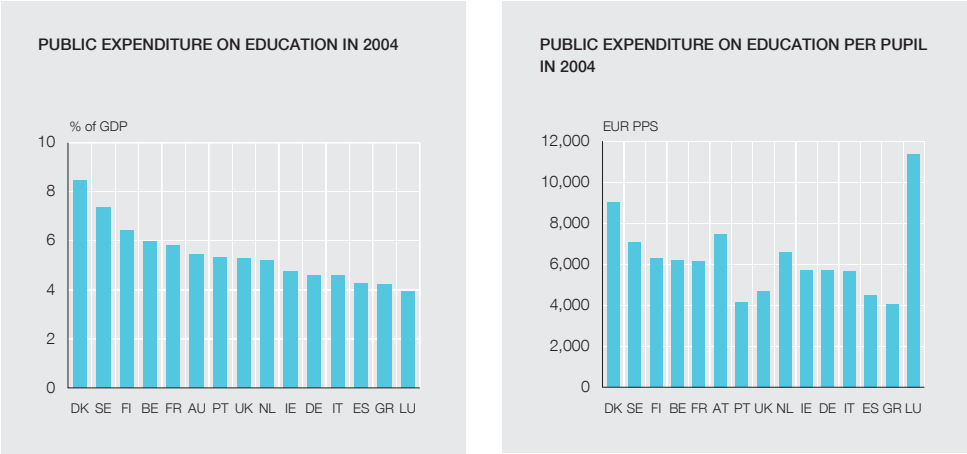
5. In any case, given the difficulties associated with the construction of measures of public capital endowment, the lack of any observed correlation between this variable and public investment should be interpreted with caution.

PUBLIC EXPENDITURE ON EDUCATION CHART 4



SOURCE: Eurostat.

SPENDING ON R&D

Investment in R&D is a fundamental determinant of innovation and technological change which, in theoretical models, is an engine of endogenous growth. The rationale for public intervention is, once again, the fact that the social return arising from this heading exceeds that obtained by firms that perform these activities, so that provision would be sub-optimal if left solely to private initiative. In this case, the externality arises from the fact that the authors of the innovation are unable to fully appropriate the benefits of their research activity.

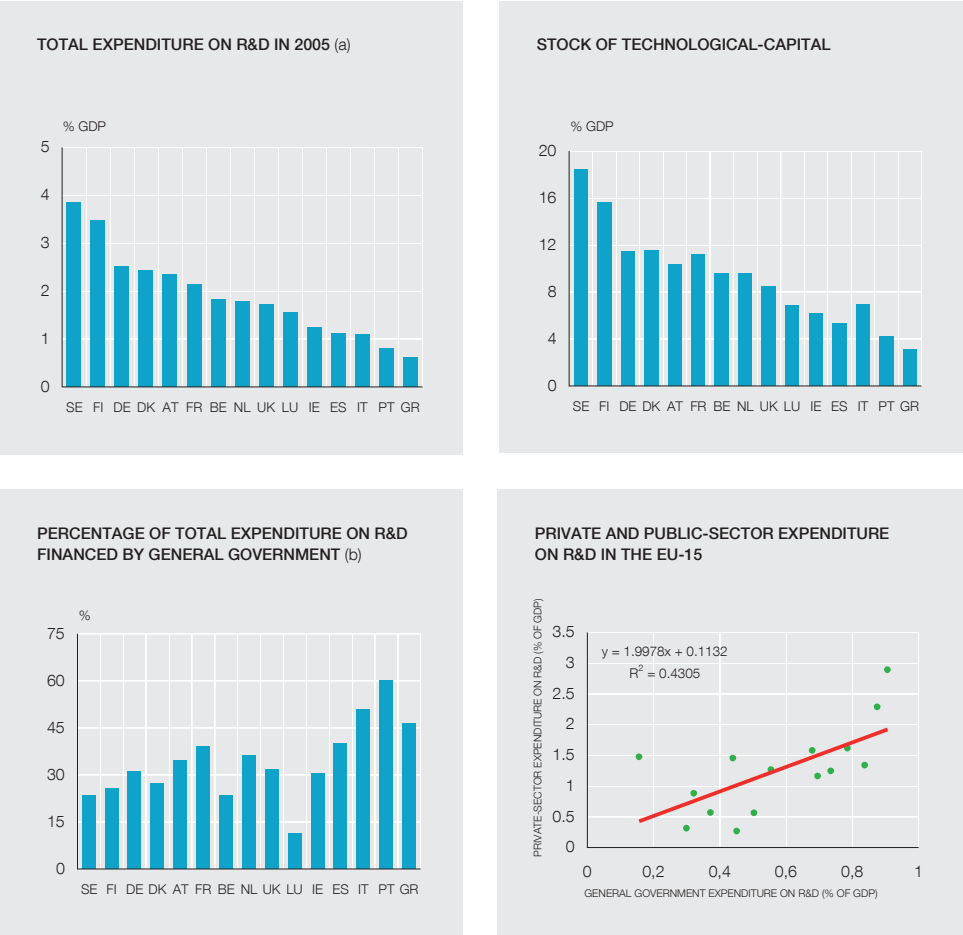
However, net positive effects would only arise from public spending on R&D if it were complementary to and more efficiently executed than private spending. With regard to the first of these two issues, the empirical evidence is not conclusive. The results of Park (1995) and Diamond (1999) support the complementarity hypothesis, while Wallsten (2000) and Bassanini *et al*. (2001) find that public spending on R&D crowds out private spending on this activity.

Public spending on R&D as a percentage of GDP varies significantly across the EU-15 countries (Chart 5). While the Nordic countries record the highest levels, the Mediterranean countries are at the bottom of the EU-15 table. This situation is all the more notable insofar as it is precisely these latter countries that have the lowest levels of technological capital. Chart 5 also shows notable differences across EU-15 countries as to the percentage of R&D spending financed by general government. The data show a significant positive correlation between the R&D expenditure financed by the private sector and that financed by the public sector, which would appear to point to possible complementarity between these two types of spending, more than to a crowding out of the private component by the public one. However, a more precise assessment of the nature of this relationship would require a more detailed study of the specific policies applied.

SPENDING ON HEALTH CARE

The influence on growth of this item of the functional classification of spending is manifest in its contribution to the increase in the economy's human capital, as it has a positive impact on labour productivity (by improving the quality of current workers) and enhances the use of this factor (by prolonging the duration of working lives). In the case of the OECD countries, empirical studies have been carried out with conflicting results. While Bleaney et al (2001) confirm the positive effect of health care spending on growth, for Rivera and Currais (1999) it would be precisely the increase in per capita income that would have prompted the increase in the demand for public health care spending.

GENERAL GOVERNMENT EXPENDITURE ON R&D CHART 5



SOURCES: Eurostat and Banco de España.

a. Data for Italy, the Netherlands and the UK refer to 2004.
b. Average 1996-2006

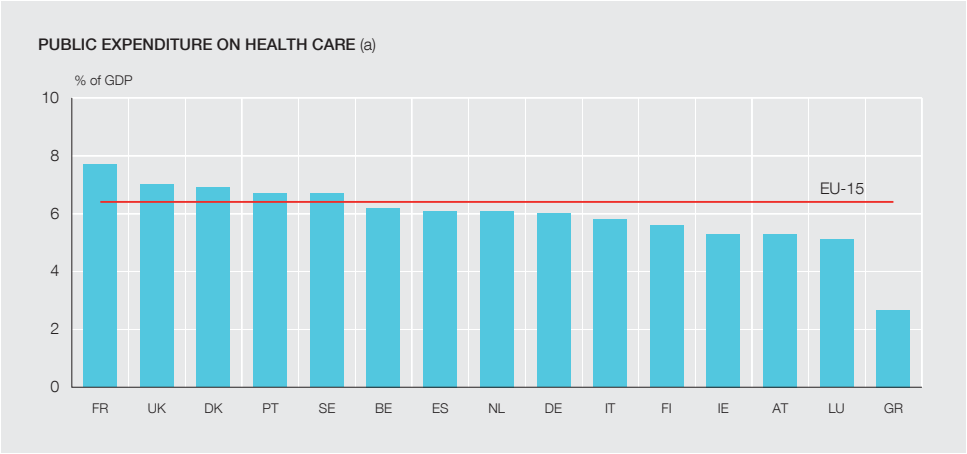
Chart 6 shows a relatively moderate dispersion of health care spending in Europe, with most countries coming within the range of 5-7% of GDP and Spain situated slightly below average. Efficiency improvements in this item are especially important in view of the strong upward pressure that population ageing will exert on this type of spending.

The institutional environment

The endogenous growth model framework described in the second section of this article allows productive public spending to affect the economy's long-term growth rate through its positive impact on the productivity of private factors. The third section highlights the importance of public spending efficiency, in the sense of targets being achieved at the lowest possible cost, given that the taxes necessary to finance spending by their very nature distort the decisions of economic agents and are therefore damaging to economic growth.

This section considers the elements of the institutional framework underlying public activity that enhance spending programme productivity. From a general perspective, sustained long-term growth in an economy requires the existence of an overall regulatory framework that reduces the degree of uncertainty underlying private agents' decisions. Public finances may contribute to the proper functioning of that institutional framework by providing sufficient resources for general government in areas such as justice and security. In addition, the guaranteeing of property rights is a prerequisite for public spending to boost private productivity growth.

PUBLIC EXPENDITURE ON HEALTH CARE CHART 6



SOURCES: Economic Policy Committee and OECD.

a. Expenditure in 2004 except in the case of Greece, the United States and Japan, whose data are for 2003.

More specifically, the budgetary institutions that favour better control of spending and a reallocation of available resources towards their most productive uses are a crucial determinant of the efficacy of government actions. In turn, the instruments that contribute to spending efficiency encompass performance budgeting, cost benefit analysis and medium-term budgetary strategies. Performance budgeting aims to relate the spending employed to achieve an economic policy goal with the specific benefits achieved as a consequence of government intervention. In practice, this assumes that budgets specify what each department expects to do with the resources assigned and, sometimes, link the amount of the appropriation to the degree of fulfilment of the objectives set the previous year. In general, the experience in other countries in the use of these techniques has failed to fulfil the expectations created, for various reasons, including the difficulty of defining variables that properly measure the results and the possibility that the latter are affected by exogenous factors beyond the authorities' control.

Cost-benefit analysis aims to assess all the social costs and benefits entailed by a specific project (for example, the construction of a specific piece of infrastructure), in order to determine the advisability of carrying it out. In practice, the greatest obstacle to this analysis is the difficulty of measuring these costs and benefits in the absence of market prices, given that the goods and services resulting from government intervention are not provided by private initiative.

Medium-term spending strategies, which complement performance budgeting and cost-benefit analysis, seek to set ceilings over a number of years to the resources allocated to the various headings of the public finances. The logic underlying the extension of budget planning horizons is twofold. First, it helps to reassign the total volume of spending between the various programmes more efficiently. Second, it enables future costs associated with current spending programmes to be factored in. In addition, these strategies are useful to facilitate expenditure-oriented fiscal consolidation.[6] The application of these strategies has also encountered difficulties in practice. In particular, macroeconomic forecasting errors may make it necessary to review the pre-set spending paths. Furthermore, the effectiveness of multi-year planning has in practice been weakened by the existence of spending areas that remain outside it, such as

6. In this respect, the empirical evidence suggests that budget adjustment based on spending retrenchment has a more favourable impact on economic growth than that based on rises in distortionary taxes.

agencies that are not consolidated within general government, and by recourse to tax expenditure [Joumard et al (2004)].

Conclusions

The analysis of the possible contribution of the composition of public spending to the long-term growth of the European economies has received increasing attention in the economic policy debate in recent years. This is a consequence of the efforts to increase potential output growth within the framework of the Lisbon strategy and the tighter budget constraint of European fiscal policies as a result of the provisions of the SGP and the effects on public finances of population ageing.

From the viewpoint of economic theory, endogenous growth models provide an appropriate conceptual framework for understanding the channels through which fiscal policy (and, in particular, public spending) may affect an economy's long-term growth. Thus, economic theory has provided theoretical arguments for the existence of a positive relationship between long-term economic growth and certain expenditure items. In particular, the existence of a number of market failures suggests that the resources allocated to public investment and to spending on R&D have a positive impact on the accumulation and productivity of physical capital, while spending on education and on health care contributes to increasing human capital and labour productivity. However, empirical confirmation of these theoretical propositions and their translation into more precise economic policy recommendations have encountered notable difficulties, partly attributable to the problems involved in isolating productive spending. While these links tend to be confirmed by the empirical evidence relating to transport and telecommunications infrastructure and education, the evidence is less conclusive in relation to the R&D (owing to the possibility that public spending partially crowds out private spending) and health care headings.

Finally, apart from the volume of public funds allocated to the different spending programmes, it is essential that such allocation be carried out on the basis of efficiency criteria. In this respect, the implementation of budgetary techniques conducive to the fulfilment of general government objectives at the lowest possible cost, such as performance budgeting, cost-benefit analysis and medium-term spending objectives seems advisable. The analytical tools available to measure spending efficiency are not sufficiently developed yet, partly due to the difficulties arising from the absence of reference market prices. Improvement at both the macro and microeconomic levels of the indicators necessary to calculate efficiency indices should therefore be a primary objective. Meanwhile, the conclusions that may be reached on the basis of the information available, which must obviously be treated with a high degree of caution, suggest that the progress made in this area has been only moderately satisfactory.

14.5.2008.

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